

# **CAUSAL ATTRIBUTION OF WUKRO SECONDARY SCHOOL STUDENTS TO MATHEMATICS ACHIEVEMENT**

**By:  
Jemal Osman**



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**Department of Psychology  
College of Education  
Addis Ababa University**

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## **Abstract**

*This study examines the causal attribution of students in Wukro Secondary School regarding success and failure to mathematics achievement. Based on the students' sex and grade level, causal attribution scales were administered to a sample of 393 students (197 males and 196 females).*

*Data about subjects were collected through questionnaire and students' score were secured from the school record office and achievement tests were given for all grades. T-test and ANOVA were used as the main methods of analysis.*

*The result of t-test indicated that males attributed their success to internal sources but females to external sources. In failure situations, both males and females attributed outcomes to themselves. A significance difference was not obtained among the grades in attributing their outcomes to internal and external sources.*

*Some recommendation are forwarded for possible intervention and further study.*

# CHAPTER I

## Introduction

### *1.1 Background of the Study*

Ethiopia has been making a new paradigm shift from rote memorization of learning to constructive way of teaching, which focuses to cultivate students to solve their problems. And for this end, the methods and contents of school subjects are highly integrated (TESO, 2003).

In order to produce a problem solver citizen the subject mathematics plays significant role in students' academic achievement. Most people associate problem solving with mathematics than with other school subjects. Mathematics has a wide application in natural and social sciences. Adleke (1998) pointed out that mathematical techniques are consistently being developed to meet changing requirements of physics, chemistry, biology, and behavioral sciences, engineering, and computer science. Similarly, Setidisho (1961) as cited in Adelke (1998) indicated that no other subject form a strong binding force among other branches of science as mathematics.

Different studies disclosed that mathematics is truly the critical filter that keeps females as well as some males from many desirable professions and vocations (Fennema, 1980). The failure of many females to take mathematics courses beyond the minimum requirements has been labeled "Math's Avoidance" (Tobias, 1978). This label conveys the affective or motivational aspects of the differential enrolment problem.

To overcome this problem, it is indispensable differentiating pupils attributions for success and failure to mathematics achievement.

The basic assumption of attribution theory is that people are 'rational beings' and want to understand why a certain behavior or act occurs (Cliffort, 1981; and Weiner, 1979 & 1983).

Researchers engaged in this area (Bar-Tal and Darom, 1979; Marray & Mednick, 1975) as cited in Tamirie (1995) have also seen the role of sex, grade, socio-economic status etc on attributions. Among these different independent variables sex and grade are the ones that were investigated in this study.

The role of sex as a factor in attribution is a controversial one in contemporary literature, a controversy that is truer of college students. Studies such as Deaux and Farris (1977) as cited in Tamirie (1995) reported that males are different from females in their attribution characteristics, while studies like Bierhoff-Alferman and Bierhoff (1982) have come up with an opposite finding. Many of the studies revealing attribution difference on the basis of Sex state that male, more than female attribute their success to internal and stable factors, and their failure to external and unstable factors.

Taking the above points in view, questions like "is mathematics really difficult from other subjects?" "Do students know and expose the causes for success and failure of their mathematics achievement?" "Do males and females have differe? in causal attribution to mathematics achievement?" initiated this writer to look into this problem.

## **1.2 Statement of the Problem**

A number of educationalists and psychologists (Weiner, et al., 1971; 1970; Darge, 1988; Tamirie, 1995 & 1997, Yalew, 1998; Tiruwork, 2004; and Demelash, 2005) have dealt with various aspects of attribution to identify causes of achievement and the effects of attribution on the teaching learning process. Most of the researchers tried to identify when

and why students select certain categories of attribution dimension considering the role of sex in determining differences among male and female students.

Boys' and girls' emotional reactions to success and failure may be different. Weiner (1986) has shown that some emotional responses to achievement outcomes are linked to particular attributions. For example, pride and shame are associated with perceptions of internal causes (e.g., effort or stability) and not with perceptions of external causes (e.g., luck, another's help or interference, task difficulty). If girls were more likely than boys to attribute success to external causes and to attribute failure to internal causes, then they would be expected to feel less pride in their success and more shame in response to failure Eccles, (1983).

These causes, as perceived by individual students are important in the development of their self-concept self-worth and future competency Kelley and Micheal as quoted in Tamir (1995) noted that:

*"Attribution research shows that attribution affect our feelings about past events and our expectations about future ones, our attitudes toward other persons and our reactions to their behavior and our conceptions of ourselves and our efforts to improve fortunes" (P. 14).*

The attribution causes have multidimensional in the development of individual's intra and inter-personal skills to create ways to tackle future obstacles and perception towards others. This multidimensional phase of attribution is important for the attainment of Ethiopian education objectives, which seeks to attain a problem solver citizen.

Attribution to mathematics achievement of boys and girls were studied by different scholars found that female students were not attributed mathematics success to their high ability and failure to their low ability Stipek (1991). Studies have singled out mathematics as major causes for students' failure in school. Aiken, (1970).

The summative evaluation conducted by Institute of Curriculum Development and Research (ICDR, 2001) as cited in Adamu (2004) indicated that the first cycle primary school pupil's achievement in mathematics was the least compared to other subjects. This supports the statement of Aiken (1970), which pointed out that the cause of more school failure, is in mathematics than any other subject.

Concerning attribution more or less some studies are conducted in Ethiopia with some how different settings. For example a study conducted by Tamir (1995) based on Addis Ababa University students concluded that males were attributed their success to internal causes, such as one's own self-confidence, self-worth, optimistic expectation to their future performance and motivational orientation to learn, on the other hand females attributed their success to external factors such as difficulty level of the course and difficulty level of the examination in higher degree than males, but not to mean all females.

It can be concluded that past research indicated attribution of success and failure in relation to overall academic achievement in different settings Locus of causality (Internal and External), Stability (Stable and unstable) and controllability (Controllable and Uncontrollable). But does this conclusion also hold true in mathematics achievement? Hence, to answer this question the study attempts to focus on students' mathematics achievement. Mathematics is a compulsory, but most students do not attend mathematics classes whole-heartedly. In this regard Seleshi (2001) wrote that had there been any chance of exemption from mathematics courses in Ethiopian high schools, most would apply for it and the majority of the latter could have been girls.

Based on the above points studying students' mathematics achievement will be indispensable. This study aims to address the following research questions.

- i. To what (internal/external) causes do students attribute their success in mathematics achievement?
- ii. To what (internal/ external) causes do students attribute their failure in mathematics achievement?
- iii. Do males and females differ in their attributions to their mathematics achievement?
- iv. Do students vary in their attribution of success and failure to mathematics achievement across grades?

### **1.3 Objective of the study**

The general objective of the present study is to investigate causal attribution to mathematics achievement. The specific objectives of the study are:

- ❖ To assess internal/external causes that students attribute for success in mathematics achievement.
- ❖ To explore internal/external causes that students attribute for failure in mathematics achievement.
- ❖ To check whether or not there is significant difference in students' attribution to mathematics achievement on the basis of sex.
- ❖ To find out the relationship between mathematics achievement and causal attributions across grades.

### **1.4 Significance of the Study**

This study shall provide some idea to educators on how to modify their teaching strategies to favorably influence causal attributions. In particular, teachers may be able to improve students' performance and work habits by changing their negative attributions that could reduce students' anxiety to learn mathematics.

Besides, the authorities at the various levels of educational administration responsible to implement policies and create conducive educational environment for students benefit from the study.

### ***1.5 Delimitation of the Study***

The study will focus on attributions of students in mathematics achievement, based on Wukro Secondary school 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup> grade students.

### ***1.6 Definition of Important Terms***

**Attribution** The explanation or reasons students give for their success or failure at mathematics

**External:** The cause is something out side one-self, which reflects an aspect of the situation of other person.

**Failure:** Stands for student's unhappiness or dissatisfaction with what they score in mathematics examinations they take.

**Internal:** The cause is something inside oneself, something that reflects an aspect of oneself.

**Mathematics Achievement:** Students' performance in mathematical tasks.

**Success:** refers to students' happiness or satisfaction with that they score in a given mathematics examination.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

#### *2.1 Overview on the Nature of Attribution Theory*

Attribution is defined by Bar-Tal (1978) as "the inference that an observer makes about the causes of behavior-either his own or another person's" (P. 59). Heider, as cited in Lindgren and Harvey (1981) stated "attribution is the central point in our understanding of others and ourselves" (P.151).

In recent years, one of the most active areas of social psychological research has been the investigation of how individuals in everyday life "figure out" what causes behavior. Attribution theory is a term given to various theories concerned with the problems of investigating causal perception (e.g., Jones, Kanouse, Kelley, Nisbett, Valins, & Weiner, 1972).

Attribution theory (Heider, 1958; Kelley, 1972; Weiner, 1979) has greatly influenced research and practice in clinical, occupational, and educational settings. According to this theory, individuals seek to understand why certain events occur, especially when outcomes are disappointing or unanticipated. These causal beliefs, in turn, can have important effects on motivation and achievement (Harvey, Yarkin, Lightner, & Town, 1980; Sweeney, Anderson, & Bailey, 1986; Wong & Weiner, 1981 as all cited in Vispoel and Austin, 1995). A recent electronic search of the psyc., LIT database suggests that, in the past 5 years alone, authors of nearly 2,000 published articles and reports drew on some facet of attribution theory (i.e., the word root attribution appearing in the title or text) in attempting to examine motivation-related affect behavior, or cognition.

Attribution response is influenced by a number of factors, including task outcome, attribution category, and achievement domain. Success and failure (outcome) neither elicit the same attributions, nor are attributions endorsed equally under both success and failure conditions. The typical pattern, referred to as the self-serving effect/bias (Marsh, Miller & Ross; Mullen & Riordan, Rejeski & Brawley, Zukckerman as all cited in Vispoel and Austin, 1995), in which participants take more personal responsibility for success than for failure (e.g., attributing success to ability and effort while attributing failure to task difficulty). This phenomenon has been observed consistently in both situational and dispositional studies, but there is continued debate as to whether the source of the effect is or is not a conscious, deliberate distortion of perceptions to protect one's self-image or present a more positive public image versus unintentional perceptual distortions.

A second factor influencing attribution response is the type and number of attributions under consideration. Most situational studies are limited to four attributions (ability, effort, task difficulty, luck) and many dispositional studies to three (ability, effort, general external factor). True attributional beliefs, however, may be misrepresented when pertinent attributions are omitted and participants are forced to endorse less relevant ones (Rejeski & Brawley, 1983) as cited in Vipoel and Austin (1995), Weiner (1983) has stressed that the traditional attributions (ability, effort, task difficulty, and luck) may be more relevant in some achievement domains than others. In athletic and artistic endeavors, for example, participants regularly cite nontraditional attributions such as interest, role of others, and strategy use in addition to the traditional ones (Asmus, Frieze & Snyder, Mullen & Riordan, Rejeski & Brawley, Roberts & Pacuzzi, cited in vispoel and Austin 1995).

## **2.2. Attribution Process and The Causes of Behavior**

The causes to which individuals attribute their performance have been linked to achievement-related behavior (Bar-Tal, 1978). Actual performance, affective reactions to success and failure, and the subjective probability of future success and failure have all been associated with particular attribution patterns. According to attribution theory, personal explanations of causality (attributions) fall into one of the four categories: ability, effort, task difficulty, or luck (Weiner, 1974). These four categories are derived from two factors, each of which has two levels-locus of causation (internal/external) and degree of stability (stable/unstable).

The importance of causal attribution theory to achievement lies in its demonstrated relationship to expectancy of success (Weiner, 1974). If an outcome is attributed to a stable factor, the same outcome will be expected in the future. If, however, the outcome is attributed to an unstable factor and there is sufficient doubt as to whether a prior success will be repeated, behavior directed toward the achievement of that outcome is not likely to Persist (Weiner, 1974).

The attribution of success to unstable external factors and of failure to internal or stable ones has also been linked to a pattern of behavior called "learned helplessness". Learned helplessness describes the condition in which failure is viewed as inevitable and insurmountable. This condition, results in lowered motivation to persist, females and more likely than males to display learned helplessness (Dweck, Davidson, Nelson, & Enna, 1978).

Attribution is considered to be a three-stage process. First, the behavior of an individual must be observed. Second, the perceiver must

determine that the behavior they have observed is deliberate. That is, the person being observed is believed to have behaved intentionally. Finally, the observer attributes the observed behavior to either internal or external causes. Internal causes are attributed to the person being observed, while external causes are attributed to outside factors. The two internal attributions one can make are that a person's ability or a person's effort determined the outcome. Task difficulty and luck are the external causes of behavior. When perceiving behavior, an observer will make a judgment as to which of these factors is the cause of behavior. However, when making a determination between internal and external causes of behavior, the perceiver must examine the elements of consistency, distinctiveness, and consensus.

### **2.3 Classification of Attribution Theory**

Recent findings have led to shifts in focus both attribution theory and research, with a greater emphasis being placed on the dimensions of causal elements. The new emphasis was reflected in the following statements by Weiner (1979: 5-6).

*In as much as the list of conceivable causes of success and failure is finite, it is essential to create a classification scheme or taxonomy of causes. In so doing, similarities and differences are delineated and the underlying properties of the causes are identified. This is indispensable requirement for the construction of an attribution theory of motivation.*

Studies have identified three causal dimensions of success and failure (Weiner, 1979; 1985; 1990; 1992). Two of these dimensions are particularly important: locus of causality, this reflects whether the cause is something about the person, who has succeeded or failed versus something external to the person; while stability, refers to whether the cause is under the control of the person or other people.

Attribution researchers further, Falbo, Frieze, Winer et al, (Quoted in Bar-Tal, 1978: 260) reveal that the four causal elements (ability, effort, task difficulty, and luck) can be classified into two dimensions: locus of causality and stability. Ability and effort are considered internal because they originate from within the person, whereas task difficulty and luck originate from outside the person and are, therefore, considered external causes, in terms of stability, ability and task difficulty are considered as stable because they do not vary if the same task is reattempted, but effort and luck are considered highly unstable because they fluctuate overtime.

Other investigations, however, disagree with the original assumption of Weiner, Freize; et al (cited in Bar-Tal 1978: 260) that state individuals tend to use four causes for explaining their academic outcomes. For example, Bar-Tal and Darmon (1979) have pointed out that the original causal elements of Weiner for explaining achievement successes and failures may be too limiting. Hence, in their study, Bar-tal and Darom identified eight causal elements for pupil's success and failure. Similarly, Bar-Tal and Guttman (1981) compared teachers', pupils' and parents' causal attributions of pupils' academic achievement and identified ten causal elements of success and failure. Moreover, in his research work, Marsh (1984) argues that a single internal or external score cannot adequately summarize attributions. According to this researcher, factor analysis of self-attribution responses provide little or no support for the dimensions typically hypothesized in attribution research. Russell (1982) suggests that the placement of causal dimensions may vary greatly from person to person as well as from situation to situation depending on the context. Therefore, the meaning of commonsense causal ascription cannot always be inferred from the original taxonomy. Effort, for example, can be perceived as stable or unstable (Elig and Frieze, 1979; Weiner, 1979). Depending on the

context, luck can be either internal or external (Meyer, 1980; Weiner, Nierenberg, and Goldstein, 1976) and task difficulty can be either stable or unstable (Meyer, 1980; Valle and Freize, 1976).

According to Meyer's (1980) multivariate investigation of dimensionality formation and consequences in casual attributions of success and failure, there was no evidence to suggest that subjects distinguished between caused on the basis of stable versus unstable dimension. Meyer, further, reported that factor-analysis results showed that difficulty of examination loaded into unstable rather than stable direction, the loading for luck, rather than being negative, external direction was near zero, and mood loaded in the controllable direction rather than uncontrollable direction. These unexpected findings are consistent with suggestions of Weiner (1979); Weiner, Russell and Lerman (1979) which suggest that the nature of the individual causal element is open to subjective interpretation and may vary from person to person and situation.

#### ***2.4 Educational Implication of Attribution Theory***

Application of Attribution theory which, has direct relevance to education, was taken by Weiner and his associates (Weiner, Frieze, Kukla, Reed, Rest and Rosenbaum, 1971; cited in Bar-Tal, 1978:259). Weiner et al., attempted to analyze individual's achievement-related behavior as determined by individuals' causal perception of successes and failures. Further, Weiner et al. suggested that individuals evaluate their achievements as success or failure and that causal ascription pertaining the perceived success or failure mediate between antecedents of attributions and achievement-related behavior.

According to Kelly's study (1982:13), attribution ideas have been used to solve a number of practical problems. Among these:

1. **In education** - the effect of attribution on self-esteem and persistence after failure.
2. **In sport psychology** - the explanations athletes give for winning or losing and the effects of these explanations on group motivation.
3. **In clinical and counseling psychology**- attribution interpretations have been made for the problems clients bring to the clinic and for the intervention procedures used in their treatment.
4. **In interpersonal relations**- the attributions made and communicated for important interpersonal events such as in marital conflict and separation.

Frosyth and McMillan (1981) reported that attributions about failure become important because they provide means through which students can insulate them from the negative implication of the performance or take full advantage of examination information that may have a positive impact. Further, Folkes, Wong and Weiner (cited in Graham, 1986:40) summarized that we are more likely to ask why following failure rather than success and response to unexpected as opposed to anticipated outcomes. Therefore, causal search is functional because it may impose order on sometimes-uncertain environment.

Weiner's achievement motivation theory (1979) found that the causal attribution and the ensuing failure feedback on a test were expected to influence perceived control and achievement in a subsequent performance. Supporting this idea Perry and Magnusson (1989), in their investigation of causal attributions and perceived performance in different instructional conditions, confirmed that students who accurately perceived their performance as failure, lack of effort (internal, unstable) attribution should in hence personal responsibility for there

failure and increase striving for success. A test difficulty (external, stable) attribution should reduce personal responsibility and offer less possibility of changing failure to success.

Moreover, emphasizing the importance and implication of attribution theory in educational setting, researchers have argued that students' attribution for their academic outcomes influences their self-concept, well-being, and social-adjustment (Ames, 1978; Weiner, 1990). Further, attribution explanations indicate student's difference in their belief about the causes of their success or failure, which have implication in achievement behavior (Bar-Tal, 1978).

Weiner's approach to classroom motivation and experience (Weiner, 1979; 1990) reports the importance of causal attribution in explaining the consequence of academic failure and success. According to this perspective, achievement striving, affective reaction, and expectations concerning future outcomes are determined, in part, by students' attribution conclusion. Similarly, Macmahon's study (cited in Davis and Stephan, 1980:237) suggests that people utilize knowledge of their outcomes to make causal attribution into subsequent expectations and decision-making.

### ***2.5 Pupils' Attribution of Success and Failure***

Weiner, Frieze, Kukla, Reed, Rest and Rosenbaum (1971) proposed that an individual's beliefs concerning causes of success and failure mediate between the perception of an achievement task and the final performance. They suggested that individuals tend to view the causes of their success and failures as being principally due to their ability, effort, the task difficulty, and luck and that it is possible to classify these cases along two dimensions: locus of control and stability. These two dimensions have been found to be important in understanding both the

affective reactions to success or failure and the changes in perceived probability for future outcome (Weiner 1974).

A number of studies have investigated patterns of attributions following success and failure (e.g. Nicholls 1975). The results of these studies indicated that individuals attempt to maintain positive self-esteem by taking responsibility for positive outcomes and externalizing negative ones.

Students' motivation is influenced not only by performance expectations but also by the explanations students give for their own performances. When one does well on a test, how does one explain successful performance to him? When one performs poorly, how does one explain it to oneself? When people succeed or fail, they explain their success or failure to themselves in various ways (McCormick & Christine, 1997).

Students frequently explain outcomes by referring to effort, ability, task factors, or luck, and each of these attributions has different motivational consequences (Weiner, 1979). If students make effort attributions, then they believe success is due to their high ability and failure to their low ability. If they make attributions to task factors, they believe success occurred because the task was easy and failure resulted from unreasonable demands of the task. Finally, if they make attributions to luck, they believe success reflects their good luck and failure their bad luck. The effort attribution is most likely to promote behaviors leading to future success.

If one believes that successes and failures are due to effort, then the person believes that fate is personally controllable. One can decide to try hard and be successful or to be idle and experience failure. The other explanatory possibilities such as ability, task difficulty and luck are all

out of one's control (cited in McCormick & Christine, 1997). They are due to your genetic endowment, the teacher's task selection, or the whimsical nature of supernatural forces. Those who believe they can control their destinies are likely to be more motivated to exert effort to pursue goals than those who believe their achievement are out of their control (Bandura, 1982; Decharms and Carpenter 1968).

To sum up students are highly affected not only by achievement expectation, but also by the explanation they give for their achievement outcomes. Based upon what they believe that success or failure is obtained due to effort, their fate is personally controllable. However, the other explanatory possibilities related to ability, task difficulty and luck lead to conclude that all are out of their control.

## **2.6 Attribution and Student Expectation**

An immense observation related to expectation indicated that students have developed different styles of explanations for their scholastic achievement. The dimensions students select to express their feeling on achievement will mostly be affected by the level of expectation they hold. These and other factors play significant role in arousing interest for success to be obtained from exercising academic motivation. For instance, elementary school children's expectations suggest that most of them have high expectations for success. When asked how they do on a task, most elementary school children assume that they will do very well (Clifford, 1975 & 1978; Flavell & Hoyt 1970; Stipek & Hoffman, 1980). Pressley and Ghatala (cited in McCormick & Christine, 1997) noted that they started their study by asking first and second grades to predict how many answers they would get right on a 30 item multiple choice vocabulary test. Nearly all of the children predicted that they would have all or almost all of the correct answers.

The optimism of young children is robust. Even after they fail to do as well as they expect, most children in the very early elementary school years continue to believe they do well (Clifford, 1975 & 1978; Stipek & Hoffman, 1980).

Past experience significantly affect the kinds of causal attribution given for success or failure (Heider & Weiner, Iso-Ahola, Roberts, Spink, cited in Cox, 1989). That is, if the outcome is inconsistent with past experience, attribution tends to be unstable. If the outcome is consistent with past experience, attribution tends to be stable.

Generally, students' expectation and attribution concerning their achievement depends upon the level of comprehension gained from past experiences. In a similar situation, children usually think that they are capable of achieving high scores, even if they failed in present work. In addition, the relationship of expectation and attribution in athletic contests suggests the way how the perception of the athlete is influenced by their past history.

So, expectations of outcomes play a central role in the selection process of the cause of attribution. However, research findings adjusted that children consider themselves as capable even after they fail to do as well as they expected. Most children in the very early elementary school years continue to believe they do well. But, the kind of attribution used in early age will gradually be converted into a new style enriched with

experiences accumulated when age increases. From this, we can understand that experience affects the selection of causality and the dominance of expectation in the selection of causal dimension.

## **2.7 Teachers and Utilization of Attribution Theory**

Research supports the value of teacher judgments as indicators of school environment. Barko and Cadwell (1982) reported that teacher judgments of pupil attributes are particularly important issues because so many decisions about pupils are based on teachers' perceptions of the pupils' performance.

Different authors quoted in Bar-Tal and Darom (1981, 233) found conflicting results regarding teachers' perception of pupils' performances. For example, Johnson, Feigenbaum, Weiby (1964), Beckman (1970), and Brandt, Haiden, and Brophy (1975) reported that pupils' performances might lead teachers to somewhat biased causal perceptions of the pupils' success and failure. On the other hand, Beckman (1973), Ross, Bierbrauer and Polly (1974), and Ames (1978) did not find any bias in teacher's causal perceptions.

However, according to John Marron, who has done much on Weiner's attribution theory, stated that Weiner's attribution theory and how teachers react to the students' attributions are key components of motivation in today's classroom. His theory identifies why students react in different ways based on their achievements and expectations. The attribution theory gives us a psychological guide to what internally motivates students to become motivated or to remain unmotivated in the classroom. (Marron, 2000).

Weiner has proposed a three-dimension taxonomy for classifying all attributions. The locus of causality dimension stresses the location of

a cause as internal or external to the individual. Stability of causality refers to whether or not the cause changes over a period of time. The final classification is the responsibility of the students toward the cause and whether or not the student can control the cause. (Albert & Luzzo, 1999).

There is a possibility of eight different combinations of these three different classifications (e.g. the cause could be internal stable and controllable, internal stable and uncontrollable). It is important for a teacher to recognize these different combinations, and the teacher must react to each combination accordingly.

Appropriate reactions from a teacher will encourage students and motivate them to continue their work. An inappropriate response or indifference from a teacher will have a detrimental effect on students' work ethics.

According to Ziegler and Helley (2000), high school girls in mathematics and physics classes showed significant improvement after teachers gave appropriate feedback to students following an assignment. Students were praised for good work, received some admonishment as well as some support for average assignments, and scolded for below average work. The study showed an overall improvement in all students' work after getting feedback from the teacher. This suggests students attempt to attribute their success and failures to a stimulus, and appropriate response if teachers will motivate them to do better.

It is important for teachers to understand the eight different combinations, which can be attained under Weiner's attribution theory.

Teachers must recognize these combinations as a doctor must be able to diagnose specific diseases. In this manner, a teacher must use the proper feedback to achieve a higher level of motivation, as a doctor must prescribe the right treatment to treat the disease or ailment.

A student is likely to attempt to detect where they fell short after a failure. "Failure leads to a more analytical perspective, which leads to an increase in attributions. In addition, affective reactions are stronger after failure than after success and can be regulated by attribution activity. The basic law of effect relates to a motivational after failure that is, avoiding and coping with future negative events." (Möller & Köller, 1999).

The toughest of the eight combinations for a teacher to deal with is when a student fails and attributes their failure to internal stable conditions that are out of their control. If students feel they have failed because of a lack of ability they will have to be convinced they are competent to do their assignments. A teacher must take extra steps to make sure this student continues to be included so he or she does not withdraw completely.

Most reasons for failing on assignment can be categorized into one of the eight classifications previously mentioned. Teachers must take every situation and analyze the cause for what happened, and then must apply an appropriate motivational strategy to get the desired effect. A teacher's ability to diagnose these situations can make them a valuable asset. Inability to identify these problems can negate an over-abundance of knowledge that a teacher may have. If a student is not motivated to learn, he/she will not learn no matter how intelligent the teacher is.

To sum up, for teachers to be effective, they must motivate their students to learn the material. Even a teacher who knows everything

about his subject area cannot teach an indifferent and unmotivated student. The student has to want to learn. It is imperative for teachers to understand Weiner's attribution theory and correctly apply solutions based on their knowledge. Teachers have to have an acute understanding of the attribution theory to be effective teachers.

## **2.8 Causal Attribution and Mathematics Achievement**

### **2.8.1 Pupils Mathematics Achievement**

Knowledge of mathematics is essential for all members of our society. To participate fully in our democratic processes and to be unrestricted in career choice and advancement, people must be able to understand and apply mathematical ideas. Unfortunately, certain groups are underrepresented in mathematics courses and do not achieve up to their potential. Black students, female students, and students of low socioeconomic status (SES) are among these groups (Reyes and Stanic, 1988).

Learning mathematics is a cognitive endeavor. Yet, in mathematics, as in other cognitive fields, affect can play an important role in students' decisions about how much mathematics they will need in the future and how they approach the mathematical content they do study. In the educational and psychological literature the affective domain is characterized in a variety of ways. Here, affective refers to students' feeling about mathematics, aspects of the classroom or about themselves as learners of mathematics (Reyes, 1984).

Researchers agree that students' attitudes towards the importance of mathematics and one's ability to do mathematics are important attributes of success in mathematics. Students who do not believe they are capable of doing well in mathematics often do not succeed and do not go on to take higher-level mathematics courses. Because advanced

mathematics is often viewed as a "gateway" to high-paying Careers, females' attitudes towards mathematics can lock them out of careers in science, law, medicine, and data processing. This hurts everyone. Our society needs people who are highly trained and capable of performing in the high tech workplace. While the males in science-related careers far out number the females, there is a real shortage of both females and males in the science today!

### **2.8.2. Sex Difference in Mathematics Performance**

The widespread belief that males outperform females in mathematics is apparently a myth. A recent meta-analysis (Hyde, Fennema, & Lamon, 1990) shows that do tend to do better on mathematics tests that involve problem solving, at least by the time they reach high school. Girls, however, do better in computation, and there is no gender difference in understanding concepts. Further, girls tend to earn better grades in mathematics than boys (Kimball, 1989).

Although gender differences in mathematics achievement are most evident during secondary and post secondary education, they may develop much earlier (kahle and Lakes, 1983; Steinkamp and Maehr, 1984). For middle school students, gender difference in performance and course work are minimal, but strong differences exist in attitudes and perceptions of the usefulness of mathematics (Lockheed, Thorpe, Brooksgunn, Gasserly, and McAloan 1985; Oakes, 1990).

Some researchers (e.g. Steinkamp and Maehr, 1984) suggested that gender differences emerge partly as a result of the new learning environment that students face when they enter middle school. At this level students are exposed to a greater number of male teachers and to a more competitive and unstructured learning environment that may

undermine girl's self-esteem and confidence in their academic abilities. Therefore, this new learning environment could contribute to subsequent inequalities in male and female students' performance and participation in mathematics during high school, when students can choose advanced mathematics course as electives.

### **2.8.3 Sex Differences in Causal Attribution of Performance in Mathematics**

A number of affective factors have been studied in relation to math avoidance (Fennema & Sherman, 1978). Females, as compared to males, have been found to be less confident about their ability to learn mathematics, to underestimate their ability to solve mathematical problems and to believe to a lesser degree that mathematics will be personally useful (Crandall, Katkovsky & Crandall, 1965; Fennema & Sherman, 1978; Hilton & Berglund, 1974). These attitudinal variables may interact with yet another factor-the attribution of causation-to produce the "Math avoidance" Syndrome.

The Principles of attribution theory and learned helplessness can be applied to the problem of math avoidance-the lack of persistence in mathematics-related activities. It appears reasonable to hypothesize that if a student attributes successful performance in mathematics to ability, the likelihood of persisting in mathematics is higher than if that success were attributed to an unstable cause such as effort or luck. Conversely, when a failure is attributed to ability, lowered persistence will result. The differential in male-female enrollment in mathematics the lack of persistence among females-might be partially explained if it can be demonstrated that females are more likely than males to attribute successful performance to unstable or external causes and unsuccessful performance to stable or internal ones.

In general, males, more than females, expect success and subsequently ascribe their success to their skill or ability and their failure to unstable factors (Deaux, 1976). Females, though, have a lower set of expectations for success. Thus success is often inconsistent with expectations and will be attributed to unstable factors. Failure, being more consistent with females' expectations, will receive the stable attributions of causality-ability and task difficulty (Deaux, 1976).

Sex-related differences in attribution are even more pronounced if the task or performance being investigated is sex-typed as masculine. On masculine [- typed tasks, the general expectation is that males will be more successful than females (Deaux, 1976). This finding is particularly relevant to the problem of math avoidance in females since mathematics is considered by many to be male area or domain (Ernest, 1976; Fennema, 1977; Stein, 1969; Casserly, 1975) According to this prevalent stereotype, males are expected to be more competent than females in mathematics. And according to attribution theory, performance consistent with expectations will be attributed to stable factors. Thus males will attribute success in mathematics to ability or ease of task, and females will attribute success to unstable courses. Analogous reversal would occur under failure.

According to Wolleat et, al, (1980) females, when compared to males, exhibit more of the learned helplessness pattern in their attribution of success and failure in mathematics. They more strongly than males, use effort (unstable), to explain their success and less strongly than males point, to ability (stable) to explain their success. When explaining math failure, females invoke more strongly than do males the attributions of ability and task difficulty (both stable). These results support the theory of causal attribution, particularly in those cases in which the domain of interest is sex-typed as masculine.

Apparently, attributions of causality in a content-specific, school subject matter area follow the same general patterns as those observed in more global field settings and in laboratory task situations.

In addition Wolleat et al. suggested that even when their performance on a mathematics achievement test is similar, male and female report different strengths of the causes of their performance. This finding is important because it highlights the separate contributions of sex and Achievement to attribution patterns. On the one hand, if males simply perform better than females, then attribution patterns, rather than reflecting affective or motivational dispositions, may be reflecting realistic assessments of ability.

A comparison of the male and female indicates that in response to success events, the male success-Ability scores are higher than those of females at all levels of Achievement. In response to Failure events, the females' attribution to lack of ability is higher than males' at every level of Achievement- the difference increasing slightly at the higher levels. High Achievement apparently does not narrow the gap between males and females in their concept of the role of their ability in their successes and failures.

In addition the study suggests that at every Achievement level, females more strongly than males use effort to explain their success. Although the sexes are only slightly different at the lowest Achievement level, the difference grows as Achievement levels increase. Sex differences in attribution to Effort in response to Success events are most pronounced at the highest level of Achievement.

## CHAPTER III

### Method of The study

#### 3.1 Subjects

The target population of this study was wukro secondary preparatory school students with a total number of 4580. Of these, 1622 were grade 9 (885 males and 737 females), 2620 grade 10 (1917 males and 703 females), 747 grade 10+1 (355 males and 392 females), 491 grade 10+2 (393 males and 98 females). From the population of 4580, subjects were selected through stratified sampling technique based on sex and grade.

The total number of students who responded to the questionnaires presented for the purpose was 398 which represent 8.7% of the population size.

Interims of sex, 199 were males, which constituted 7.51% of the total male population and the remaining 199 were females which constituted 10.3% of the total female population. The 398 students have the following distribution interims of grade: grade 9 120, grade 10 130, grade 10+1 90, grade 10+2 58,

Out of the total 398 students who participated in filling out the questionnaire 393 were completed both parts of the questionnaire attribution of success and failure but 5 students (2 male and 3 female students) filled in only the attribution of success. Hence this reduced the sample to 393.

### **3.2 Instruments**

The instrument used for this study was adapted from causal attribution scale, which was developed by (Tamire, 1995). The instrument has two parts; the first part is on perceived causes of success, which were 18 in numbers. This part is intended to show the attribution of students who succeeded in mathematics and the second part is on perceived causes of failure, which were 20 in number. This part was intended to show the attribution of students who failed (not satisfied with their result) in mathematics. Students were required to rate each item on the Likert type scale (strongly disagree = 1, disagree = 2, slightly agree = 3, agree = 4, strongly agree = 5) following the instructions indicated in the first page of attached to the questionnaire. The reliability of the final attribution scale was 0.85, 0.81 for success and failure respectively.

### **3.3 Procedure**

First a mathematics achievement test was developed by three mathematics teachers (BSC holders) including the researcher. To maintain its content validity; item specification was prepared for each grade. Originally, 30 multiple choice item for each grade was developed by the teachers. Then 70 students from grade 9 to 10+2 (20 from grade 9, 20 from grade 10 and 15 from 10+1 and 15 from 10+2) were participated for pilot study purpose. The reliability of the tests was 0.78, 0.86, 0.87 and 0.74 for grade 9 to 10+2 respectively. Finally using item discrimination and difficulty index analysis the best 25 items were selected for each grade for final administration and the result is compared to student's first semester results (which was taken from the school record office) and Pearson Product-Moment coefficient was

calculated for each grade level. The correlation coefficients were 0.86, 0.89, 0.91 and 0.87 for grade 9 to 10+2 respectively.

Second the study employed "the causal attribution scale for academic successes and failure" developed by Tamire (1995), with a simple modification words in the items. Before conducting the pilot study, the scale was translated to the Tigrigna language by experts (three English measure and Tigrigna minor BA holder teachers). This was made to overcome any language problem of the subjects in understanding the items and the directions.

Furthermore, using 19 items for success and 22 for failures, which were selected for this study a pilot study, was conducting for 50 randomly selected from different grades, after chi-square was calculated, one item from success and two items from failure were discarded. Finally 18 for success and 20 for failures were selected. Hence the final instrument includes only 38 items (18 success and 20 failure attribution items).

In order to administer the final instrument 6 assistants (teachers from Wukro Secondary School) were selected and oriented on how to administer the instrument. The instrument was administered after pupils received their first semester mathematics results.

### **3.4 Data Analysis**

First, to investigate whether there was attribution bias among the four grade levels, the 38 (18 for success and 20 for failure) causal attribution items were combined in to four group: Internal stable causes, internal unstable causes, external stable causes, and external unstable causes based on Elig & Freiez's classification (cited in Darom and Bar-

Tal, 1981: 285) and Tamire's 1995) classification. Then multiple t-tests were computed to see the statistical difference of the four groups.

Second, analysis of variance with factorial design (2x2) was performed to test significant difference between pupils' sex and their mathematics outcome (success and failure). Also analysis of variance with factorial design (4x2) was performed to test significant difference among grade and outcome, and (4x2x2) was performed to test significant difference among outcome, grade, and gender. Further, a t-test was computed to find out whether there was a difference of causal perception of mathematics outcome between male and female pupils among the dimension of causality and stability. In general, significance levels of the different test results were carried out at  $\alpha = 0.05$ .

## CHAPTER IV

### Results

#### **4.1 The relationship between students first semester result and the achievement test result.**

Originally to investigate the consistence of pupils mathematics result, so that the researcher administered mathematics achievement test for all grade levels (9th to 10+2), and based on students first semester mathematics result and the achievement test result the Pearson product - Moment correlation and its coefficient of determination was calculated as follow and the result was presented in table. 1

**Table 1:** Correlation Coefficient and Coefficient of determination of each grade level

Grade	N	r	r <sup>2</sup>
9	120	0.86	74.0%
10	130	0.89	79.2%
10+1	90	0.91	82.8%
10+2	58	0.87	75.7%

Since these correlation coefficients were considered reasonably as large there were a good correlation among each grade levels between pupils' first semester mathematics result and the achievement test results given by the researcher.

Furthermore the values of coefficient of determination from Table 1 tells us the proportion of the total variation in scores on achievement test that we know as a function of information about students' first semester mathematics scores. Thus the researcher focused on the achievement test result only for analysis purpose.

## 4.2 Students Causal attributions of success in mathematics achievement

One of the purposes of this study was to investigate to what (internal /external) cause's students attribute their success in mathematics achievement. Thus, mean and standard deviations of internal and external causal attributions were presented by grade levels as follow.

**Table- 2:** Means and standard Deviations, of Attribution to success.

Attribution to success	Mean	Standare deviation	t
Internal Stable	3.09	1.24	7.90*
Internal Unstable	3.71	0.94	
External Stable	3.18	1.26	14.5*
External Unstable	2.03	0.94	

\* $t < 0.05$

Note: Attributions are expressed as means on a 1 - 5 scale with higher means indicating greater attributions

As depicted in Table-2, the mean attribution scores to mathematics achievement to internal unstable causes were ( $M = 3.71$ ), to external stable causes ( $M = 3.18$ ), to internal stable causes ( $M = 3.09$ ), and external unstable causes ( $M = 2.03$ ), for success statistically significant difference among the groupings was obtained between internal stable and internal unstable causes ( $t = 7.90$ ,  $P < 0.05$ ), between external stable and external unstable causes ( $t = 14.5$ ,  $P < 0.05$ ) between internal unstable and external stable causes ( $t = 25.16$ ,  $P < 0.05$ ) between internal

stable and external unstable causes ( $t = 13.63, p < 0.05$ ), between internal unstable and external stable causes ( $t = 6.62, p < 0.05$ ). This means there is a difference among students in explaining causal attributions for success. Most of the students related their success to internal unstable causes. But statistically significant difference was not obtained between internal stable and external stable causes ( $t = 1.01$ ).

#### 4.3 Students causal attributions of failure in mathematics achievement

**Table 3.** Means and Standard Deviations of Attributions to failure

Attribution to failure	Mean	Standare deviation	t
Internal Stable	2.64	1.32	12.5*
Internal Unstable	3.71	1.05	
External Stable	2.42	1.24	0.91
External Unstable	2.35	1.23	

\* $t < 0.05$

From table 3 above we can observe that students attributed their failure to internal unstable causes ( $M = 3.71$ ), to internal stable causes ( $M = 2.64$ ), to external stable causes ( $M = 2.42$ ), to external unstable causes ( $M = 2.35$ ). This result shows that most of the students attribute failure in mathematics achievement to internal unstable causes.

For failure statistically significant difference among the groupings was obtained. Between internal stable and internal unstable causes ( $t = 12.50$ ), between internal stable and external stable causes ( $t = 2.47$ ), between internal stable and external unstable causes ( $t = 3.26$ ), between internal unstable and external stable causes ( $t = 15.70$ ), and between internal unstable and external unstable causes ( $t = 16.69$ ). But statistically significant difference was not obtained between external stable and external unstable causes.

#### 4.4 Sex difference in Causal Attributions

To examine whether there is causal attribution difference (internal/external) of male and female pupils in their mathematics achievement, for their success and failure t-test analysis was performed and the result is summarized in table 4,

**Table- 4:** Means, standard Deviation, and t-values of internal-external causal Attributions of Male and Female students.

Causal Attribution	outcome	Male			Female			t
		N	Mean	SD	N	Mean	SD	
Internal	Success	197	3.89	0.92	196	2.70	1.13	11.44*
	Failure	197	2.88	1.33	196	2.76	1.35	0.89
External	Success	197	2.89	1.31	196	3.23	1.23	-2.65*
	Failure	197	2.41	1.22	196	2.39	1.26	0.16

\*  $t < 0.05$

Table 4 above shows t-test values of male and female pupils whether they internalize or externalize their attribution for success and failure. The result revealed that male and female pupils significantly differ in their causal attribution of success. As a result, males internalize their success more than females ( $t = 11.47, P < 0.05$ ) whereas females externalize their success than males ( $t = 2.65, P < 0.05$ ).

To test whether there is attribution difference of pupils of the same sex along the locus of causality, t - test was computed and the result is summarized in table 5

**Table - 5:** Means, Standard Deviations and t - values for internal - external causal Attributions of students with the same gender

Causal Attribution								
Gender	Internal				External			
	Outcome	N	M	SD	N	M	SD	t
Male	Success	197	3.89	0.92	197	2.89	1.31	8.80*
	Failure	197	2.88	1.33	197	2.41	1.22	3.63*
Female	Success	196	2.70	1.13	196	3.23	1.23	4.40*
	Failure	196	2.76	1.35	196	2.39	1.26	2.87*

\*  $t < 0.05$

As indicated in table 5, both males and females attributed their failure to internal factors ( $t = 3.63, P < 0.05$ , and  $t = 2.87, P < 0.05$  respectively) rather than external factors. But in the case of success males internalize their success and females externalize their success.

Furthermore, to test gender difference in classifying causal attributions in terms of the dimensions of stability (stable - unstable) t-test was performed and the results are summarized in Table- 6

**Table 6:** Means, Standard Deviations and t - values of stable unstable causal Attributions for male and female students.

Causal Attribution	Outcome	Male			Female			t
		N	M	SD	N	M	SD	
Stable	Success	197	3.39	1.23	196	2.90	1.22	3.96*
	Failure	197	2.53	1.26	196	2.46	1.28	0.57
Unstable	Success	197	3.40	1.26	196	3.18	1.06	1.87
	Failure	197	2.61	1.28	196	2.63	1.34	-0.13

t<0.05\*

As can be observed from the above Table 6, male and female students significantly differ ( $t = 3.96, P < 0.05$ ) in attributing their success to stable causes. But statistically significant sex difference was not obtained in attributing failure to stable causes and success and failure to unstable causes.

To examine whether there is attribution difference of male and female pupils in their mathematics achievement, analysis of variance (2x2) was performed and the result is summarized in table 7

**Table 7:** Summary of Analysis of variance for pupils' Gender and their mathematics Achievement (Success and Failure)

Source Variation	SS	DF	MS	F
B (gender)	3699.91	1	3699.91	68.39*
C (out come)	8740.00	1	8740.00	161.55*
BXC	2138.02	1	2138.02	39.52*
Residual	42309.19	782	54.10	
Total	56887.12	785		

\*P<0.05

As indicated in Table - 7, the effect of gender and the main effect of outcome (success and failure) and also the interaction of gender and outcome were statistically significant,  $F(0.05, 1,782) = 68.39$ ,  $F(0.05, 1,782) = 161.55$ , and  $F(0.05, 1,782) = 39.52$   $P < 0.05$ . That means male and female students were differing in attributing success and failure.

#### **4.5 Comparison of students Causal Attribution across r grade levels**

To investigate whether or not there is a significant difference in attributing their success and failure among each grade level, a t-test analysis is used. Thus, the obtained result is presented in table - 8

**Table-8:** Means and Standard Deviation, for success and failure, across each grade level.

<b>Outcome</b>						
<b>Grade</b>	<b>Success</b>			<b>Failure</b>		
	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>N</b>	<b>Mea n</b>	<b>SD</b>
9	118	3.10	1.25	118	2.60	1.29
10	127	3.22	1.26	127	2.56	1.34
10+1	90	3.21	1.26	90	2.43	1.26
10+2	58	3.22	1.16	58	2.47	1.16

Table - 8 shows no statistically significant difference in attributing both success and failure among each grade levels.

Furthermore to investigate whether or not there is causes of attribution difference (internal/external/ and also in terms the dimension of stability (stable unstable), across each grade level at Wukro secondary school t-test analysis is used. Thus, the obtained result is presented in table 9.

**Table -9:** Means and Standard Deviation across each grade level

Causal Attributions			Grade							
			9		10		10+1		10+2	
			M	SD	M	SD	M	SD	M	SD
INTERNAL	Stable	Success	3.00	1.24	3.08	1.27	3.22	1.23	3.11	1.14
		Failure	2.72	1.30	2.67	1.38	2.52	1.33	2.62	1.20
	Unstable	Success	3.56	1.03	3.81	0.98	3.77	0.89	3.70	0.87
		Failure	3.63	1.07	3.81	0.99	3.60	1.15	3.79	0.89
EXTERNAL	Stable	Success	3.14	1.28	3.23	1.24	3.14	1.30	3.25	1.20
		Failure	2.49	1.28	2.45	1.31	2.34	1.18	2.33	1.09
	Unstable	Success	2.04	0.91	1.98	0.97	1.93	0.84	2.24	1.02
		Failure	2.45	1.23	2.36	1.28	2.22	1.21	2.31	1.12

As we observed from table 9 pupils of grade 9 attributed their success to internal unstable causes (M=3.56), to external stable causes (M=3.14), to internal stable causes (M=3.00), and to external unstable causes (M=2.04). Whereas they attribute failure to internal unstable causes (M=3.63), to internal stable causes (M=2.72), to external stable causes (M=2.49), and to external unstable causes (M=2.45). For success, statistically significant difference among grade 10+1 and 10+2 was obtained in attributing to external unstable causes ( $t=2.00$ ,  $P<0.05$ ). But statistically significant difference was not obtained in success and failure among any other grade levels to any causes of attributions.

Furthermore to investigate whether or not significant sex difference in internal and external causal perception of success and failure at each grade level of Wukro secondary school students, t-test analysis is used and the result is presented in table 10.

**Table -10:** Sex difference, in internal and external, causal perception of success, at each grade level of Wukro Secondary School students.

Sex	Causal Attributions								
	Statistics	Grade 9		Grade10		Grade 10+1		Grade10+2	
		Int	Ext	Int	Ext	Int	Ext	Int	Ext
Male	N	59	59	64	64	45	45	29	29
	Mean	3.73	2.93	3.95	2.92	4.06	2.79	3.85	2.89
	S.D.	1.01	1.36	0.93	1.27	0.77	1.35	0.88	1.24
Female	N	59	59	63	63	45	45	29	29
	Mean	2.65	3.10	2.69	3.27	2.75	3.23	2.76	3.40
	S.D	1.14	1.21	1.19	1.26	1.11	1.24	1.00	1.15
	t	*5.46	0.73	*6.68	1.57	*6.53	1.59	*4.43	1.63
	df	116	116	125	125	88	88	56	56

P<0.05

Concerning the treatment of each grade levels, Table 10 shows statistically significant sex difference in internalizing causal attribution of success in all grade levels. That means males are internalizing their success than females. But statistically significant difference was not obtained between male and female students among the four grade levels in externalizing their success.

**Table -11** Sex difference, in internal and external, causal attribution of failure at each grade level.

Sex	Causal Attributions								
	Statistics	Grade 9		Grade 10		Grade 10+1		Grade 10+2	
		Int	Ext	Int	Ext	Int	Exe	Int	Ext
Male	N	59	59	64	64	45	45	29	29
	Mean	2.90	2.46	2.90	2.44	2.80	2.38	2.90	2.29
	SD	1.28	1.23	1.37	1.27	1.36	1.20	1.28	1.07
Female	N	59	59	63	63	45	45	29	29
	Mean	2.84	2.50	2.83	2.41	2.60	2.23	2.73	2.35
	SD	1.33	1.30	1.41	1.33	1.36	1.17	1.18	1.13
	t	0.27	0.17	0.28	0.15	0.71	0.61	0.53	1.86
	df	116	116	125	125	88	88	56	56

\*t<0.05

Table 11 shows no significance sex difference in internalizing and externalizing failure at each grade level.

To estimate whether attribution showed variation among the four (grade levels and out come, a (4X2) analysis of variance was computed and the summarized result is shown in Table 12.

**Table -12:** Summary of Analysis of Variance, for Comparing Causal Attribution Outcome by Grade.

Source Variation	SS	DF	MS	F
A (grade)	186.86	3	62.23	1.03
B (Outcome)	8740.00	1	8740.00	144.32*
AXB	845.12	3	281.71	4.65
Residual	47115.14	778	60.56	
Total	56683.81	785		

\*P<0.05

Table 12 presents the results of analysis of variance. The table shows that, there is no statistical difference among the attributers that means there is no statically significant difference among the grade levels. And also there is no statistically significant difference in the interaction of grade and out comes.

But there is statistically significant difference in the main effect of out come (success and failure),  $F(0.05, 1,778)=144.32, P<0.05$ .

To investigate grade 9 to 10+2 causal attributions of mathematics out come for male and females pupils, (4x2x2), (grade X gender X Out come) analysis or variance was computed and the result is summarized in Table 13.

**Table- 13:** Summary of Analysis of Variance, for comparing the four groups of Attributers in Terms of pupils' gender.

<b>Source Variation</b>	<b>SS</b>	<b>DF</b>	<b>MS</b>	<b>F</b>
A(attributers)	186.86	3	62.29	1.17
B(gender)	3699.91	1	3699.91	69.30*
C(outcome)	8740.00	1	8740.00	163.70*
AXB	153.61	3	51.20	0.96
AXC	845.12	3	281.71	5.28
BXC	2138.02	1	2138.02	40.05*
AXBXC	9.82	3	3.27	0.06
Residual	41113.78	770	53.39	
Total	56887.12	785		

\* $P<0.05$

As depicted in Table 12 above, the analysis of variance yielded significant main effect for gender  $F(1,770)=6930, p<0.05$ , and out come

$F(1,770)=163.70, p<0.05$ . In addition the interaction of gender-by  
-outcome was also found statistically significant  $F(1,770)=40.05, p<0.05$ .

## CHAPTER FIVE

### Discussion

#### 5.1 Causal Attribution of Students for Success and Failure in Mathematics Achievement

The result of the present study answered the causal attributions of students' mathematics outcomes are in almost the same way as reported by other investigators (eg. Bar-Tal, Goldberg and, Knaani (1984), and Cooper and Burger (1978), as cited in Weiner, 1979).

In this study, regarding attributions to success causes evaluated as "very important" and "very highly important" according to their order of importance are: (parental encouragement and cooperation, participation in the tutorial program, parental follow up on each semester result, hard work), ( App. D) 61.5% of the causes which were evaluated as "important" and "very important "are internal causes. Even if the best item ranked as a first cause for success by students was parental encouragement and cooperation which is external. These means, that student attribute success to causes related to them (internal). (e.g. hard work), this attributions style has an implication that student tend to have self-confidence, and need motivation to achieve good results.

Causal attributions made for failure according to their order of importance were lack of appropriately use free times for study, lack of planed study program, difficulty items included in the examination, lack of effort, bad exam schedules, shortage of reference material in the library.62.5% of the causes which ware evaluated as "important" and "very important" by the students are external causes and the rest 37.5% were internal. Attribution of failure to external was once again a better condition for self-concept and motivation to do well in the subsequent tasks. Studies examining causal attributions have disclosed that

individual differences in making attributions are those associated with achievement needs. Hence, according to Bar-Tal and Freize (1976), Kulkula (1972), individuals high in achievement needs differ in their attribution from individuals low in achievement needs. In addition, Bernstein et. al, (1979, 1810) quoting Miller and Roses suggests that in achievement situation, if high expectations are based on individual's belief that they possess the appropriate skills and will exert sufficient effort, then success will be attributed to the internal factors of ability and effort. Failure, on the other hand, disagrees with high expectations, and leads to external attributions such as luck and task difficulty.

From all this, it is possible relatively to deduce that students of Wukro Secondary School have a favorable attribution patterns

## ***5.2 Gender Difference in Causal Attributions in Mathematics***

### ***Achievement***

The result of this study showed that males and females are different in their attribution of their success. Males internalize their success more than females. This is consistent with the findings of researchers as Bar-Tal and Frieze (1976), Bar-Tal and Darom (1979) Wolleat and et al. (1980), and Stipek and Gralinisk (1991). On the other hand, this finding disagrees with the previous findings of Bar-Tal and Raviv (1982), Miller (1976), Freize et al. (1982) that found there was no significant difference between male and female students in internalizing and externalizing their success.

However, the results of this study showed that there is no statistically significant difference for males and females student in either internalizing or externalizing their failure. This finding supports the findings of previous researchers partially by Freize et al. (1982), O'Connell and Susan (1982), and Gaeddert (1987) that were found no significant

difference between male and female students in internalizing and externalizing their failure.

Statistical analysis performed to test attributional difference for pupils of the same gender in internalizing and externalizing their mathematics outcome yielded a significant difference for males and females (Table 5). The result showed that in success situation males attributed their success more to internal causes while females attribute to external causes than internal causes.

Comparison of male and female students' mathematics achievement on stability dimensions showed statistically significant difference for success only. As a result, males attributed their success more to satiable causes than females did. This finding agrees with previous findings of Bierhoff-Alferman and Bierhoff (1982), Deaux (cited in Goeddert, 1987: 688), Tamire (1995) that found that females attribute more to unstable factors for success than males.

### ***5.3 Causal Attributions for Mathematics Achievement and Grade level***

According to the result of this study, there was no significant difference for success and failure across the grade level. For success pupils of all grade levels internalize their success and also all of them attribute their failure to internal unstable causes. Only for grade 10+1 and 10+2, statistically significant difference was obtained in attributing success to external unstable causes. This study supports the previous findings of Tamire (1995), who reported the differences between year levels was not statistically significant.

## CHAPTER VI

### Summary and Conclusion

The primary objective of this study is to investigate whether there is attributional difference of pupils in their causal attribution of mathematics achievement, perception of success and failure by students' gender, and their grade level. Specially, students of Wukro Secondary School have been selected as subjects for this study.

In light of the above objectives, the following specific questions were formulated for investigation.

1. To what (internal /external) causes do student attribute their success in mathematics achievement?
2. To what (internal /external) causes do students attribute their failure in mathematics achievement?
3. Do males and females differ in their attributions to mathematics achievement?
4. Do students vary in their attribution of success and failure to mathematics achievement across their grade level?

To answer the above basic questions, the study was conducted on a sample size of 393 regular students. These students, who were selected randomly from grade 9 to 10+2 of Wukro Secondary School, also represented both sexes.

Two instruments, namely mathematics achievement test for the four grade levels (25 multiple choice items for each grade level) to assess the consistency of pupils first semester mathematics result, the second instrument is a Causal Attribution Scale to measure the causal

attribution of pupils for success and failure to their mathematics achievement. After the instrument was administered to a pilot samples, a reliability test was carried out. This led to improving the instrument.

After the data were collected, the analysis was carried out using t-test, one way analysis of variance with repeated measures and analysis of variance with two and three factorial designs

The analysis disclosed that,

1. Students attribute success in most cases to internal causes (61.5%) of items, which were valued as "important" and "very important" are internal causes, even if the item selected by pupils as a first cause for their success was external and stable cause.
2. Students attribute their failure to external causes (62.5%) of the items, which were valued as "important" and "very important" are external causes, even if the item selected as a first cause for their failure is internal stable.
3. Students' attribution showed gender difference for success situation, but statistically significant difference was not obtained between male and female students in attributing their failure.
4. Students' attribution showed that grade level difference did not appear as a source of variation for their attribution to success and failure.

From the above findings, one may conclude that, the causal attributions of pupils to mathematics achievement are somewhat similar to previous research work. What makes different this finding is the causal attribution of success that is ranked by pupils is "parental encouragement and cooperation", which can be considered as external stable factor. Similarly for failure the item that is ranked as best cause

by pupils was "luck of using appropriate time for the study" which can be considered as internal stable causes.

This research has shown that sex is related to the attributional style of students. One can infer from the results of the study that the attributional style is more favorable to males than females. This is because males, more than females, have been found to attribute their success to internal factors. But this does not mean that the style is totally disadvantages to females. An important result in this connection is that, females, more than males; attribute their failure to lack of effort. This may indicate that females, more than males, take responsibility for their outcome.

### **Recommendation**

Based on the result, the following recommendation are forwarded

To identify sources of variation in achievement, further research involving more specific information about the cultural and educational background of the respondents is useful.

Female students should be encouraged more to adopt internal orientation in their attribution for their success.

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Addis Ababa University  
School of Graduate Studies  
Department of psychology Measurement  
and Evaluation Stream

To be filled by Wukro Secondary School Students

Objective

The Present investigator is conducting a study on causal attribution for mathematics achievement in Wukro Secondary school students. To achieve this end, the investigator seeks your cooperation in responding to on this causal attribution scale. There are no right and wrong answers. Please answer as you really think and feel. Your answers will be confidential and used for the research purpose only. Read each statement carefully and respond by giving the answers that most accurately represent your feeling.

**Thank you for your cooperation**

Part One

Put tick mark or state your replies

Grade and section \_\_\_\_\_

Sex                      Female \_\_\_\_\_                      Male \_\_\_\_\_

Age \_\_\_\_\_

Part Two

Below are presented a series of statements/ phrases, please mark a "✓" under one of the columns in front of each statements to indicate your level of agreement/disagreement.

### Scales on Perceived Causes of Success

	<b>I succeed in mathematics examination because of</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Slightly agree</b>	<b>Agree</b>	<b>Strongly agree</b>
1	good luck					
2	my ability to know the subject					
3	being fast to understand and memorize the question and answers					
4	being sharp minded					
5	my participation in the group work and study program					
6	my parents cooperation and encouragement during the study					
7	hard work					
8	give enough time to study the subject					
9	easiness of the examination					
10	easiness of the subject					
11	my interest to know the subject					
12	teacher's generosity in marking					
13	the teacher used clear and simple method in explaining the subject					
14	repeated exercises I did on the subject carefully					
15	my desire to be a mathematician					
16	strict procedures and disciplinary measures applied by the school					
17	my parent's strict follow up on my semester result					
18	the focus of the exam are on a specific area I studied					

### Scales on Perceived Causes of Failure

	<b>I fail in mathematics examination because of</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Slightly agree</b>	<b>Agree</b>	<b>Strongly agree</b>
1	my failure to be adjusted with the school environment					
2	teachers incompetence in assigning marks for each items					
3	teachers incompetence in teaching					
4	teachers incompetence in scores marking					
5	test anxiety I developed during the examination					
6	lack of effort					
7	my failure to strictly follow the planned study program					
8	shortage of reference material in the school library					
9	difficulty of the items included in the examination					
10	lack of ability to adequately understand the subject					
11	lack of clarity of the questions					
12	bad luck					
13	being careless in doing class works and home take quizzes					
14	lack of interest to improve my academic career					
15	my failure to appropriately use free times for study					
16	the school rules and strict procedural guidelines are discouraging					
17	failure of my parents in encouraging me for learning					
18	lack of encouragement I expect from My parents					
19	the examination schedules					
20	not being sharp minded					

አዲስ አበባ ዩኒቨርሲቲ  
ናይ ድህረ ምረቃ ፕሮግራም  
አብ ሳይኮሎጂ ትምህርቲ ክፍሊ  
ጨንፈር ሜጀርመንትን ኢንፎርሜሽን

ብናይ ውቕሮ 2<sup>ይ</sup> ብርኪ ቤት ትምህርቲ ተምሃሮ ዝምላእ ቅጥዒ

**ዕላማ:-** ናይዚ ቅጥዒ ዋና ዕላማ ተምሃሮ ንሒሳብ ትም/ቲ ውዕኢቶም ዕውት ምዃንን ወይ ድማ ዕውት ንዘይምዃኖም ዝህብዎ መመክነይታ ብዝምልከት ካብ ተምሃሮ መረዳእታ ንምእካብ እዩ። እዚ እምህራም ሕቶታት እዚ እምህራም ናይቲ መላሲ መልሲ ልክዕ ምዃንን ወይ ድማ ጌጋ ምዃንን ኣየሪኡን። ኣብዚ ቅጥዒ ዘለዉ ሕቶታት መልሲ ጥቕሚ ናይ መመረቂ ዕሑፍ (thesis) ንምድላው እንትኸውን እቲ መልሲ ካብዚ ዕላማ ወፃኢ ካለእ ዕላማ ስለዘይብሉ እዚ ተፈሊጡ መልስኹም ከምዝመሰለኩም ንክትህቡኒ ብትሕትና ይላቦ።

ስለዝተሓባበርኩምኒ ብጣዕሚ የመስግን።

**ክፍል ሓደ**

ናይ "✓" ምልክት ብምግባር ወይ ድማ ብዕሑፍ ኣብ ታሕቲ ንዘለዉ መልሲ ይሃቡ።

ክፍል ሴክሽንን \_\_\_\_\_ ያታ:- ኣንስታይ \_\_\_\_\_ ተባዕታይ \_\_\_\_\_ ዕድመ \_\_\_\_\_

**ክፍል ክልተ**

ካብዚ ንታሕቲ ተምሃሮ ንሒሳብ ትምህርቲ ውዕኢቶም ዕውት ምዃንን ወይ ድማ ዘይምዃንን መመክነይታ እዮም ኢሎም ካብ ዘቕረቡዎም ሓሳባት ዝተወሰኑ ብዝርዝር ቀሪቦም እዮም። ካብዞም ዝተዘርዘሩ መመክነይታ ሓሳባት ምስ ኣንብብኩም ምስ ናይ በዓልትኹም ዝመሳሰል ብምግንዛብ ካብ ዝተዋሃቡ መማረጊ ኣብ ዝመሰለኩም ናይ "✓" ምልክት ብምግባር መልሲ ሃቡ።

**መተሓሳሰቢ**

ዕውት ክንብል እንተለና ብዝረኽብናዮ ውዕኢት ሕጉስ ምዃንን ይጥምት። ዕውት ዘይምዃንን ድማ ብዝረኽብናዮ ውዕኢት ሕጉስ ዘይምዃንን ይጥምት።

ዕውት ንምኳን መመኽነይታ ዝኾኑ ሕቶታት

ተራ ቁ.	ኣብ ናይ ሒሳብ ትም/ቲ ፈተናታት ኩሉሻዕ ዕውት እዩ። ምክንያቱም	ብጣዕሚ ኣይስማማዕን	ኣይስማማዕን	ብመጠኑ ይስማማዕ እዩ	ይስማማዕ እዩ	ብጣዕሚ ይስማማዕን እዩ
1	ዕቡቕ ዕዳል ስለዘለኒ					
2	ነቲ ትምህርቲ ኣፀቢቐ ስለዝፈልጦ					
3	እተን ሕቶታት ትረዲዕኻን ዘኪርኻን ናይ ምስራሕ ክእለት ስለዘለኒ					
4	ነቲ ትም/ቲ ንምርዳእ ክፍት ዝኾነ ሃንጎል ስለዘለኒ					
5	ኣብ ጉጅለ ዝግበር መፅናእቲ ስለዝሰተፍ					
6	ኣብ ዕቡቕ ደረጃ ንክበዕሕ ካብ ወለደይ ድጋፍን ትሕብብርን ስለዘይተፈለየኒ					
7	ብጥንኹር ስለዝሰርሕ					
8	ብዙሕ ጊዜ ወሲደ ነቲ ትምህርቲ ስለዘፀንዕ					
9	ናይተን ፈተናታት ቐሊል ምኳን					
10	ናይቲ ትም/ቲ ቐሊል መኳን					
11	ነቲ ትም/ቲ ናይ ምፍላጥ ዝለዓለ ድሌት					
12	ማርኪ ኣብ ምሃብ መምህራን ዕቡቕ ስለዝኾነ					
13	መምህራን ነቲ ትምህርቲ ዕቡቕ ጌርም ስለዘረድኡን፣ ስለዘምህሩን					
14	ተዛመድቲ ዝኾኑ መልመዲታት ኣፀቢቐ ስለዝሰርሕ					
15	ብሒሳብ ትም/ቲ ዝለዓለ ደረጃ ናይ ምብጻሕ ድሌት ስለዘለኒ					
16	ኣብ ቤት ትም/ትና ዝወሰዱ ናይ ዲስፒሊን ስጉምቲ ጥንኩራት ስለዝኾኑ					
17	ብብስሚስተሩ ንዝረኽቦም ውፅዒት ወለደይ ግቡዕ ክትትል ስለዝገብሩለይ					
18	ኣብ ፈተና ዝመፀ ሕቶታት ዝበዝሑ ካብ ዘፅናኸዎም ስለዝኾኑ					

ዕውት ንዘይምኻን መመኸነይታ ዝኾኑ ሕቶታት

ተራ ቁ.	ብሒሳብ ትም/ቲ ፈተናታት ዕውቅ ኣይኮንኹን። ምክንያቱ	ብጣዕሚ ኣይስማማዕን	ኣይስማማዕን	ብመጠኑ ይስማማዕ እዩ	ይስማማዕ እዩ	ብጣዕሚ ይስማማዕን እዩ
1	ምስ ቤት ትም/ቲ ማህበረሰብ ብቅልጡፍ ተዛሚድካ ና ምኻድ ክእለት ስለዘይብለይ					
2	መምህራን ንሕድ ሕድ ሕቶታት ዝህቡዎ ናይ ማርኪ /ዋጋ/ደንቢ ፅቡቕ ዘምኻን					
3	ናይ መምህራን ምምሃር ብቛት ድኹም ስለዝኾነ					
4	ናይ መምህራን ማርኪ ኣወሃህባ ዝተዛፀ ምኻን					
5	ኣብ እዋን ፈተና ናይ ምጭናቕ ባሕሪ ስለዘለኒ					
6	ግብእ ጻዕሪ ስለዘይገብር					
7	ብትልሚ ዝምራሕ ናይ መፅናዕቲ መርሃ					
8	ተወሳኽ ዝኾኑ (ሓገዝቲ) መፅሓፍቲ ኣብ ቤት ትምህርትና ቤተ መፅሓፍቲ ስለዘየለ					
9	ኣብ ፈተና ዝመፁ ሕቶታት መብዛሕቲኡ ጊዘ ከቢድ ስለዝኾኑ					
10	ነቲ ት/ቲ ኣፀቢቕ ናይ ምምላኽ ፀገም ስለዘለኒ					
11	ኣብቲ ፈተና ዘለው ሕቶታት ግልፂ ስለዘይኾኑ					
12	ዕድል ስለዘይብለይ					
13	ክፍሊ እዮን፣ ገዛ እዮን ኣብ ምስራሕ ስለዘይግደሰሎም					
14	ብትምህርቲ ደፊኦ ናይ ምቅፃል ድሌት ስለዘይብለይ					
15	ነቲ ጊዘይ ብግቡዕ ስለዘይጥቀመሉ					
16	ናይ ቤት ትምህርትና ደንቢ ዘበረታተዕ ብዘይምኻኑ					
17	ካብ ወለደይ ዝዋሃበኒ መተባብዒ ስለዘየለ					
18	ካብ ወለደይ ክንዲ ዝፅበዮ ደገፋ ስለዘይዋሃበኒ					
19	ፈተናታት ኣብ ርዕሲ ርዕሲ ስለዝደራረበኒ					
20	ናይ ምርዳእ ክእለቲይ ትሑት ብምኻኑ					

**Individual Perceived Causes of mathematics achievement success, and their mean and standard deviation**

	<b>I succeed in mathematics examination because of</b>	<b>Mean</b>	<b>S.D</b>	<b>Rank</b>
1	good luck	2.03	0.9365	16
2	my ability to know the subject	3.07	1.1657	12
3	being fast to understand and memorize the question and answers	3.10	1.2812	11
4	being sharp minded	2.95	1.2032	14
5	my participation in the group work and study program	3.93	0.8712	2
6	my parents cooperation and encouragement during the study	3.95	0.9040	1
7	hard work	3.75	0.9363	4
8	give enough time to study the subject	3.13	1.2950	10
9	easiness of the examination	2.76	1.2398	15
10	easiness of the subject	1.97	0.9282	17
11	my interest to know the subject	3.31	1.1411	9
12	teacher's generosity in marking	1.87	0.8614	18
13	the teacher used clear and simple method in explaining the subject	3.63	1.0674	7
14	repeated exercises I did on the subject carefully	3.45	1.0254	8
15	my desire to be a mathematician	3.00	1.2910	13
16	strict procedures and disciplinary measures applied by the school	3.74	0.9185	5
17	my parent's strict follow up on my semester result	3.87	0.8317	3
18	the focus of the exam are on a specific area I studied	3.68	0.9556	6

**Individual Perceived causes of mathematics achievement  
Failure, and their mean and standard deviation**

	<b>I fail in mathematics examination because of</b>	<b>mean</b>	<b>S.D</b>	<b>Rank</b>
1	my failure to be adjusted with the school environment	2.051	0.9584	8
2	teachers incompetence in assigning marks for each items	1.962	0.9030	10
3	teachers incompetence in teaching	1.959	0.9237	11
4	teachers incompetence in scores marking	1.964	0.9349	9
5	test anxiety I developed during the examination	1.926	0.9635	13
6	lack of effort	3.705	1.0457	4
7	my failure to strictly follow the planned study program	3.761	0.9879	2
8	shortage of reference material in the school library	3.649	1.0551	6
9	difficulty of the items included in the examination	3.735	0.9993	3
10	lack of ability to adequately understand the subject	1.949	0.9557	12
11	lack of clarity of the questions	1.885	0.8469	15
12	bad luck	1.748	0.8796	20
13	being careless in doing class works and home take quizzes	3.583	1.0345	7
14	lack of interest to improve my academic career	1.850	0.9082	17
15	my failure to appropriately use free times for study	3.779	0.9752	1
16	the school rules and strict procedural guidelines are discouraging	1.893	0.9212	14
17	failure of my parents in encouraging me for learning	1.758	0.8620	19
18	lack of encouragement I expect from my parents	1.794	0.9028	18
19	the examination schedules	3.667	1.0181	5
20	not being sharp minded	1.880	0.9015	16

## Declaration

The thesis is my original work, has not been presented for a degree in any other

University and that all sources of material used for the thesis have been duly acknowledged

Name Jemal Osman

Signature 

Place Addis Ababa

Date \_\_\_\_\_

This thesis has been submitted for examination with my approval.

Name Desalegn Chalchisa

Signature 