American Journal of Humanities and Social Sciences Research (AJHSSR)
e-ISSN : 2378-703X
Volume-10, Issue-10, pp-149-164
www.ajhssr.com
Research Paper Open Access

Locus of Control and Students' Academic Achievement Level of Attributional Ambiguity in Public Secondary Schools in Bomet East Sub-County, Kenya

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Article derived from the doctoral thesis "Influence of Self-Perceptual Constructs among Students' Academic Achievement Levels of Attributional Ambiguity in Public Secondary Schools in Bomet East, Bomet County, Kenya" (2026).

ABSTRACT : *Background:* Examination results do not explain themselves, and students must decide whether a grade reflects ability, effort, preparation, task difficulty or circumstances beyond their control. Locus of control, the belief about whether outcomes are determined by one's own actions or by outside forces, is the self-perceptual construct theoretically closest to this causal reasoning, yet its influence on how clearly students can explain their results is unknown in rural Kenyan secondary schools. *Objective:* To determine the influence of locus of control on students' academic achievement level of attributional ambiguity in Bomet East Sub-County, Kenya.
Methods: A correlational, cross-sectional design guided by Attribution Theory and Social Cognitive Theory was used. A sample of 365 Form Four students in 19 of 48 public secondary schools was drawn through purposive selection of schools, probability proportional to size allocation and simple random sampling. A self-administered five-point Likert questionnaire measured locus of control (higher scores indicating stronger external control) and attributional ambiguity. Data were analyzed with descriptive statistics, Pearson correlation and simple linear regression in SPSS at the .05 level. *Results:* The response rate was 100%. Locus of control (M = 72.08, SD = 11.36) was positively and significantly correlated with attributional ambiguity (M = 55.41, SD = 18.52), r = .283, p < .001, 95% CI [.186, .375]. Locus of control predicted ambiguity (R^2 = .080, $F(1, 363)$ = 31.553, p < .001, B = .461, β = .283), and the null hypothesis was rejected. *Conclusion:* Students who attribute outcomes to forces beyond their control are more uncertain about why they succeed or fail, although control beliefs explain only a modest share of that uncertainty. Guidance programs should combine attribution retraining with specific, timely feedback that makes the causes of results visible.
Keywords: *locus of control; attributional ambiguity; academic achievement; secondary school students; Attribution Theory; Kenya*

I. INTRODUCTION

Students receive academic outcomes in the form of examination grades, class rankings and teacher comments, but these outcomes do not explain themselves. A student who receives a poor grade must decide whether the result reflects ability, effort, preparation, the difficulty of the paper, the way it was marked or the emotional state in which it was written. Attribution Theory holds that the causes students assign to their outcomes shape their emotions, expectations and later motivation (Weiner, 1985). Attributional ambiguity is the uncertainty that arises when more than one plausible explanation for an outcome exists and the person cannot tell which one applies (Crocker & Major, 1989). In this article the concept is applied to students' academic achievement level of attributional ambiguity, the degree of uncertainty students experience when explaining their academic outcomes. The article asks whether locus of control, the belief about whether outcomes are determined by one's own actions or by outside forces, influences that degree of uncertainty among secondary school students in a rural Kenyan sub-county.

Locus of control is the generalized belief individuals hold about whether outcomes in their lives are determined by their own effort and ability, an internal orientation, or by external forces such as luck, fate or powerful others, an external orientation (Rotter, 1966). It occupies an unusual position among the self-perceptual constructs studied in education. It sits at the historical origin of attribution theory, since Weiner (1985) later formalized locus of causality as one of the three dimensions along which causes are classified, and

it is therefore theoretically the construct closest to the way students explain their results. Research has shown that perceived control moderates students' responses to favorable and unfavorable academic outcomes (Findley & Cooper, 1983), and recent work has linked internal and external academic locus of control in opposite directions to academic dropout (Morelli et al., 2023) and linked internal control and resilience to achievement (Arsini et al., 2023).

Yet this literature, in common with most research on self-perceptual constructs, treats achievement as the outcome to be explained. It rarely asks how clearly students can explain the achievement itself. The distinction matters because uncertainty about causes carries costs. A meta-analysis of studies in achievement contexts linked causal attributions to what learners subsequently do (Brun et al., 2021), and nationally representative evidence from the United States found that attributional ambiguity was associated with more depressive symptoms and poorer self-reported mental health (Cuevas et al., 2024). Students who cannot tell why they succeed or fail may find it hard to decide what to change, and their confidence and persistence may suffer (Weiner, 1985).

The question is pressing in Kenya, where the Kenya Certificate of Secondary Education (KCSE) is the terminal measure of secondary school achievement and a major determinant of access to university and other opportunities. Students are ranked competitively, sit several rounds of mock examinations and often receive delayed, summative feedback that shows the score but not the reasons for it. Unclear assessment criteria and limited formative feedback in East African secondary schools are associated with heightened anxiety and with reduced clarity in students' understanding of their own academic standing (Mkumbo & Amani, 2022), and unclear feedback and institutional practices have been associated with a shift toward external attributions among Kenyan students in higher education (Gitumu & Kinyua, 2024). Such conditions could plausibly both strengthen an external orientation and make results harder to explain, but whether the two are linked among secondary school students has not been tested.

Bomet East Sub-County in Bomet County shares these national features and adds local ones. Its public secondary schools operate with limited material resources, large classes and underdeveloped guidance and counseling support, and school-related factors associated with dropout have been documented there (Koech, 2025). Education office reports on the KCSE and on mock examinations indicate that a substantial proportion of candidates obtain the lowest grade categories (Bomet County Education Office, 2024, 2025). These reports describe performance and not interpretation, but they raise a reasonable concern. Students who sit repeated examinations and still obtain low or fluctuating grades may be unsure whether their results reflect ability, effort, anxiety, the difficulty of the papers or circumstances beyond their control. To the knowledge of the researchers, no study has examined how locus of control influences students' academic achievement level of attributional ambiguity in Bomet East Sub-County or in any comparable rural Kenyan setting.

1.1 Statement of the problem

Examination grades show what students have achieved, yet they do not necessarily explain why the outcome occurred. Students therefore have to interpret the causes of their own success or failure, and this interpretation may be unclear, particularly when students are uncertain whether an outcome reflects their ability, effort, emotional state, task difficulty or external circumstances. Theory suggests that students who believe that outcomes lie outside their control may find it harder to decide what caused a result (Rotter, 1966; Weiner, 1985). Studies at the global, continental, regional and national levels have linked locus of control to achievement, coping and resilience, but they did not measure how uncertain students are about the causes of that achievement. Schools and counselors therefore cannot tell whether students' beliefs about control help or hinder their interpretation of results, and guidance support may be misdirected.

1.2 Purpose, objective and hypothesis

The purpose of this article is to report the influence of locus of control on students' academic achievement level of attributional ambiguity among Form Four students in public secondary schools in Bomet East Sub-County, Bomet County, Kenya. The objective was to determine the influence of locus of control on students' academic achievement level of attributional ambiguity. The study tested one null hypothesis at the .05 level of significance:

H_{04}: Locus of control has no significant influence on students' academic achievement level of attributional ambiguity in Bomet East Sub-County.

A null hypothesis states that no significant influence exists between a predictor and the outcome in the population, and it is the statement that is tested statistically and then retained or rejected on the evidence (Creswell & Creswell, 2018).

1.3 Significance of the study

The study contributes to theory by testing Attribution Theory and Social Cognitive Theory together in a setting where they have rarely been applied, and by examining the construct that shares the longest conceptual

lineage with the dependent variable. For school counselors and mental health professionals, it indicates whether guidance should be directed at students' beliefs about control. For teachers, it explains why some learners cannot make sense of their results even when marks and comments are given, and it can inform feedback that makes the causes of results visible. For policy makers, including the Ministry of Education, the Kenya National Examinations Council and the Teachers Service Commission, it informs guidance curricula and feedback practices in national and school-based assessment. The study also adds evidence from a rural Kenyan sub-county to a literature drawn mostly from other settings.

II. LITERATURE REVIEW AND THEORETICAL BACKGROUND

2.1 Conceptualizing locus of control and attributional ambiguity

Locus of control was conceptualized by Rotter (1966) as a generalized expectancy about whether reinforcement depends on one's own behavior or on outside forces. Levenson (1973, 1981) extended the original bipolar construct into a tripartite one that distinguishes internality from two forms of externality: control attributed to powerful others, such as teachers, administrators or examination boards, and control attributed to chance, such as luck. Measurement has evolved from Rotter's forced-choice scale toward Likert-type formats with separate internal and external subscales, as in the academic locus of control measure of Morelli et al. (2023). Lefcourt (2014) recommended domain-specific measurement, arguing that a student's orientation toward academic outcomes may differ from the same student's orientation toward health or relationships. In this study locus of control refers to the extent to which students perceive their academic outcomes as resulting from their own effort, ability and actions or from external factors beyond their personal control, and higher scores indicate a stronger external orientation.

Attributional ambiguity was first articulated in the social psychology of stigma. Crocker and Major (1989) used it to describe the difficulty members of stigmatized groups face in deciding whether feedback reflects their own performance or prejudice against their group. The present study extends the logic of interpretive uncertainty to the academic domain. Students' academic achievement level of attributional ambiguity is the degree of uncertainty students experience when interpreting and attributing the causes and meaning of their academic outcomes, such as whether success or failure is attributable to ability, effort, anxiety, task difficulty, teacher expectations or other internal and external factors. Where the construct has been applied it has been examined mostly in relation to stigma, ethnic identity and mental health among adults and university students in Western contexts (Cuevas et al., 2024; Kim & Park, 2024).

2.2 Theoretical background

The study is anchored on Attribution Theory as advanced by Weiner (1985, 1986), complemented by Bandura's (1986, 1997) Social Cognitive Theory. Attribution Theory originated in the work of Heider (1958), who proposed that individuals act as intuitive scientists constantly searching for the causes of events. Weiner (1972, 1985) extended this to achievement, proposing that when students experience success or failure they engage in a causal search that results in an attribution. The causes most commonly cited are ability, effort, task difficulty and luck, classified along three dimensions: locus of causality (internal or external), stability (stable or variable) and controllability (controllable or uncontrollable). The combination assigned shapes emotion, expectancy of future success and persistence, and a meta-analysis of studies that measured these dimensions directly confirmed that they reliably predict cognitive, emotional and behavioral consequences (Brun et al., 2021).

Weiner's framework, like most attribution research, implicitly assumes that students eventually arrive at a definite, even if sometimes inaccurate, explanation. It does not theorize the possibility that a student may be unable to settle on any single explanation, remaining in sustained interpretive uncertainty in which insufficient ability, insufficient effort, a difficult paper and simple misfortune all appear plausible without any one becoming convincing. This state is what the study terms attributional ambiguity. Social Cognitive Theory complements the framework by explaining how self-referential beliefs are formed through triadic reciprocal determinism, the continuous interaction of personal, behavioral and environmental factors (Bandura, 1986). In school, the examination system and its feedback practices form part of the environment that shapes the beliefs students hold about control, and the beliefs in turn shape the effort invested and the feedback received.

The two theories are integrated by proposing that self-perceptual constructs function as antecedents that shape the ease or difficulty of the causal attribution process. Locus of control has a distinctive place in this scheme. Following Rotter's (1966) social learning formulation it bridges personal disposition and generalized expectancy about the environment, and it is the construct most directly related to Weiner's dimension of locus of causality. It is therefore tested as a direct predictor of attributional ambiguity. The logic is that a student who believes outcomes depend mainly on effort and ability has a stable reference against which any result can be compared, whereas a student who attributes outcomes to luck, teacher favor or the difficulty of the paper lacks such a reference, because each of these causes is unstable, unobservable or uncontrollable.

Two cautions apply. First, Weiner's categories and Bandura's principles were developed largely in Western educational systems with small classes, abundant resources and continuous feedback. Graham (1991) noted that the weight given to different explanations varies across cultures, and Kenyan students may draw on communal, familial or spiritual explanations that sit outside Weiner's original categories. Second, the reciprocal logic of Social Cognitive Theory implies that the reverse direction of influence, in which ambiguity strengthens an external orientation, is equally plausible (Marsh & Craven, 2006). The cross-sectional design cannot adjudicate between the two directions, and the findings are interpreted as associations.

2.3 Empirical literature on locus of control

2.3.1 Global and continental evidence

Global research has sought to refine the measurement of locus of control within academic settings. Morelli et al. (2023) developed and validated an academic locus of control measure among Italian university students and found that internal and external academic locus of control were respectively negatively and positively associated with academic dropout. The result confirms the relevance of the construct to contemporary education and shows that it can be usefully disaggregated into internal and external dimensions. Arsini et al. (2023) examined the joint role of locus of control and resilience in Indonesia and found that both were significant predictors of achievement, noting that internal aspects of student psychology deserve greater attention if teachers are to help students optimize performance. In the Philippines, Liban et al. (2024) found that most college students in their study had an internal locus of control, associated with more positive academic attitudes and outcomes. These studies confirm the predictive relevance of locus of control for achievement, but each treats achievement, not the clarity of students' own causal explanations, as the ultimate outcome.

In Africa, locus of control has been studied mainly in relation to achievement, often jointly with self-efficacy or self-esteem, reflecting a tradition that treats these constructs as an interconnected cluster. Akunne and Anyamene (2021) found that locus of control and self-esteem were both significantly related to English Language achievement among secondary school students in Anambra State, Nigeria, extending the evidence into subject-specific performance. The continental literature supports the relevance of control beliefs to achievement, but, as in the global literature, it does not extend to interpretive uncertainty.

2.3.2 Regional and Kenyan evidence

In East Africa, Nannungi (2022), using a correlational design among secondary school students in Kayunga District, Uganda, found meaningful associations between locus of control and academic achievement, showing that the construct retains explanatory relevance under resource constraints and large classes comparable to those in Kenya. In Kenya, locus of control has most often been examined as a correlate within broader studies of examination anxiety and resilience, and not as a primary independent variable. The Kenyan evidence that bears most directly on this study concerns the way unclear evaluative conditions interact with control orientation. Gitumu and Kinyua (2024) found that unclear feedback and institutional practices prompted a shift toward external attributions among Kenyan students in higher education, which is direct, though not fully attribution-theoretic, evidence that unclear evaluative conditions and locus of control are connected.

Two further studies link locus of control to students' behavior under ambiguity. Ahmed et al. (2021) found that locus of control significantly predicted the coping strategies students adopted when confronted with unclear or inconsistent academic feedback, with internally oriented students more likely to use active, problem-focused coping and externally oriented students more likely to use avoidant or emotion-focused strategies. Gál et al. (2023) found that students holding a fixed intelligence mindset, which is conceptually related to an external orientation, were more vulnerable to negative interpretations of adverse academic experiences than students with a growth-oriented mindset. Liu and Li (2023) reported that students with external orientations were less able to give consistent explanations for their academic performance. These studies link control beliefs to responses to ambiguity, but they measured coping, mindset or consistency of explanation, and not the uncertainty about causes that is the dependent variable here.

2.3.3 Stable disposition versus situational state

Rotter's (1966) formulation and the meta-analysis of Findley and Cooper (1983) conceptualize locus of control as a relatively stable orientation formed under reasonably consistent causal feedback. Findley and Cooper's core finding, that perceived control moderates responses to favorable and unfavorable outcomes, remains influential, although it predates contemporary Kenyan schooling, in which students are exposed over four years to continuous internal and county-level mock examinations that culminate in a single terminal national assessment. Such cumulative exposure may intensify rather than resolve uncertainty in causal attribution irrespective of a student's trait level of control. Ahmed et al. (2021) and Gál et al. (2023) begin to problematize the stability assumption by showing that even students with an internal orientation may experience situational uncertainty when evaluative cues are unclear, inconsistent or delayed.

This points to a distinction that is central to the study: locus of control as a relatively enduring disposition and attributional ambiguity as a more situationally responsive cognitive state. If they were the same construct, testing one as a predictor of the other would be pointless; if they are related but distinct, the strength of the association shows how far the stable orientation explains the situational state. A related refinement is Levenson's (1981) separation of powerful others from chance. A Kenyan student who attributes an unclear result to the opacity of the marking and grading process of a powerful and distant examination authority may experience a different form of ambiguity from a student who attributes it to simple bad luck. The scale used here does not separate these components, so the distinction is noted as an avenue for future research.

2.4 Research gaps

Three gaps justify the study. At the level of knowledge, Kenyan and regional studies establish that locus of control predicts coping, resilience and achievement, but none has tested whether it predicts the clarity or ambiguity of the explanations students construct for their own examination outcomes. This is despite locus of control being theoretically the most proximate of the self-perceptual constructs to attributional ambiguity. At the theoretical level, the stable-disposition assumption has been questioned but not resolved, and the relationship between a stable control orientation and a situational state of uncertainty has not been tested. At the methodological level, most Kenyan and regional studies use single-administration, cross-sectional designs that treat locus of control as a trait, and few relate a domain-specific measure of control to a distinct measure of interpretive uncertainty using regression.

2.5 Conceptual framework

Figure 1 presents the relationship tested. Locus of control, scored so that higher values indicate a stronger external orientation, is the independent variable, and students' academic achievement level of attributional ambiguity is the dependent variable. Consistent with the integrated theoretical position, students with a stronger external orientation were expected to find it harder to construct clear and confident explanations for their results, and so to show greater ambiguity. The arrow corresponds to the null hypothesis H_{04}. The diagram simplifies a more complex set of reciprocal relationships among self-perceptual constructs and the assessment environment.

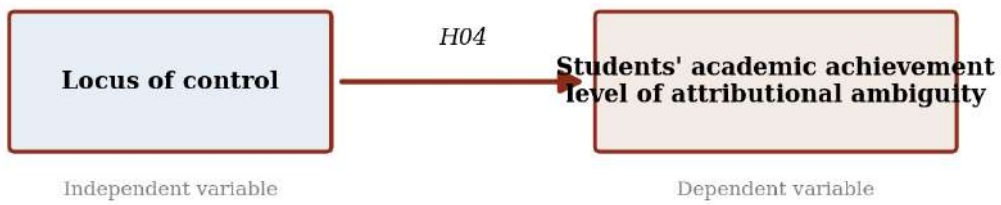


Figure 1. *Conceptual framework: the hypothesized influence of locus of control on students' academic achievement level of attributional ambiguity.* Source: Researchers (2026).

III. METHODOLOGY

3.1 Research design

The study adopted a correlational research design with a predictive analytical approach. A correlational design is non-experimental and examines the direction and strength of relationships among variables as they occur naturally, without manipulation of the independent variable (Creswell & Creswell, 2018; Cohen et al., 2018). It was appropriate for three reasons. First, locus of control and attributional ambiguity are psychological constructs that cannot be manipulated in school settings, and doing so would be impractical and ethically questionable (Fraenkel et al., 2019). Second, the study sought to establish whether and how strongly the constructs were related, and not to prove cause and effect, which correlational designs do not permit (Bryman, 2016). Third, correlational data support regression analysis, which estimates how much of the variance in a dependent variable a predictor explains without implying causation (Tabachnick & Fidell, 2019). The approach was purely quantitative and cross-sectional, because data were collected from students at a single point in time, and it was guided by a post-positivist orientation, which holds that psychological constructs can be measured objectively through valid instruments while recognizing that measurement is never perfect (Creswell & Creswell, 2018).

3.2 Study location, population and sample

The study was conducted in Bomet East Sub-County, Bomet County, in the South Rift region of Kenya. The sub-county has public secondary schools of different kinds, including boys', girls' and mixed schools, and day, boarding and day-and-boarding schools, spread across different geographical and administrative areas. At the time of the study no private secondary school in the sub-county offered Form Four classes, so the study focused exclusively on public schools. The target population comprised all Form Four students in public secondary schools in the sub-county. Records from the Sub-County Education Office (Bomet East Sub-County Education Office, 2024) show 4,372 Form Four students in 48 public secondary schools. Form Four students were targeted because they are in their final year, a stage marked by intense academic demands and by the high-stakes KCSE, and because they have had sustained exposure to assessment, teacher evaluation and competitive academic environments that contribute to relatively stable self-perceptions and attributional tendencies.

Slovin's formula, at a 95% confidence level and a 5% margin of error, was used to determine the sample size for this finite population (Yamane, 1967; Israel, 1992), and the sample was set at 365 students. This sample was adequate for correlation and regression. Tabachnick and Fidell (2019) recommend a minimum of 50 + 8*m* cases, where *m* is the number of predictors, which gives 82 for four predictors and is greatly exceeded by 365. The sample also gives power of about .82 to detect a correlation of .15 in a two-tailed test at the .05 level (Cohen, 1988), so correlations of educational importance were unlikely to be missed, which reduces the risk of Type II error (Hair et al., 2019).

A multi-stage sampling procedure was used (Creswell & Creswell, 2018; Kothari, 2004). At the first stage, purposive sampling selected 19 of the 48 public secondary schools, guided by school gender category, residential status and broad geographical coverage, so that different institutional contexts were represented. At the second stage, probability proportional to size allocation determined the number of students drawn from each school according to its Form Four enrolment (Cochran, 1977); the total enrolment in the sampled schools was 2,484. At the final stage, simple random sampling selected individual students from the Form Four class registers, so that every eligible student, whatever his or her performance level, had an equal and independent chance of selection.

3.3 Research instrument

A self-administered student questionnaire was the only instrument. Section A collected demographic information. Sections B to F measured self-esteem, self-efficacy, examination anxiety, locus of control and attributional ambiguity, each with five items rated on a five-point Likert scale from Strongly Disagree (1) to Strongly Agree (5). Scoring was arranged so that higher scores indicated higher levels of the construct measured and, for locus of control, a stronger belief in external control. Scale scores are reported on a 100-point metric in the results below. The two sections relevant to this article are described below. The questionnaire was written for Form Four students, and the attributional ambiguity and locus of control items were worded in neutral academic terms.

Locus of control. The five locus of control items addressed whether academic results depend on personal effort and study habits or on factors such as luck and circumstances beyond the student's control, and the scale was restricted to beliefs about academic and examination-related outcomes, in line with the domain-specific measurement recommended by Lefcourt (2014). Example items are "My academic success depends mostly on my own effort" and "My academic performance depends more on factors outside my control than on my effort." Scoring was arranged so that higher scores indicate a stronger belief in external control. The scale yields a single score and does not separate control by powerful others from control by chance (Levenson, 1981).
Attributional ambiguity. The five items were developed for this study, guided by Weiner's causal dimensions of locus, stability and controllability, because no validated instrument combining these measures existed for Kenyan secondary schools. They addressed how often students are unsure or confused about why they succeed or fail and whether they can explain differences between their performance and that of classmates. An example item is "I feel confused about the reasons behind the grades I receive in examinations." Higher scores indicate greater ambiguity.

3.4 Pilot testing, validity and reliability

A pilot study was conducted with about 10% of the intended sample, approximately 37 students, drawn from a neighboring sub-county with similar characteristics. Piloting outside the study area prevented contamination of the main sample. The pilot assessed item clarity, feasibility and reliability, and the results were used to revise ambiguous or weak items. Validity is the extent to which an instrument measures what it is intended to measure (Cohen et al., 2018). Content validity was established through expert review, and construct validity was ensured by aligning the items with the study objectives, the conceptual framework and the theoretical foundations of Attribution Theory and Social Cognitive Theory, so as to avoid construct underrepresentation and contamination. Reliability was examined through internal consistency using Cronbach's

alpha, with a coefficient of 0.70 or higher taken as acceptable (Tavakol & Dennick, 2011), through test-retest correlation of two administrations to the pilot participants, and through item-total correlations, with weak items revised or removed.

3.5 Data collection and ethical considerations

Authorization was obtained from the university, the National Commission for Science, Technology and Innovation (NACOSTI) and the Sub-County Education Office. The principals of sampled schools were informed and dates agreed. Informed consent was obtained before data collection, and students were told the purpose of the study and the voluntary nature of participation. Questionnaires were administered during school hours with the assistance of class teachers. Participants were assured of confidentiality and anonymity, and no identifying information was collected. The study posed minimal risk because the questionnaire dealt with non-intrusive academic perceptions phrased in a neutral manner, and respondents were free to skip any item. Hard-copy questionnaires were stored securely, electronic data were password-protected, and raw data were to be destroyed at the end of the research in line with university and NACOSTI requirements.

3.6 Data analysis

Questionnaires were checked for completeness, coded and entered into the Statistical Package for the Social Sciences (SPSS), and the data were screened for missing values, out-of-range entries and outliers. Descriptive statistics (frequencies, percentages, means, medians, standard deviations, variances, skewness and range) and histograms summarized the sample and the distributions of the variables. Skewness and histograms were used to judge whether distributions were close enough to normal for parametric tests; with a sample of 365 the Pearson correlation and linear regression are robust to moderate departures from normality (Tabachnick & Fidell, 2019). For group comparisons, scores were grouped into low, moderate and high categories describing relative standing within the sample.

Inferential analysis proceeded in two steps. First, Pearson's product-moment correlation coefficient established the direction and strength of the relationship between locus of control and attributional ambiguity, and 95% confidence intervals were calculated using Fisher's z transformation. Second, simple linear regression determined whether locus of control influenced attributional ambiguity, using the model $Y = \beta_0 + \beta_1 X + \varepsilon$, where Y is attributional ambiguity and X is locus of control. The model summary, analysis of variance and coefficients were reported, and effect sizes were interpreted against the benchmarks of Cohen (1988), under which correlations of about .10, .30 and .50 represent small, medium and large effects. The null hypothesis was tested at the .05 level of significance, rejected where $p < .05$ and retained otherwise. Correlation significance is reported one-tailed, as produced by SPSS, while F and t tests in the regression are two-tailed.

IV. RESULTS

4.1 Response rate and respondent profile

All 365 questionnaires were administered and all were returned in usable form, giving a response rate of 100%. Mugenda and Mugenda (2003) regard a response rate of 70% and above as very good for survey research. There were no missing values on the study variables, so all 365 cases contributed to every analysis. The high return is attributed to administration during school hours with the assistance of class teachers, prior consent from the education office and school administrations, and assurance of anonymity.

Table 1 summarizes the profile of respondents. The sample was almost evenly divided between the sexes (51% female and 49% male), and 71.7% of respondents were aged 17 or 18 years, which matches the age at which most learners complete Form Four. About one fifth (21.2%) were aged 19 years or above, and roughly two thirds of this older group were male, which is not surprising in a rural sub-county where late entry, grade repetition and interrupted schooling are common (Koech, 2025). Mixed schools contributed 72.6% of respondents, boys' schools 14.0% and girls' schools 13.4%, and day-and-boarding schools formed the largest residential category (41.6%). Only about 51 respondents came from boys' schools and about 49 from girls' schools, so percentages for those groups rest on small numbers and are less stable.

Table 1. *Profile of respondents (N = 365)*

Characteristic	Category	Percentage of sample
Gender	Female	51.0
	Male	49.0
Age (years)	15–16	7.0
	17	32.8
	18	38.9
	19	15.1
	20 and above	6.1
School type	Mixed	72.6
	Boys'	14.0
	Girls'	13.4
Residential status	Day-and-boarding	41.6
	Day	32.9
	Boarding	25.5

Note. Percentages are shares of the total sample of 365 respondents. Percentages within each characteristic sum to approximately 100 because of rounding.

4.2 Descriptive profile of locus of control and attributional ambiguity

Table 2 presents the descriptive statistics. Locus of control had a mean of 72.08 (*SD* = 11.36), with a median and a mode of 72.00, so that the typical student scored well above the midpoint of a scale on which higher scores mean a stronger belief in external control. The distribution was moderately negatively skewed (−0.699), with scores ranging from 24.00 to 100.00. Attributional ambiguity had a mean of 55.41 (*SD* = 18.52), a median of 56.00 and a mode of 40.00, and it varied widely, with scores from .00 to 96.00 and a variance of 342.86 that was well over twice that of locus of control (129.01). Expressed as a percentage of the mean, the standard deviation was 15.8% for locus of control and 33.4% for attributional ambiguity. Students therefore resembled one another more in their beliefs about control than in how certain they were about the causes of their results. The wide spread of attributional ambiguity is favorable for analysis, because a dependent variable that varies considerably gives a predictor something to explain.

Table 2. *Descriptive statistics for locus of control and attributional ambiguity (N = 365)*

Statistic	Locus of control	Attributional ambiguity
Valid *N* (missing)	365 (0)	365 (0)
Mean	72.08	55.41
Median	72.00	56.00
Mode	72.00	40.00
Standard deviation	11.36	18.52
Variance	129.01	342.86
Skewness	−0.699	−0.323
Minimum	24.00	0.00
Maximum	100.00	96.00
Range	76.00	96.00

Note. Higher scores indicate a stronger belief in external control and greater attributional ambiguity.

Figure 2 shows the histogram of locus of control scores. The distribution is single-peaked and centered close to 72, with most scores between about 60 and 90, and it has a tail of lower scores, indicating a minority of students with a strongly internal orientation. Its skewness of −0.699 is milder than that of self-efficacy in the same sample, and the spread is wide enough for the scale to discriminate among respondents. The central tendency suggests that a leaning toward external explanations is common among Form Four students in the sub-county. This is consistent with the conditions of rural public schooling, with large classes, limited resources and unclear feedback, in which students experience many outcomes that are shaped by factors outside their control (Koech, 2025). Figure 3 shows that attributional ambiguity has a broad, fairly flat distribution with a plateau of

frequent scores between about 40 and 80, which shows that students sit at low, middle and high levels and that there is variation to be explained. With 365 cases and skewness well below the level that signals marked departure from normality, Pearson correlation and linear regression are appropriate (Tabachnick & Fidell, 2019).

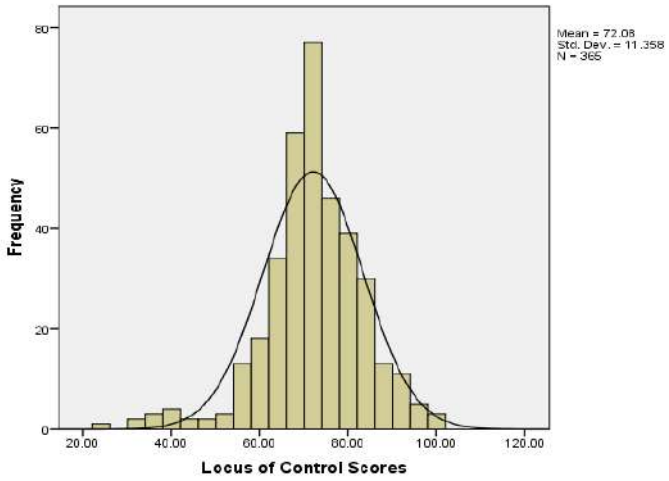


Figure 2. *Histogram of locus of control scores (M = 72.08, SD = 11.36, N = 365).*

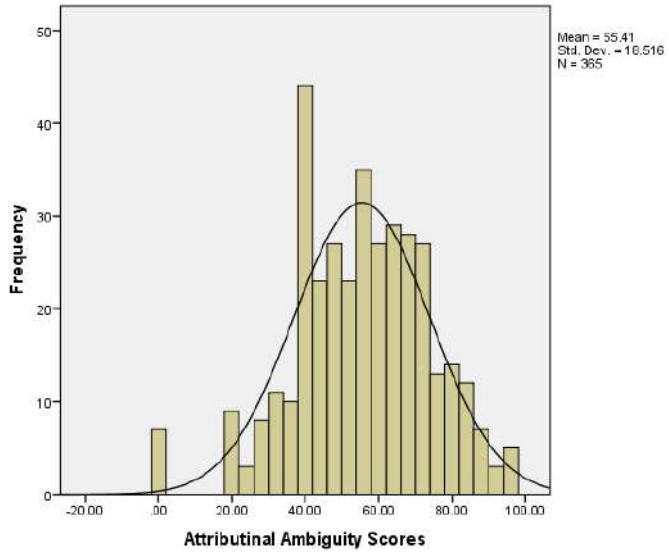


Figure 3. *Histogram of attributional ambiguity scores (M = 55.41, SD = 18.52, N = 365).*

4.3 Locus of control by gender, school type and residential status

Table 3 gives the distribution of locus of control across low, moderate and high categories for the sample and for subgroups, and Figure 4 displays the subgroup patterns. Because higher scores denote a stronger external orientation, the low category contains students with the most internal beliefs and the high category those with the most external beliefs. Overall, 38.6% of respondents fell in the low category, 33.7% in the moderate category and 27.7% in the high category. The categories describe relative standing within the sample, so they do not contradict the high mean in Table 2.

By gender, male students were distributed fairly evenly across categories (33.1% low, 36.5% moderate and 30.4% high), whereas female students were concentrated in the low category (44.0%) and less often in the high category (25.0%). In other words, girls were somewhat more likely than boys to hold the most internal beliefs on this scale. By school type, 55.1% of girls' school students were in the low category and only 12.2% in the high category, compared with 25.5% and 31.4% among boys' school students and 38.1% and 29.8% among mixed-school students. By residential status, the high category was largest among day students (34.2%) and smallest among boarding students (21.5%), while the low category was largest among boarding students (41.9%). These are descriptive patterns, the groups of girls' and boys' school students are small, and none of the differences was tested inferentially.

Table 3. *Locus of control levels by subgroup (percentage within group)*

Group	Low (internal)	Moderate	High (external)
Whole sample	38.6	33.7	27.7
Male	33.1	36.5	30.4
Female	44.0	31.0	25.0
Mixed schools	38.1	32.1	29.8
Boys' schools	25.5	43.1	31.4
Girls' schools	55.1	32.7	12.2
Day	37.5	28.3	34.2
Boarding	41.9	36.6	21.5
Day-and-boarding	37.5	36.2	26.3

Note. Moderate-category percentages are the remainder after the low and high categories where these were reported separately. Categories describe relative standing within the sample and are not clinical or normative cut-offs.

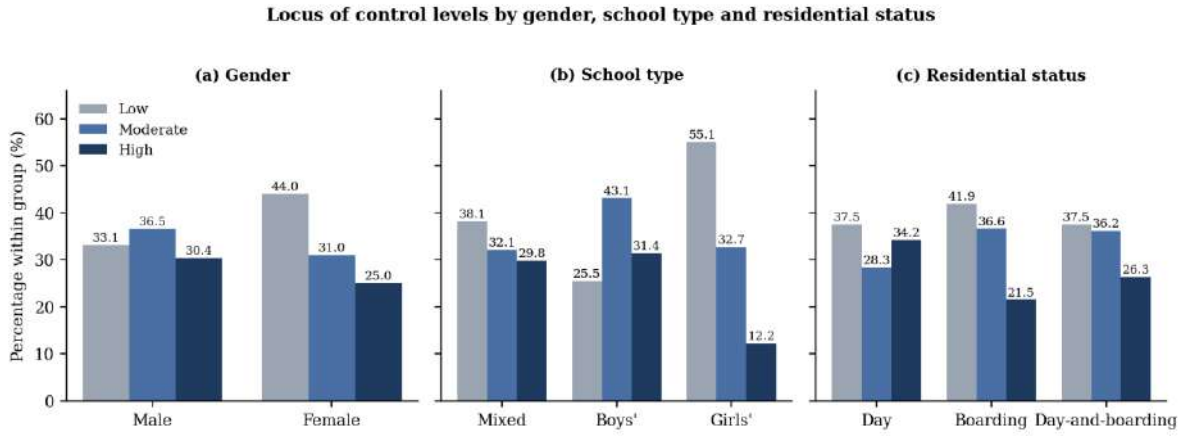


Figure 4. *Distribution of locus of control levels by gender, school type and residential status.*

4.4 Correlation between locus of control and attributional ambiguity

Table 4 presents the Pearson product-moment correlation. The correlation was positive, statistically significant and of small-to-moderate size (r = .283, p < .001, one-tailed), and the 95% confidence interval, from .186 to .375, lies well above zero. The coefficient of determination (r^2 = .080) indicates that about 8.0% of the variance in attributional ambiguity is shared with locus of control. The direction is as the theory predicts: the stronger the belief that academic outcomes lie outside the student's control, the greater the uncertainty about why results occur. Against the benchmarks of Cohen (1988), the coefficient falls between a small effect (.10) and a medium effect (.30), close to the medium benchmark, and the lower bound of the confidence interval is itself above the small benchmark.

Table 4. *Pearson correlation between locus of control and students' academic achievement level of attributional ambiguity*

Variable pair	r	95% CI for r	Sig. (1-tailed)	N
Locus of control and attributional ambiguity	.283	[.186, .375]	< .001	365

Note. The 95% confidence interval was computed using Fisher's z transformation. Higher locus of control scores indicate a stronger external orientation.

4.5 Regression analysis

The regression model was specified as AA = a + b_1(LOC) + e, where AA is attributional ambiguity and LOC is locus of control. Tables 5 to 7 present the model summary, analysis of variance and coefficients. Locus of control explained 8.0% of the variance in attributional ambiguity (R^2 = .080, adjusted R^2 = .077), and the model was statistically significant, $F(1, 363)$ = 31.553, p < .001. The unstandardized coefficient was B = .461

(*SE* = .082), meaning that each one-unit increase in locus of control, a stronger external orientation, was associated with a 0.461-unit increase in attributional ambiguity (β = .283, *t* = 5.617, *p* < .001). The 95% confidence interval for *B*, from .300 to .622, does not include zero. The regression equation is AA = 22.179 + 0.461(LOC).

Table 5. *Model summary for locus of control predicting attributional ambiguity*

R	R^2	Adj. R^2	Std. error	ΔR^2	ΔF	df1	df2	Sig. ΔF
.283	.080	.077	17.785	.080	31.553	1	363	< .001

Note. Predictor: (Constant), locus of control. Dependent variable: attributional ambiguity.

Table 6. *Analysis of variance for the locus of control regression model*

Source	Sum of squares	df	Mean square	F	Sig.
Regression	9,980.452	1	9,980.452	31.553	< .001
Residual	114,819.724	363	316.308		
Total	124,800.175	364			

Note. Dependent variable: attributional ambiguity. Predictor: (Constant), locus of control.

Table 7. *Regression coefficients for locus of control predicting attributional ambiguity*

Variable	B	Std. error	β	t	Sig.	95% CI for B
(Constant)	22.179	5.988		3.704	< .001	
Locus of control	.461	.082	.283	5.617	< .001	[.300, .622]

Note. Dependent variable: attributional ambiguity.

The practical meaning of the coefficient can be illustrated with predicted values, shown in Figure 5. A student with the lowest observed locus of control score of 24, the most internal orientation, would be predicted to score 33.2 on attributional ambiguity, and a student with the highest score of 100, the most external orientation, would be predicted to score 68.3. This is a difference of 35.1 points across the observed range, or nearly two standard deviations of attributional ambiguity. Because the extreme scores are rare, a more representative contrast is the effect of one standard deviation of locus of control (11.36 points), which corresponds to a change of about 5.2 points in attributional ambiguity, or 0.28 of its standard deviation. Cohen's f^2 is .09, between the small (.02) and medium (.15) benchmarks. The equation predicts 55.4 for a student at the mean locus of control score, which equals the observed mean of the dependent variable. The effect is statistically reliable and of modest but real practical importance.

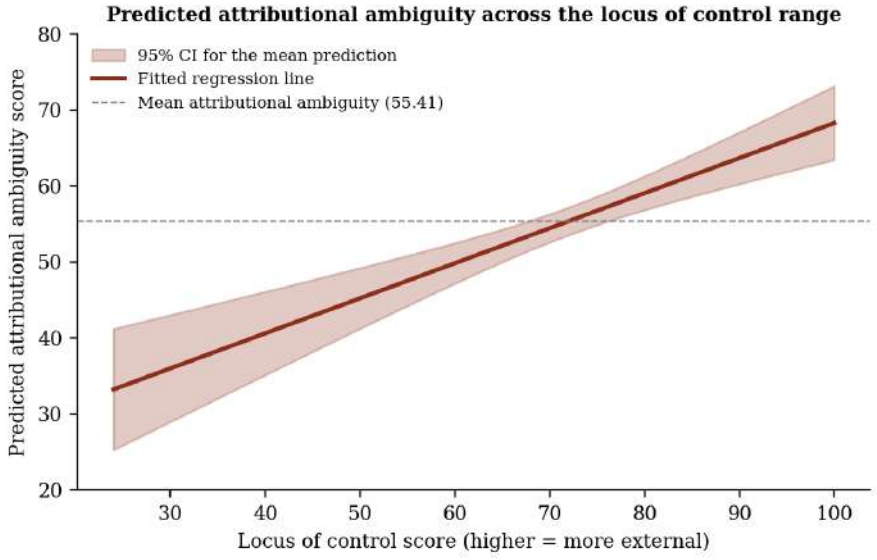


Figure 5. *Fitted regression line for locus of control predicting attributional ambiguity.* The line and the 95% confidence band for the mean prediction were computed from the coefficients and standard deviations reported in Tables 2 and 5 to 7; they are not a plot of the raw data.

4.6 Decision on the null hypothesis

Because the significance value of the regression model ($p < .001$) and of the correlation ($p < .001$) are both below .05, the null hypothesis H_{04} is rejected. Locus of control has a statistically significant influence on students' academic achievement level of attributional ambiguity among Form Four students in Bomet East Sub-County, with a stronger external orientation associated with greater ambiguity.

V. DISCUSSION

The study asked whether locus of control influences students' academic achievement level of attributional ambiguity. The answer is that it does. Locus of control was positively and significantly related to ambiguity ($r = .283$, $p < .001$), it explained 8.0% of its variance, and each one-point increase in external orientation was associated with 0.461 points more ambiguity (95% CI .300 to .622). The null hypothesis H_{04} was rejected. Students who believed that their academic outcomes lay mainly outside their control were more uncertain about why those outcomes occurred than students who believed that effort and ability determined them. This section interprets the finding, compares it with the literature, considers the size of the effect and its limits, and draws out the implications for theory.

5.1 Why an external orientation goes with greater ambiguity

The result is consistent with the theoretical position that guided the study. Weiner (1985) classified causes by locus of causality, stability and controllability, and Rotter's (1966) construct is the personal counterpart of the first of these dimensions. A student with an internal orientation has a stable reference against which any result can be interpreted: a good mark confirms that preparation worked and a poor mark signals that something in preparation must change. The student with an external orientation has no comparable anchor. If outcomes are believed to depend on luck, the difficulty of the paper, the generosity of a marker or the favor of a teacher, then every result can be explained in several ways and none of the explanations can be tested, because each is unstable, hidden or beyond the student's influence. Interpretive uncertainty is the natural consequence.

A second line of reasoning comes from the way control beliefs organize the search for causes. Heider's (1958) intuitive scientist looks for causes that can be verified through observation and action. Internal causes such as effort and strategy lend themselves to this kind of testing, since a student can revise more, change method and observe the effect. External causes largely do not. A student who has concluded that outcomes depend on forces outside personal control has little reason to examine the results closely, and the causal question stays open. This reading matches the observation of Ahmed et al. (2021) that externally oriented students respond to unclear feedback with avoidant or emotion-focused coping, and avoidance of this kind prevents the very analysis that would reduce uncertainty.

5.2 Comparison with studies of control beliefs under ambiguous conditions

The result is in line with the Kenyan evidence that bears most directly on the question. Gitumu and Kinyua (2024) reported that unclear feedback and institutional practices prompted Kenyan students in higher education to shift toward external attributions, which implies that the evaluative environment and control orientation are bound together. The present result shows the association from the other side by demonstrating that, in secondary school students, the more external the orientation, the greater the uncertainty about causes. Together the two findings suggest a reinforcing relationship in which unclear evaluative conditions encourage external attributions and external attributions deepen uncertainty. Gál et al. (2023) found that students holding a fixed mindset were more exposed to negative interpretations of adverse academic experiences, and Liu and Li (2023) found that externally oriented students gave less consistent explanations of their performance. The present study confirms for a rural Kenyan secondary school sample what these studies suggested, using a direct measure of uncertainty about causes in place of coping, mindset or consistency of explanation.

5.3 The size of the effect and what it implies

The coefficient of determination of .080 shows that locus of control accounts for about one twelfth of the variation in attributional ambiguity, and the standardized coefficient of .283 lies between the small and medium benchmarks of Cohen (1988). In practical terms, a difference of one standard deviation in locus of control corresponds to about 5.2 points, or 0.28 standard deviations, of ambiguity.

The same figure shows that over 90% of the variation in ambiguity is not explained by locus of control. It would be a mistake to treat control beliefs as the principal cause of ambiguity. Part of the unexplained variation probably reflects the feedback environment, which students in the sub-county share. Mkumbo and Amani (2022) reported that unclear assessment criteria and limited formative feedback in East African secondary schools were associated with reduced clarity in students' understanding of their academic standing, and these features are properties of schools and not of individual students. Brandmo and Gamlem (2025) likewise emphasized that the effects of feedback depend on how students perceive and use it. Part of the

remainder will also reflect other personal factors, such as anxiety, which in the wider study had its own association with ambiguity (r = .256, R^2 = .065), and measurement error in a five-item scale. The sensible conclusion is that locus of control is one reliable, moderately sized contributor in a multi-determined outcome.

The result also bears on the distinction between a stable disposition and a situational state drawn in Section 2.3.3. If locus of control and ambiguity were the same construct, the correlation would be close to one, and if they were unrelated it would be close to zero. A moderate association is what would be expected of a stable orientation that influences, without fixing, how a student reads individual results. Ahmed et al. (2021) and Gál et al. (2023) suggested that even internally oriented students may feel uncertain when evaluative cues are unclear, and the sizeable unexplained portion here is consistent with this. An internally oriented student who receives a score without a marking scheme or a comment is likely to be uncertain too. External orientation raises the baseline of uncertainty, and the quality of feedback determines how much of it a given student actually experiences.

5.4 Distributional features and subgroup patterns

The sample leaned toward the external end of the scale (M = 72.08), with 27.7% of students in the high category and 38.6% in the low category, and this lean has two possible readings. First, it may reflect the conditions of the schools. Large classes, limited materials, a competitive terminal examination and summative feedback are all conditions under which students encounter outcomes shaped by factors they cannot control, and external beliefs may be a realistic response to such conditions and not a defect of the students. Second, it may reflect the way the scale was keyed, with some of its items asking directly about the influence of factors outside the student's control.

5.5 Implications for theory

The study contributes to theory in four ways. First, it supports the integration of Attribution Theory and Social Cognitive Theory proposed in Section 2.2, in which self-perceptual constructs act as antecedents that make the causal attribution process easier or harder. Locus of control is the construct most closely tied to Weiner's locus of causality, and the finding that it predicts uncertainty about causes is consistent with the integration. Second, it adds to Attribution Theory a variable that the theory does not itself treat, namely the degree of confidence with which causes are held, and it shows that this variable is related to a stable belief about control. Third, it suggests that the stable-disposition view of locus of control should be tempered. A disposition that explains only 8% of a situational state leaves substantial room for situations to matter, which accords with the work of Ahmed et al. (2021) and Gál et al. (2023). Fourth, it shows that a construct built for stigma research (Crocker & Major, 1989) can be applied to the academic domain, in an African secondary school setting, and can be predicted from a standard educational construct.

5.6 Gaps addressed by the finding

The finding addresses the gaps identified in Section 2.4. As regards knowledge, it shows for the first time in a Kenyan rural secondary school population that locus of control predicts the clarity of students' causal explanations for their academic outcomes, which regional work on coping, resilience and achievement had not tested. On the theoretical side, it clarifies the relationship between a relatively stable control orientation and a situational state of uncertainty by showing that the two are related but distinct. Methodologically, it relates a domain-specific control measure to a separate measure of interpretive uncertainty within a single sample and analyzes them with regression, with confidence intervals and effect sizes. The cross-sectional and self-report nature of the data prevents conclusions about direction and change over time.

VI. CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

6.1 Conclusions

The study concludes that locus of control significantly influences students' academic achievement level of attributional ambiguity among Form Four students in Bomet East Sub-County. Students who attribute their academic outcomes mainly to forces outside their control are more uncertain about why they succeed or fail than students who attribute them mainly to their own effort and ability. The association is of modest but real size, with locus of control accounting for about 8% of the variance in ambiguity, and it should be regarded as one contributor among several. The belief that outcomes lie outside one's control is thus connected not only to how students perform but to how well they can understand their performance.

6.2 Implications for practice

The finding has direct implications for guidance and counseling. Programs that help students to see the connection between their own actions and their results can be expected to reduce both the external orientation and the uncertainty that accompanies it. In practice this means moving from a general encouragement to "work harder" toward concrete exercises in which students trace marks back to identifiable study behaviors and

features of the paper. It also means that schools should attend to the conditions that encourage external beliefs, notably summative feedback that gives a score without reasons.

6.3 Recommendations

- *School counselors* should assess students' control beliefs early in the final year and give targeted support to students with strongly external orientations, using attribution retraining that teaches students to distinguish the roles of effort, strategy, task difficulty and chance and to link them to specific results.
- *Teachers* should return examination results with specific, criterion-referenced and timely feedback, including a marking scheme and comments on the common errors made, so that the causes of results are visible to students and an external explanation is not the only one available (Mkumbo & Amani, 2022; Brandmo & Gamlem, 2025).
- *School principals* should provide time within the school calendar for structured post-examination review and mentoring in which students reflect on their results, and should strengthen guidance and counseling departments so that such reflection is guided and not left to chance.
- *The Sub-County Education Office, the Ministry of Education and the Kenya National Examinations Council* should consider how examination results and school reports are communicated to learners, and should include the development of students' sense of agency over their learning as an explicit aim of guidance curricula.

6.4 Limitations

Several limitations qualify the interpretation. The design is cross-sectional, so the direction of influence cannot be established, and the reverse and reciprocal explanations discussed in Section 2.2 remain plausible. All variables were self-reported on one instrument, which may have introduced social desirability and shared method variance and which could have inflated the association, although the modest size of the coefficient suggests that any inflation was limited. The attributional ambiguity measure was developed for this study, and although it was reviewed by experts and piloted, it has not been validated beyond this sample. Locus of control was measured with a single score that does not separate powerful others from chance, and it was analyzed in a simple regression model, so the result describes its association with ambiguity taken singly and does not partition shared variance among the other self-perceptual constructs. The categories used in the subgroup figures are relative to the sample, and the boys' and girls' school groups are small. Finally, the study was confined to Form Four students in public secondary schools in one sub-county, and the findings should be generalized with caution.

6.5 Suggestions for further research

- Longitudinal and cross-lagged designs that follow students from Form One to Form Four to establish whether an external orientation leads to greater ambiguity, whether ambiguity strengthens an external orientation, or both.
- Measures that separate internal control, control by powerful others and control by chance, and that capture culturally specific communal and spiritual sources of control, in order to determine which forms of external belief are most closely tied to ambiguity.
- Multiple regression and structural equation modeling to test whether locus of control operates directly or through feedback quality, examination anxiety and other self-perceptual constructs.
- Intervention studies testing whether attribution retraining and improved feedback reduce external orientation and ambiguity among Form Four students, with mixed-methods designs that include the perspectives of teachers and counselors.
- Replication in urban and private schools and in other counties to test generalizability.

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