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Achievement Goals, Perceived Teacher Support, and Mathematics Achievement: The Mediating Role of Academic Disidentification

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ABSTRACT: In a competency-based curriculum (CBC), the development of logical and critical thinking skills in mathematics is essential. As a cornerstone of Science, Technology, Engineering, and Mathematics (STEM), mathematics is pivotal for addressing real-world challenges. However, overall pass rates remain unsatisfactory in Kenyan secondary schools, particularly in Kisii County. This study investigated the mediating role of academic disidentification in the relationship between achievement goals, perceived teacher support, and mathematics achievement. Grounded in the revised 3x2 Achievement Goal Model, Self-Determination Theory, and Expectancy-Value Theory, a correlational design was employed with a random sample of 418 Form Three students from thirty seven schools in Kisii County; Kenya in 2023. Multiple linear regression analysis revealed that academic disidentification partially mediates the relationship among achievement goals, perceived teacher support, and mathematics achievement. School categories differed significantly in avoidance motivation, with co-educational schools exhibiting the highest levels. Based on these findings, the study recommends that mathematics teachers prioritize fostering approach motivation, especially in co-educational schools, to enhance student achievement in mathematics.

1. INTRODUCTION

In recent years, Science, Technology, Engineering, and Mathematics (STEM) education has gained prominence for its vital role in fostering essential 21st-century skills, including critical thinking, problem-solving, and technological literacy. These skills are crucial for developing a competitive workforce capable of addressing complex global challenges. Central to effective STEM education is a solid foundation in mathematics; as Shaughnessy (2013) notes, “the M in STEM will become insignificant if not given significant attention” (p. 324) within integrative educational programs.

Literature indicates that mathematical competence not only enhances systematic thinking but also nurtures creativity and data analysis - skills indispensable in STEM fields (Just & Siller, 2022; McKenna, 2023; Nufus et al., 2024; Wang et al., 2023; Yildirim & Yilmaz, 2023). According to McKenna (2023), students with a robust foundation in mathematics are better positioned to become the next generation of innovators and problem solvers. However, despite its critical role in fostering innovation, mathematics achievement remains persistently low, both globally and in Kenya (Namkung et al., 2019; Mazana et al., 2020; KNEC, 2022).

Recent research has increasingly highlighted the importance of achievement goals (Vergara, 2021; Wu, 2023) and perceived teacher support (Li et al., 2023; Wang et al., 2024; Zhou et al., 2024) in influencing mathematics performance. Yet, a key question arises: do these relationships endure when students psychologically withdraw from academics? This study examines the mediating role of academic disidentification in the connections between these factors and mathematics achievement.

Grounded in the 3x2 trichotomous model of goal orientation (Elliot et al., 2011) and Self-Determination Theory (Ryan & Deci, 2000), this research posits that student motivation thrives when the needs for competence, autonomy, and relatedness are

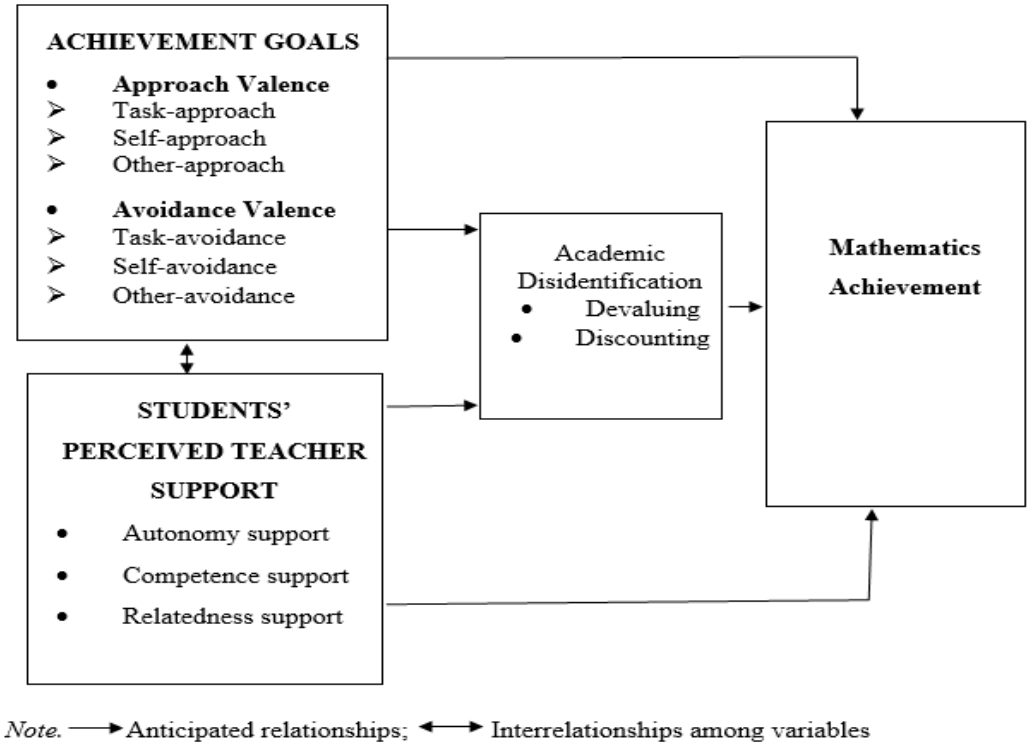
satisfied—needs significantly shaped by teacher interactions. When students experience academic disidentification (Kim & Meister, 2023), the benefits of achievement goal orientation and social support may erode, as students tend to devalue academic performance (Major et al., 1998).

Motivational literature highlights complex interconnections among the study variables. Research indicates that achievement goals serve as antecedents, while academic performance is an outcome influenced by value judgments (Hulleman et al., 2008; Ncororo et al., 2022; Osborne & Jones, 2011). Furthermore, academic achievement has been shown to be predicted by both achievement goal orientation (Ndyareeba et al., 2024; Ng'ang'a et al., 2018; Werunga & Odera, 2022) and the related construct of identity (Ireri, 2015; Ireri et al., 2015; Ireri et al., 2021; Radišić et al., 2024).

Goal orientation profiles are particularly linked to perceived instructional strain (Pulkka & Budlong, 2022) and students' perceived costs associated with studying mathematics (Tuominen et al., 2020). Together, goal orientation and value beliefs predict academic achievement (Hunsu et al., 2023). Given that teachers are significant external influences on students' achievement goals (Zhong et al., 2023), teacher support has been found to correlate with the value students assign to academic tasks (see Möller, 2024, for a review). Additionally, Loose et al. (2012) and Carvalho et al. (2021) highlight the intricate relationships between academic discounting, teacher feedback, and student engagement, emphasizing the need for a nuanced understanding of these dynamics. It was thus conceptualized that academic disidentification mediates the relationships among achievement goal orientations, perceived teacher support, and academic achievement (see Figure 1).

However, most existing research focuses on college samples from the Global North, with secondary school students in the Global South largely underrepresented. Responding to calls for more diverse perspectives in psychological research (Balva et al., 2022; Puthillam et al., 2023), this study investigates academic disidentification as a mediator between achievement goals, perceived teacher support, and mathematics achievement among secondary school students in Kenya. It is anticipated that when students devalue academic tasks, this devaluation will mediate the relationships among achievement goal orientation, perceived teacher support, and academic achievement.

Figure 1: Conceptual Framework



Note. ⟶ Anticipated relationships; ⟷ Interrelationships among variables

2. METHODOLOGY

2.1 Research Design

This study embraced a correlational design (Creswell, 2018) to ascertain the relationships exist between AGs, perceived teacher support, and mathematics achievement. Importantly, the design was suitable in exploring the mediating role of academic disidentification in the relationships between AGs, perceived teacher support and mathematics achievement.

2.2 Sampling

Thirty-seven secondary schools were selected through stratified sampling across four categories in Kenya: National, Extra County, County, and Sub-County. Participants were then chosen via simple random sampling within each category, ensuring equal selection probability, as noted by Fowler and Lapp (2019). Following the guidelines established by Gill et al. (2010), a sample size of 322 was deemed adequate for our target population of 2,000 form three students. Consistent with the recommendation by Israel (2020), the sample size was adjusted by 30% to account for possible non-response and incomplete questionnaires, yielding a final sample size of 418 participants.

2.3 Research Instruments

Section I consisted of demographic information: A demographic information form captured the participants' age, gender, school category, and the school type. Section II had sets of questionnaires - Achievement Goal Questionnaire (AGQ) used to measure achievement goals, modified Teacher as Social Context Questionnaire (TASC – Student Version) used to measure perceived teacher support, and Modified Intellectual Engagement Inventory (MIEI) used to measure academic disidenitification. An average of mathematics scores end of term one and term two, 2023 converted to Z scores were used to measure mathematics achievement. The instruments comprised of closed-ended items.

2.4 Procedure

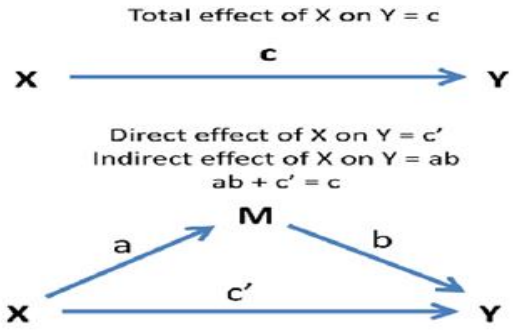
Self-administered questionnaires were used for data collection. Prior to this, the researcher informed the principals of the selected schools about the study's purpose and arranged a specific date and time for data collection. Participants were given 20-30 minutes to complete the questionnaires, accommodating individual differences in response time. Additionally, Form Three class teachers provided the researcher with the mathematics examination scores from the end of Term One and Term Two in 2023.

2.5 Data Analysis

H_{03}: Academic disidentification does not significantly mediate the relationship between achievement goals, perceived teacher support and mathematics achievement

The hypothesis was tested using multiple linear regression analysis. Baron and Kenny, (1986, as cited in Dastgeer et al., 2020) guided the mediation analysis.

Figure 2.1 Statistical mediation model. Adapted from Baron and Kenny (1986).



To further explore the null hypothesis, the researcher used path analysis.

3. RESULTS

To carry out the mediation test, the following conditions were tested; step 1: whether the independent variable in every hypothesis had a significant association with the dependent variable (i.e., mathematics achievement) (test path c); step 2: whether the independent variable had significant association with the mediator (i.e., academic disidentification) (test path a); step 3: whether the mediator variable had a significant association with the dependent variable (test path b). Step 4 involved

establishing whether the mediating variable mediates the association between the independent and outcomes variables. Path c demonstrates the total effect. The effects of independent and mediator variables on the outcome variable were computed. Mediation effect is considered to be either full (effect is zero) or partial (effect decreases) (Celli, 2022).

Analysis of hypothesis was done in two parts. In part one, eight supplementary hypotheses affiliated to devaluing and in part two, eight supplementary hypotheses affiliated to discounting were advanced.

First, the descriptive statistics for academic disidentification were done.

Table 3.1 Descriptive Statistics for Academic Disidentification Subscales

Sub-dimension	Mean	SD	MD	Sk	Kur
Devaluing	19.25	1.86	2.05	-.29	.55
Discounting	17.30	1.14	3.29	-.37	-.60

Note. N = 418; SD = standard deviation; Kur = kurtosis; Sk = skewness.

Table 3.1 shows results on devaluing and discounting subscales of academic disidentification. Results for devaluing had a mean score of 19.25 and a standard deviation of 1.86. It was negatively skewed; -.29 with kurtosis of -.55. Negative skewness showed that most of the scores in relation to academic disidentification were above the mean. On the other hand, the mean score for discounting was 17.30 and standard deviation of 1.14. The scores had a negative skewness of -.37 and a positive kurtosis of -.60 as well.

A correlation test was then done and results presented in Table 3.2.

Table 3.2 Correlation Matrix for Academic Disidentification Subscales, Subscales of the Independent Variables and Mathematics Achievement

	Devaluing	Discounting	MA
Tap	-.26**	.33**	.23**
Sap	-.18**	-.29**	.27**
Oap	-.25**	-.30**	.26**
Tav	.33**	-.21**	-.37**
Sav	.35**	-.41**	-.36**
Oav	.24**	-.25**	-.44**
AuS	-.23**	-.20**	.39**
CoS	-.28**	-.23**	.39**
ReL	-.26	-.28	.26
MA	-.31**	-.36**	1

Note. ** = significant relationship

Note. Tap = Task approach goals; Sap = Self-approach goals; Oap = other approach goals; Tav = Task avoidance goals; Sav = Self-avoidance goals; Oav = other avoidance goals; AuS = Autonomy support; CoS = Competence support; ReL = Relatedness; MA = Mathematics achievement.

Table 3.2 indicates that all the variables were statistically significantly correlated except relatedness variable. Consequently, this variables was excluded from mediation analysis.

3.1 Hypothesis Testing

To conduct mediation analysis, the following null hypothesis was central:

H_{03}: Academic disidentification does not significantly mediate the relationship between achievement goals, perceived teacher support and mathematics achievement

Analysis of this hypothesis was done in two parts. In part one, eight supplementary hypotheses affiliated to devaluing and in part two, eight supplementary hypotheses affiliated to discounting were advanced.

a. Hypothesis for Devaluing

H03.1: Devaluing does not significantly mediate the relationship between Tap goals and mathematics achievement.

H03.2: Devaluing does not significantly mediate the relationship between Sap goals and mathematics achievement.

H03.3: Devaluing does not significantly mediate the relationship between Oap goals and mathematics achievement.

H03.4: Devaluing does not significantly mediate the relationship between Tav and mathematics achievement.
H03.5: Devaluing does not significantly mediate the relationship between Sav and mathematics achievement.
H03.6: Devaluing does not significantly mediate the relationship between Oav and mathematics achievement.
H03.7: Devaluing does not significantly mediate the relationship between autonomy support and mathematics achievement.
H03.8: Devaluing does not significantly mediate the relationship between competence support and mathematics achievement.
In all the eight hypotheses, regression model of mediation analysis was done. The results are presented in Table 3.3.

Table 3.3 Regression Model of Mediation of Devaluing in the Relationship between Achievement Goals and Perceived Teacher Support Subscales and Mathematics Achievement

Hypothesis	Path	Beta (Unstandardized)	SE	Beta (Standardized)	r	F	p-value
1	c	1.05	1.38	.15	.23	16.22	.00
	a	.26	.03	.09	-.26	11.58	.00
	b	1.39	1.42	.14	-.31	18.30	.00
2	c	2.11	1.93	.13	.23	22.67	.00
	a	1.32	.54	.07	-.26	13.40	.00
	b	.87	1.25	.10	-.31	9.34	.00
3	c	2.70	2.03	.18	.26	14.30	.00
	a	1.41	.03	.11	-.25	10.98	.00
	b	.86	1.80	.12	-.31	15.44	.00
4	c	3.60	2.53	.16	-.44	19.26	.00
	a	1.43	1.06	.10	.24	16.13	.00
	b	1.76	2.38	.13	-.31	14.22	.00
5	c	2.06	2.95	.14	-.36	21.13	.00
	a	1.33	.07	.08	.35	16.74	.00
	b	1.96	1.36	.06	-.31	19.61	.00
6	c	1.88	2.41	.17	-.44	7.90	.00
	a	.35	.24	.11	.24	6.93	.00
	b	3.12	2.66	.12	-.31	4.15	.00
7	c	3.12	2.11	.09	.39	16.64	.00
	a	.65	.53	.06	-.23	13.78	.00
	b	1.40	1.42	.11	-.31	9.70	.00
8	c	2.76	2.11	.12	.34	20.65	.00
	a	.49	.55	.07	-.28	17.63	.00
	b	1.80	2.47	.10	-.31	8.91	.00

Note. SE = Standard error

Results in Table 3.3 reveal:

Hypothesis I: An increase in devaluing was associated with a decrease in mathematics achievement. When controlling for devaluing, the beta value decreased from .15 to .09 showing evidence of partial mediation.

Hypothesis 2: An increase in devaluing was associated with a decrease in mathematics achievement. When controlling for devaluing, the beta value decreased from .13 to .07 showing evidence of partial mediation.

Hypothesis 3: An increase in devaluing translated to a decrease in mathematics achievement. When controlling for devaluing, the beta value decreased from .18 to .11 showing evidence of devaluing being a partial mediator in the association between Oap goals and mathematics achievement.

Hypothesis 4: An increase in devaluing was attributed to a decrease in mathematics achievement. The results for controlling for devaluing showed a decrease in the beta value from .16 to .10. This was an evidence of devaluing partially mediating the association between Tav goals and mathematics achievement.

Hypothesis 5: An increase in devaluing was linked with a decrease in mathematics achievement. Controlling for devaluing also resulted in a decrease in the beta value from .14 to .08; showing evidence of that devaluing partially mediated the association between Sav goals and mathematics achievement.

Hypothesis 6: an increase in devaluing was attributable with a decline in mathematics achievement. When other devaluing was controlled for, the beta value decreased from .17 to .11, therefore, giving evidence that devaluing partially mediated the association between Oav goals and mathematics achievement.

Hypothesis 7: The outcome revealed that an increase in devaluing was attributed to a decrease in mathematics achievement. In addition, when devaluing was controlled for, a decrease in the beta value from .09 to .06 was noted. Thus, devaluing partially mediated the association between autonomy support and mathematics achievement.

Hypothesis 8: An increase in devaluing was linked to a decrease in mathematics achievement. When devaluing was controlled for, the beta value decreased from .12 to .07; confirming that devaluing partially mediated the association between competence support and mathematics achievement.

b. Hypotheses for Discounting

H03.1: Discounting does not significantly mediate the relationship between Tap goals and mathematics achievement.

H03.2: Discounting does not significantly mediate the relationship between Sap goals and mathematics achievement.

H03.3: Discounting does not significantly mediate the relationship between Oap goals and mathematics achievement.

H03.4: Discounting does not significantly mediate the relationship between Tav support and mathematics achievement.

H03.5: Discounting does not significantly mediate the relationship between Sav and mathematics achievement.

H03.6: Discounting does not significantly mediate the relationship between Oav and mathematics achievement.

H03.7: Discounting does not significantly mediate the relationship between autonomy support and mathematics achievement.

H03.8: Discounting does not significantly mediate the relationship between competence support and mathematics achievement.

Results for all the eight hypotheses are presented in Table 3.4.

Table 3.4 Regression Model of Mediation of Devaluing in the Relationship between AGs and Perceived Teacher Support Subscales and Mathematics Achievement

Hypothesis	Path	Beta (Unstandardized)	SE	Beta (Standardized)	r	F	p-value
1	c	3.12	2.40	.17	.23	19.16	.00
	a	.80	.90	.13	-.33	14.98	.00
	b	2.23	1.42	.16	-.36	11.23	.00
2	c	1.51	2.58	.20	.27	14.80	.00
	a	.59	.21	.13	-.29	12.63	.00
	b	2.67	2.30	.09	-.31	10.67	.00
3	c	1.37	3.31	.09	.26	10.24	.00
	a	1.62	1.21	.05	-.30	11.42	.00
	b	0.35	1.67	.06	-.31	12.11	.00

4	c	3.62	2.46	.10	-.37	13.54	.00
	a	.68	.31	.08	-.21	9.02	.00
	b	2.67	1.22	.02	-.36	8.76	.00
5	c	3.15	2.68	.11	-.36	12.44	.00
	a	.52	.34	.07	-.41	9.67	.00
	b	2.56	1.40	.13	-.36	7.70	.00
6	c	2.01	3.61	.14	-.44	14.29	.00
	a	.44	.45	.09	-.25	13.58	.00
	b	2.56	.58	.11	-.36	12.36	.00
7	c	2.04	2.48	.16	.39	17.16	.00
	a	1.32	.48	.11	-.20	10.60	.00
	b	.37	1.34	.10	-.36	13.41	.00
8	c	1.64	1.38	.10	.39	22.28	.00
	a	.08	.05	.06	-.23	18.58	.00
	b	.27	2.59	.08	-.36	12.93	.00

Note. 418. SE = Standard error

Results in Table 3.4 reveal:

Hypothesis 1: An increase in discounting was associated with a decrease in mathematics achievement. When controlling for discounting, the beta value decreased from .17 to .13 showing evidence of partial mediation. Discounting, therefore, was a partial and significant mediator in the association between Tap goals and mathematics achievement.

Hypothesis 2: An increase in discounting was attributable to a decline in mathematics achievement. When controlling for discounting, the beta value decreased from .20 to .13 showing evidence of partial mediation.

Hypothesis 3: An increase in discounting translated to a decrease in mathematics achievement. Whilst controlling for discounting, the beta value decreased from .09 to .05 showing evidence of partial mediation in the association between Oap goals and mathematics achievement.

Hypothesis 4: An increase in discounting was attributed to a decrease in mathematics achievement. The results for controlling for discounting showed a decrease in the beta value from .10 to .08. This was an evidence of discounting partially mediating the link between Tav goals and mathematics achievement.

Hypothesis 5: An increase in discounting was attributable to decline in mathematics achievement. Controlling for discounting also resulted in a decrease in the beta value from .11 to .07; showing evidence of that discounting partially mediated the association between Sav goals and mathematics achievement.

Hypothesis 6: The results pointed out that an increase in discounting was attributable to a decline in mathematics achievement. When discounting was controlled for, the beta value decreased from .14 to .09, therefore, giving evidence that discounting partially mediated the association between Oav goals and mathematics achievement.

Hypothesis 7: The outcome revealed that an increase in discounting was attributed to a decrease in mathematics achievement. In addition, when discounting was controlled for, a decrease in the beta value from .16 to .11 was noted. Thus, discounting partially mediated the association between autonomy support and mathematics achievement.

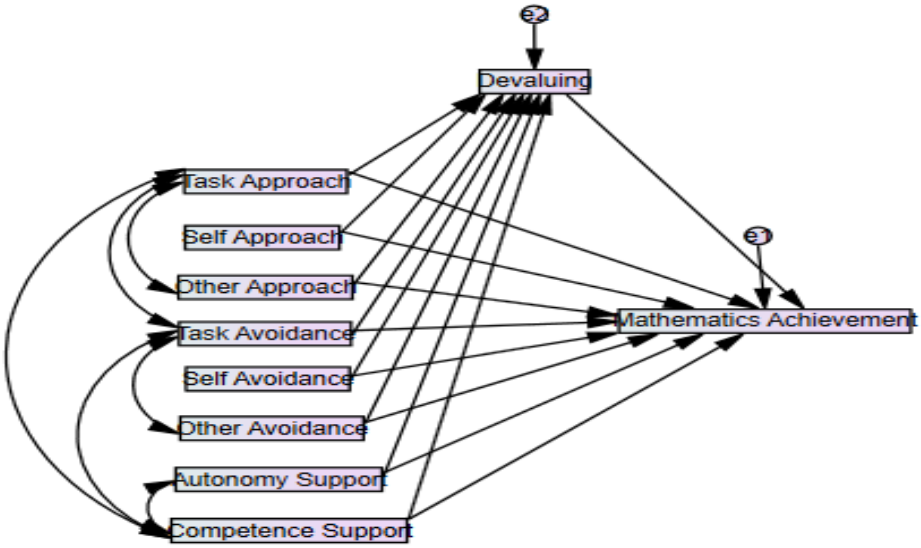
Hypothesis 8: An increase in discounting was linked to a decrease in mathematics achievement. When discounting was controlled for, the beta value decreased from .10 to .06; confirming that discounting partially mediated the relationship between competence support and mathematics achievement.

3.2 Path Analyses

Path analysis was used to test the overall conceptual framework advanced in the study. On this premise, path analysis sought to: a) estimate the path loadings of the independent (exogenous) variables on the dependent (endogenous) variable; b) show relationships between the variables based on a priori model; c) show the indirect effects of exogenous variables on the endogenous variable. The proposed model investigating whether academic disidentification mediated the relationship between

the achievement goals, perceived teacher support and mathematics achievement. Using Amos version 26 software; a general structural model was developed and results presented in Figure 3.1.

Figure 3.1 Reduced Structural Model 1



Estimates for the direct paths from Tap, Sap, Oap, autonomy and competence support through devaluing to mathematics achievement were negative and significant (β = -.26, -.28, -.25, -.23, -.20, p < .05 respectively). Conversely, estimates for the direct paths from Tav, Sav, and Oav goals to devaluing were positive and significant (β = .25, .22, .24 p < .05 respectively). The path from devaluing to mathematics achievement was negative and significant (β = -.21, p < .05). Therefore, Figure 3.1 demonstrates that the paths for Tap, Sap, Oap, autonomy, competence support and devaluing were negative and significant predictors of mathematics achievement while the paths for Tav, Sav, and Oav to devaluing were positive and significant predictor of poor mathematics achievement. Additionally, devaluing was a negative and significant predictor of mathematics achievement. As pointed out by Harris & Gleason (2022) direct effects show how 1 unit change in an independent variable will affects the outcome variable holding all other variables constant. Indirect effects for mathematics achievement through devaluing were determined and results are given in Table 3.5.

Table 3.5 Indirect Effects for Mathematics Achievement through Devaluing

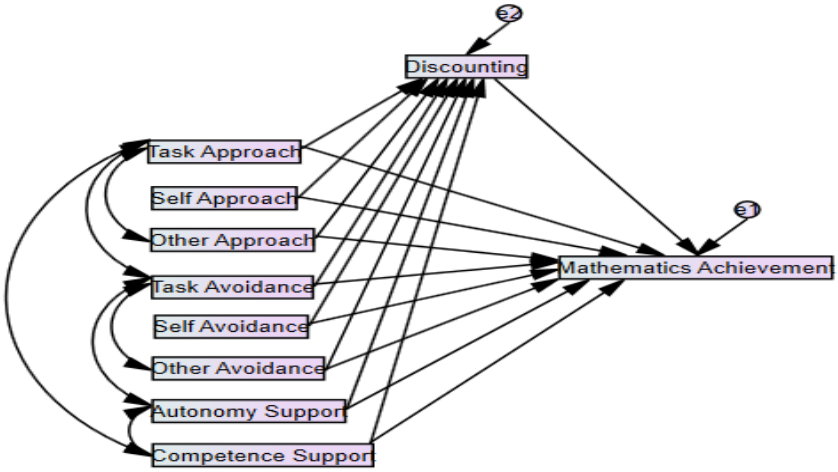
Predictors	Path a		Path b		Path c		IE	95% Boot CI	
	β	p	β	p	β	p		LL	UL
Task approach (p1)	-.26	.00	-.21	.00	.23	.00	.04	.33	.45
Self-approach (p2)	-.28	.00	-.21	.00	.23	.00	.03	.08	.12
Other approach (p3)	-.25	.00	-.21	.00	.18	.00	.04	.12	.20
Task avoidance (p4)	.25	.00	-.21	.00	-.20	.00	-.03	.11	.25
Self-avoidance (p5)	.22	.00	-.21	.00	-.24	.00	-.04	.09	.12
Other avoidance (p6)	.24	.00	-.21	.00	-.19	.00	-.03	.10	.18
Autonomy support (p7)	-.23	.00	-.21	.00	.26	.00	.04	.06	.13
Competence (p8)	-.20	.00	-.21	.00	.22	.00	.04	.10	.25

Note. P = path; IE=Indirect effects, CI=Confidence interval, LL=Lower Limit, UL=Upper Limit

The indirect effects of task based goals, self-based, approach based, avoidance based, autonomy, and competence on mathematics achievement through devaluing were determined and statistical significance assessed. The results revealed that the indirect effects of Tap goals to mathematics achievement was .04. The effect was found to be statistically significant (p<.05). Other indirect effects include Sap, Oap, Tav, Sav, Oav goals, autonomy and competence support (.03, .04, -.03, -.04, -.03, .04, and .04; p<.05) respectively. From the findings, the indirect effects were statistically significant.

Results for reduced model 2 are presented in Figure 3.2.

Figure 11 Reduced Structural Model 2



Similarly, estimates for the direct paths from Tap, Sap goals, Oap, autonomy and competence support through discounting to mathematics achievement were estimated. Results demonstrated that the estimates for task approach, self-approach, other approach, autonomy, and competence paths to discounting were negative and significant (β = -.20, -.29, -.18, -.20, -.23; p < .05) respectively while positive and significant for Tav, Sav, and Oav goals (β = .21, .19, .22; p < .05) respectively. The path from discounting to mathematics achievement was negative and significant (β = -.22, p < .05). Results in Table 3.5 affirms that the paths for Tap, Sap, Oap, autonomy, competence support to discounting were negatively associated and significant predictors of mathematics achievement while the paths for Tav, Sav and Oav goals to discounting were positive and significantly predicted mathematics achievement. Further, the indirect effects for mathematics achievement through discounting were determined and results were presented in Table 3.6.

Table 3.6. Indirect Effects for Mathematics Achievement through Discounting

Predictors	Path a		Path b		Path c		IE	95% Boot CI	
	β	p	β	p	β	p		LL	UL
Tap (p1)	-.20	.00	-.22	.00	.23	.00	.04	.12	.18
Sap (p2)	-.29	.00	-.22	.00	.27	.00	.04	.34	.39
Oap (p3)	-.18	.00	-.22	.00	.26	.00	.03	.25	.33
Tav (p4)	.21	.00	-.22	.00	-.27	.00	-.04	.17	.26
Sav (p5)	.19	.00	-.22	.00	-.26	.00	-.04	.13	.19
Oav (p6)	.22	.00	-.22	.00	-.21	.00	-.03	.10	.17
Autonomy support (p7)	-.20	.00	-.22	.00	.29	.00	.04	.03	.19
Competence (p8)	-.23	.00	-.22	.00	.26	.00	.04	.17	.23

Note. P = Path, IE=Indirect effects, CI=Confidence interval, LL=Lower Limit, UL=Upper Limit

Results from Table 3.6 demonstrates the indirect effect estimates of the independent variables on the outcome variable. The estimates for Tap, Sap, Oap, Tav, Sav, Oav goals, autonomy and competence support are (.04, .04, .03, -.04, -.04, -.03, .04, and .04; p<.05) respectively. It was established, therefore, that the indirect effects of the independent variables on the outcome variable were significant and associated with mathematics achievement.

4. DISCUSSION OF THE RESULTS

Premised on the tenets of the expectancy - value theory, motivation to perform well in mathematics is dependent on two components that include expectations and value linked to the mathematics task. The emphasis of this study was largely on the task value facet. Task value was operationalized as the motivation to engage in solving mathematics problems. Task value was characterized by four attributes - attainment value, the intrinsic value, cost, as well as the utility value. Students who believed they can solve certain mathematics tasks were more likely to find their achievement goals and teacher support aligned to their motivation of solving mathematics problems. Based on these findings, the study established that the two subscales of

disidentifying with mathematics – devaluing and discounting mediated the association between achievement goals and perceived teacher support subscales and mathematics achievement.

The path results affirmed prior findings that achievement goals, perceived teacher support, academic achievement predicts mathematics achievement. Importantly, through path analyses, the indirect effects of task based, self-based, approach based, avoidance-based goals, and autonomy and competence support on mathematics achievement through devaluing and discounting were statistically significant. Therefore, the indirect effect of the independent variables on the outcome variable also predicts mathematics achievement.

Disidentification, ego withdrawal from a domain and its standards, was found to result in a student exhibiting depleted ego on the pursuit of mathematics and may resist any encouragement either intrinsically or extrinsically to develop one. Domain disidentification illuminates a more permanent separation of the self and the mathematics domain whose outcome is suboptimal achievement in mathematics. Domain disidentification is a dynamic process. Prior studies are in agreement that continued disidentification impairs achievement (Ferd, 2016). In line with this, the study established that devaluing and discounting distances ego from a valued domain. As a result, students disidentified with mathematics are more likely to post poor mathematics achievement outcomes.

5. CONCLUSION AND RECOMMENDATIONS FOR FURTHER RESEARCH

Either process, discounting and devaluing, allows learners to psychologically distance themselves from pursuing their achievement goals and realizing the role of teacher support in developing their autonomy and competence consequently resulting poor mathematics achievement. Indeed, mathematics achievement requires strong identification with the subject, setting achievement goals and embracing the scaffolding role of mathematics teachers. The study concluded that avoidance valence goals are rarely related to positive mathematics outcomes (i.e., largely, a negative impact of avoidance motivation with mathematics achievement was reported), whereas approach valence goals had a positive association with mathematics achievement outcomes. These findings augment knowledge that ego attachment plays a crucial role in students' mathematics learning process. The findings of the current study can be linked to two plausible reasons. First, students' achievement goals would be affected by student individual reasons assigned to engaging in solving mathematics problems. Students focus may go high or decline in solving mathematics tasks depending on whether they are approach or avoidance based. Secondly, how students view the role of teacher support impact the overall achievement in mathematics.

Recommendations for further research: Whether the effect of devaluing and discounting on students' mathematics achievement is consistent across student subgroups and how background differences may influence the association was not within the scope of this study. Further studies are therefore recommended.

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