DOCUMENT RESUME

ED 304 614 CG 021 487

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TITLE The Relationship of Affective Variables to Student Performance: Research Findings.
PUB DATE Mar 89
NOTE 31p.; Paper presented at the Annual Conference of the National Association of Developmental Education (13th, Cincinnati, OH, March, 1989).
PUB TYPE Information Analyses (070) -- Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Achievement; Affective Measures; Anxiety; Cognitive Style; *College Freshmen; *Developmental Studies Programs; Developmental Tasks; Higher Education; *High Risk Students; *Performance Factors; *Student Attitudes; Student Educational Objectives; Student Motivation

ABSTRACT

This report examines the relationship between affective variables and academic success among high-risk college freshmen. It summarizes research conducted on the impact of student goals, learning styles, mathematics and test anxiety, other sources of stress, and level of development on achievement among Developmental Studies students. Results are reported showing that: (1) Developmental Studies students who placed a higher priority on academic reasons for attending the institution earned higher grades during their first quarter in the program; (2) Developmental Studies students were likely to prefer a hands-on learning style and learning through interaction and visual stimuli rather than through lecture and text; (3) stress and other variables may account for a greater proportion of variance in first quarter grades than does high school grade point average or Scholastic Aptitude Test scores; and (4) counseling can have a positive effect on developmental tasks. The report concludes that affective variables are significantly related to performance among Developmental Studies freshmen and that admissions decisions must consider student self-concept and motivational issues. Administrators and faculty members who serve high-risk populations are encouraged to consider individual student needs and to be willing to use various teaching strategies to communicate ideas to these students. The value of a counseling component in developmental/remedial education programs is emphasized. Three pages of references are included; 13 tables and 3 figures are appended. (NB)

The Relationship of Affective Variables to Student Performance: Research Findings

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Running head: Research Findings

Abstract

Numerous affective variables are related to the academic success of high risk freshmen. This paper summarizes research conducted by the authors which examines the impact of students' goals, learning styles math and test anxiety, other sources of stress, and level of development on achievement among Developmental Studies students.

Assessment is widely accepted as a key to promoting the academic success of high risk students (Bray, 1987). Generally, assessment of the needs of underprepared students has been interpreted as proficiency testing in English, mathematics, and reading. Numerous affective variables may also have a significant impact on student retention. The purpose of this paper is to acquaint developmental educators with the results of research recently completed by the authors which sheds light on the relationship between nonacademic variables and performance in Developmental Studies English, mathematics, and reading.

Goals

The first set of variables examined is student goals, which may be closely linked to motivation. The Goals Checklist developed by the authors places reasons for attending college into the categories of career, academic, personal, social, and other directed/avoidance. Developmental Studies students placing a higher priority on academic reasons for attending the institution earned higher grades during their first quarter in the program.

Learning Styles

Learning styles has become a generic term with many meanings. The authors have conducted research using three instruments--the Myers -

Briggs Type Indicator (MBTI; Briggs & Myers, 1943), Kolb's (1981; 1984) Learning Styles Inventory, and the assessment of perceptual modality preferences designed by James and Galbraith (1985). Findings support other studies of high risk populations (Myers & McCaulley, 1985; Nisbet, Ruble, & Schurr, 1982). Developmental Studies students are more likely to be sensing(S) than intuitive(N) on the MBTI, indicating a preference for hands-on experience. They also prefer learning through interaction and visual stimuli rather than the traditional modes of the lecture and text.

Anxiety/Stress

There are many sources of stress which may impede student achievement. Studies involving the Math Anxiety Rating Scale (MARS; Suinn, 1972; Richardson & Suinn, 1972), the Fennema - Sherman Mathematics Attitude Scales (Fennema & Sherman, 1976), Spielberger's (1977) Test Attitude Inventory, and the Developmental Inventory of Sources of Stress (Higbee & Dwinell, 1988) have found that stress and other variables may account for a greater proportion of the variance in first quarter grades than high school grade point average or SAT scores (Goolsby et al., 1988).

Developmental Tasks

The authors hypothesized that Developmental Studies students may suffer from developmental lag, i.e., may not be as mature as other freshmen. However, research utilizing the Student Developmental Task and Lifestyle Inventory (SDTLI; Winston, (1981) determined that most

significant differences between the Developmental Studies sample and a regular freshman cohort favored the high risk students. These findings are not consistent with those of a previous study (Pollard, Benton, & Hinz, 1983). However, it should be noted that the instrument was administered during the ninth week in a counseling class which focused on such self awareness issues as setting goals and objectives, time management, career exploration, effective communication, stress reduction, and health and wellness. Previous research supports the positive effect of counseling on growth or developmental tasks (Pennscott, Ingle, & Atkinson, 1986).

Discussion

Research findings support the theory that affective variables are significantly related to performance among Developmental Studies freshmen. High school grade point average and standardized test scores may not be the most accurate predictors of success among this high risk population. Admissions decisions based upon these factors alone overlook the importance of student self-concept and motivational issues.

Administrators and faculty members who serve high risk populations must consider the individual needs of the students. Students may require assistance in adapting their skills to the aural (lecture) and print (text) orientation of the traditional university classroom. It is also likely to be helpful if Developmental Studies faculty use a wide variety of teaching strategies to communicate key ideas to their students, including visual aids and opportunities for interaction in dyads or small groups.

The introduction of stress reduction techniques may be critical to the success of some high risk students. Strategies such as progressive and deep muscle relaxation, systematic desensitization for test and mathematics anxiety, and cognitive restructuring may be used to limit the negative impact of stress on performance.

Above all these research findings support the value of a counseling component in developmental/remedial education programs. When possible a required counseling or orientation-type course can provide valuable assistance to students who would not otherwise seek these services, and would also serve as a support mechanism. If a regular course is not available Developmental Studies faculty members must be even more sensitive to the noncognitive needs of their students in order to make referrals for group or individual counseling when appropriate.

When a counseling component is an integral part of a Developmental Studies program the scope of assessment can be extended beyond traditional measures of aptitude in the areas of English, mathematics, and reading. Measurement of noncognitive variables can have implications for curriculum development as well as determining the individual needs of students. Student profiles (Higbee & Dwinell, 1988) can be developed to assist counselors in communicating with other faculty and the students themselves. The impact of affective variables on performance among Developmental Studies students is to great to be ignored.

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Appendix 1

Tables and Figures

Table 1

Goals Checklist

Means and Standard Deviations

Variable	Females n = 49 x	SD	Males n = 54 x	SD	Total n = 103 x =	SD
Reasons for Attending College						
Career	3.50	.50	3.43	.49	3.46	.50
Academic	2.89	.55	2.83	.46	2.86	.50
Personal Growth*	3.00	.49	2.80	.51	2.89	.51
Social	2.53	.53	2.48	.52	2.51	.52
Other directed/avoidance	2.20	.51	2.21	.57	2.21	.54
Reasons for Attending UGA						
Academic/career	2.75	.56	2.78	.40	2.77	.47
Financial	1.97	1.07	1.92	.80	1.96	.94
Housing	2.12	.69	1.93	.71	2.03	.70
Social	2.23	.84	2.10	.74	2.17	.79
Campus	3.08	.86	2.88	.76	2.98	.81
Influence of others	2.13	.98	2.05	.84	2.10	.91
HSGPA*	2.66	.38	2.49	.37	2.58	.38
SATT**	784	72.9	841	105.7	814	95.4

*p> .05

**p> .01

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Table 2

Regression Analyses

Goals Checklist

	Variable	R^2
English Grade		
Females	------	---
Males	UGA, PER	.15
Total	------	---
Mathematics Grade		
Females	UGA	.23
Males	UGA	.15
Total	UGA	.18
Reading Grade		
Females	------	---
Males	UGA	.10
Total	ACAD, OTH	.06
1st Qtr. GPA		
Females	------	---
Males	UGA, PER	.26
Total	UGA	.08

Note: UGA = Academic and career related reasons for attending the University of Georgia
PER = Personal growth reasons for attending college
ACAD = Academic reasons for attending college
OTH = Other directed/avoidance reasons for attending college

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Table 3

Learning Styles Frequencies

Myers-Briggs Type Indicator (MBTI)

Extroversion (E)	64	Introversion (I)	29
Sensing (S)	58	Intuition (N)	35
Thinking (T)	37	Feeling (F)	55
Judging (J)	50	Perceptive (P)	42

James and Galbraith Learning Styles Inventory

	1st Choice	2nd Choice	3rd Choice
Print	11	7	4
Aural	2	12	8
Visual	39	11	3
Interactive	26	14	7
Haptic	2	3	0
Kinesthetic	3	6	9
Olfactory	0	0	1

Kolb Learning Style Inventory

	n	Mean	SD
Concrete Experience	87	26.30	5.86
Abstract Conceptualization	87	30.24	6.33
Reflective Observation	87	31.32	5.84
Active Experimentation	87	32.16	6.79

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Means and Standard Deviations

Developmental Inventory of Sources of Stress (DISS)

RAW SCORES	1986-1987 N	MEAN	STD	MIN	MAX	1987-1988 N	MEAN	STD	MIN	MAX	1988-1989 N	MEAN	STD	MIN	MAX
Time	123	47.20	8.76	23	71	81	46.17	8.52	28	67	75	48.80	9.28	29	73
Physical	123	33.76	5.78	18	49	81	35.74	5.77	24	48	75	36.23	5.44	25	47
Chemical	123	38.63	4.57	21	47	81	39.86	4.56	26	50	75	39.98	4.69	23	48
Academic	123	49.36	6.86	31	67	81	50.46	7.44	35	69	75	50.97	7.97	33	68
Interaction	120	40.24	6.05	22	54	80	50.70	7.61	30	72	75	51.04	7.96	28	70
Total Stress Score	123	208.20	22.27	145	274	80	222.23	25.42	165	281	75	227.03	24.92	168	280
ADJUSTED SCORES															
Time	123	3.15	0.58	1.53	4.73	81	3.08	0.57	1.87	4.47	75	3.25	0.62	1.93	4.87
Physical	123	3.38	0.58	1.80	4.90	81	3.57	0.58	2.40	4.80	75	3.62	0.54	2.50	4.70
Academic	123	3.86	0.46	2 10	4.70	81	3.99	0.46	2.60	5.00	75	3.99	0.47	2.30	4.80
Chemical	123	3.29	0.46	2.07	4.47	81	3.36	0.50	2.33	4.60	75	3.39	0.53	2.20	4.53
Interaction	120	2.68	0.40	1.47	3.60	80	3.38	0.51	2.00	4.80	75	3.40	0.53	1.87	4.67
Total Stress Score	123	3.20	0.34	2.23	4.21	80	3.42	0.39	2.54	4.32	75	3.49	0.38	2.58	4.31

Table 4

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Table 5

Regression Analyses

DISS, HSGPA and SAT Composite

	Variable	R^2
English Grade		
Females	SAT	.17
Males	TIME	.19
Total	SAT	.06
Mathematics Grade		
Females	------	---
Males	PHYS, CHEM	.43
Total	PHYS	.10
Reading Grade		
Females	HSGPA	.14
Males	------	---
Total	------	---
1st Qtr. GPA		
Females	------	---
Males	PHYS, CHEM	.24
	TIME, CHEM	.24
Total	PHYS	.05

Note: SAT = Composite score on Scholastic Aptitude Test
TIME = Time management scale of DISS
PHYS = Physical lifestyle scale of DISS
CHEM = Chemical scale of DISS
HSGPA = High school grade point average in college placement curriculum coursework only

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Table 6

Means and Standard Deviations by Gender for

the DISS Scales, Test Attitude Inventory and MARS

Variable	Males n= 41		Females n= 38		Total n= 79	
	M	SD	M	SD	M	SD
Time Management*	48.7	8.74	43.5	7.74	46.2	8.56
Physical Stressors	35.4	6.05	36.2	5.65	35.8	5.80
Chemical Stressors	39.4	4.98	40.5	4.08	39.9	4.59
Academic*	52.9	6.93	48.1	6.92	50.4	7.46
Interaction	51.1	7.82	50.2	7.62	50.6	7.64
Total Stress Score	226.3	27.55	218.5	22.62	222.2	25.42
Test Attitude Inventory*	37.9	11.61	47.6	13.85	42.7	13.58
MARS	153.7	49.54	170.9	48.28	162.4	49.06

*Significant difference between males and females at .01 level.

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Table 7

Regression Analyses

DISS, MARS, and Test Attitude Inventory

	Variable	R^2
English Grade		
Females	------	---
Males	Time	.11
Total	------	---
Mathematics Grade		
Females	------	---
Males	Phys, Chem	.42
Total	Phys	.10
Reading Grade		
Females	Time, Acad	.25
Males	------	---
Total	------	---
1st Qtr. GPA		
Females	------	---
Males	Phys, Chem	.22
Total	Phys	.5

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Table 8

Student Developmental Task and Lifestyle Inventory

Means and Standard Deviations for Developmental Students Compared to Freshman Students

Task Subtask Scale	Developmental Students n = 80			Freshman		
	n	Mean	SD	n	Mean	SD
*Establishing and Clarifying Purpose Task (PUR)	80	35.41	10.21	386	32.41	11.18
*Education Involvement Subtask (EI)	80	8.59	3.01	386	7.72	3.37
Career Planning Subtask (CP)	80	8.05	4.16	386	8.12	4.04
*Lifestyle Planning Subtask (LP)	80	6.53	2.13	386	5.80	2.52
Cultural Participation Subtask (CUP)	79	2.94	1.87	386	3.17	1.49
*Life Management Subtask (LM)	79	9.47	2.84	386	7.60	3.26
Developing Mature Interpersonal Relationships Task (MIR)	79	17.05	4.68	386	17.71	5.20
Mature Peer Relationships Subtask (PR)	79	7.87	2.40	386	7.72	2.61
*Tolerance Subtask (TOL)	79	5.41	1.94	386	5.99	1.92
Emotional Autonomy Subtask (EA)	78	3.82	2.00	386	4.07	1.97
Academic Autonomy Task (AA)	79	4.97	2.48	386	4.59	2.35
Intimacy Scale (INT)	66	12.98	5.30	317	11.86	3.71
*Salubrious Lifestyle Scale (SL)	79	5.13	1.88	386	4.59	2.16

*p <.05

Table 9

Regression Analyses

Student Developmental Task and Lifestyle Inventory

	Variable	R^2
English Grade		
Females	------	---
Males	AA	.12
Total	AA	.09
Mathematics Grade		
Females	AA	.11
Males	------	---
Total	AA	.11
Reading Grade		
Females	------	---
Males	------	---
Total	AA	.07
1st Qtr. GPA		
Females	------	---
Males	AA	.14
Total	AA	.12

Note: AA = Academic Autonomy Subscale of the Student Developmental Task and Lifestyle Inventory

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Table 10

Means and Standard Deviations of Variables

Variables	Females n = 59 M	SD	Males n = 59 M	SD	Total Group n = 118 M	SD
Attitude toward success (AS)	52.64	5.63	51.41	6.11	52.03	5.88
Teacher (T)	42.95	7.54	42.73	7.61	42.84	7.54
Mathematics anxiety (AN)	33.61	11.37	36.00	11.22	34.81	11.31
Level of confidence (C)	38.80	12.10	41.08	11.32	39.94	11.72
Locus of control (LC)	9.31	3.62	9.51	3.76	9.41	3.67
*High School GPA (HSGPA)	2.69	.43	2.47	.43	2.58	.44
*SAT Quantitative (SATQ)	382.37	62.73	433.56	62.80	407.97	67.58
Mathematics grade (MGRADE)	2.42	1.12	2.34	1.12	2.38	1.12

*Significant difference between males and females at .01 level.

Table 11

Mathematics Background, Mathematic Attitude, HSGPA, and SAT Quanitative Score

Results of Regression Analysis

	Variable	R^2	R^2	df	F	p
Females	Algebra II grade	.1229		1,99	13.88	.0003
Males	EM	.2073		1,73	19.09	.0001
	HSGPA	.2559	.0486	2,72	12.35	.0001
	SATQ	.3129	.0570	3,71	10.78	.0001
Total	HSGPA	.1058		1,174	20.60	.0001
	EM	.1835	.0777	2,173	19.44	.0001
	Algebra II grade	.2064	.0229	3,172	14.92	.0001

Note: EM = Effectance Motivation Scale of the Fennema-Sherman Mathematics Attitude Scales

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Table 12

Means and Standard Deviations

Fennema-Sherman Mathematics Attitude Scales

Variable	Males n=20 M	Males n=20 SD	Females n=38 M	Females n=38 SD	Total n=58 M	Total n=58 SD
Confidence in Learning Mathematics (C)	39.8	10.9	37.9	12.9	38.6	12.2
Father (F)	45.6	7.9	44.2	10.7	44.7	9.8
Effectance Motivation (EM)	35.2	7.4	35.1	10.7	35.1	9.6
*Mathematics as a Male Domain (MD)	45.2	8.7	53.2	7.2	50.5	8.6
Mother (M)	41.9	7.9	43.2	9.6	42.8	8.9
Mathematics Anxiety (A)	35.9	11.9	36.6	12.3	36.3	12.1
Usefulness of Mathematics (U)	40.9	9.9	43.5	11.4	42.6	10.9
Attitude Toward Success in Mathematics(AS)	49.3	8.5	51.6	6.9	50.8	7.6
*High School Grade Point Average (HSGPA)	2.25	.26	2.76	.46	2.58	.47
*SAT-Quantitative (SAT-Q)	436	67.6	383	57.4	401	65.7
Mathematics Grade (MGRADE)	2.35	1.2	2.50	1.2	2.45	1.2

*Significant difference between males and females at .01 level.

Table 13

Variables Affecting Mathematics Performance

Means and Standard Deviations

	Females n = 118		Males n = 90	
	M	SD	M	SD
*Mathematics Anxiety	40.77	11.42	35.88	8.43
*Attitude toward Success	17.90	5.21	20.02	5.69
Effectance Motivation	35.25	8.73	33.88	8.08
*High School GPA	2.80	.42	2.47	.45
*SATQ	412	46.02	445	57.23

*Significant differece between males and females at the .01 level.

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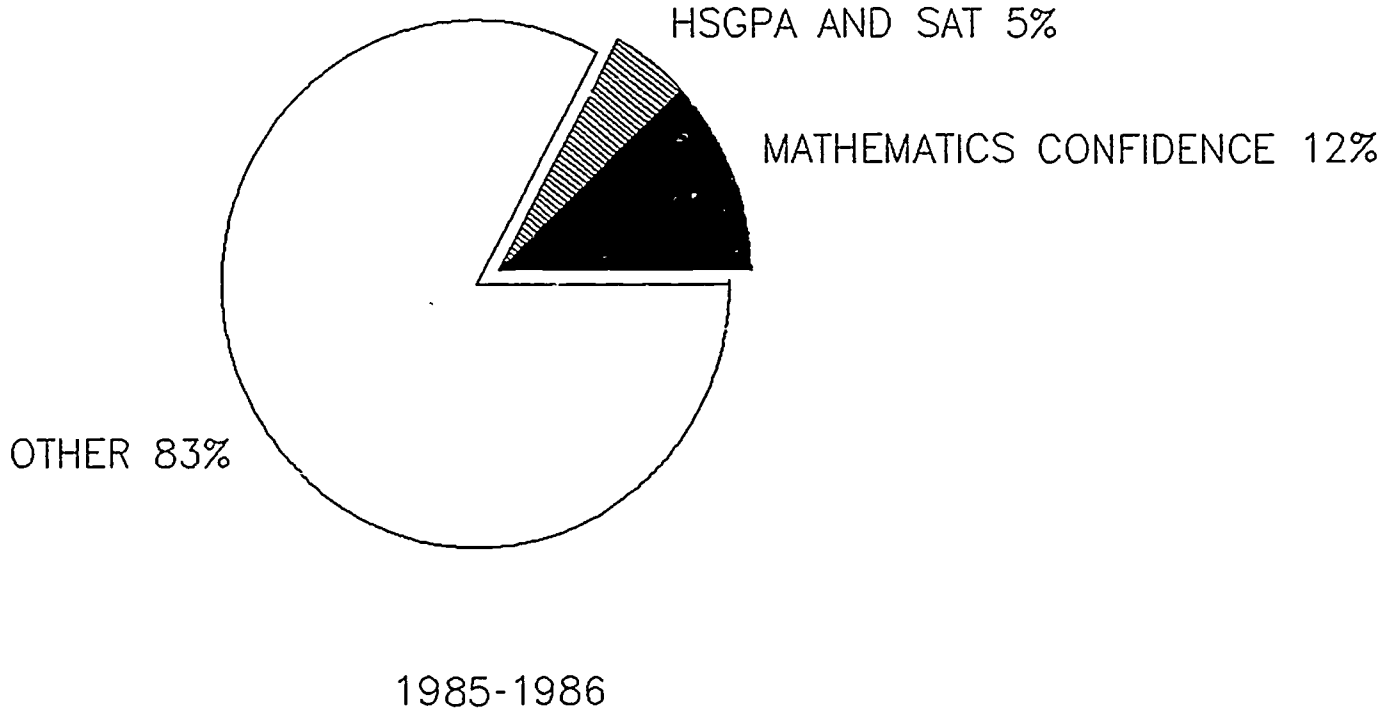
HSGPA AND SAT 5%
MATHEMATICS CONFIDENCE 12%
OTHER 83%
1985-1986

Figure 1

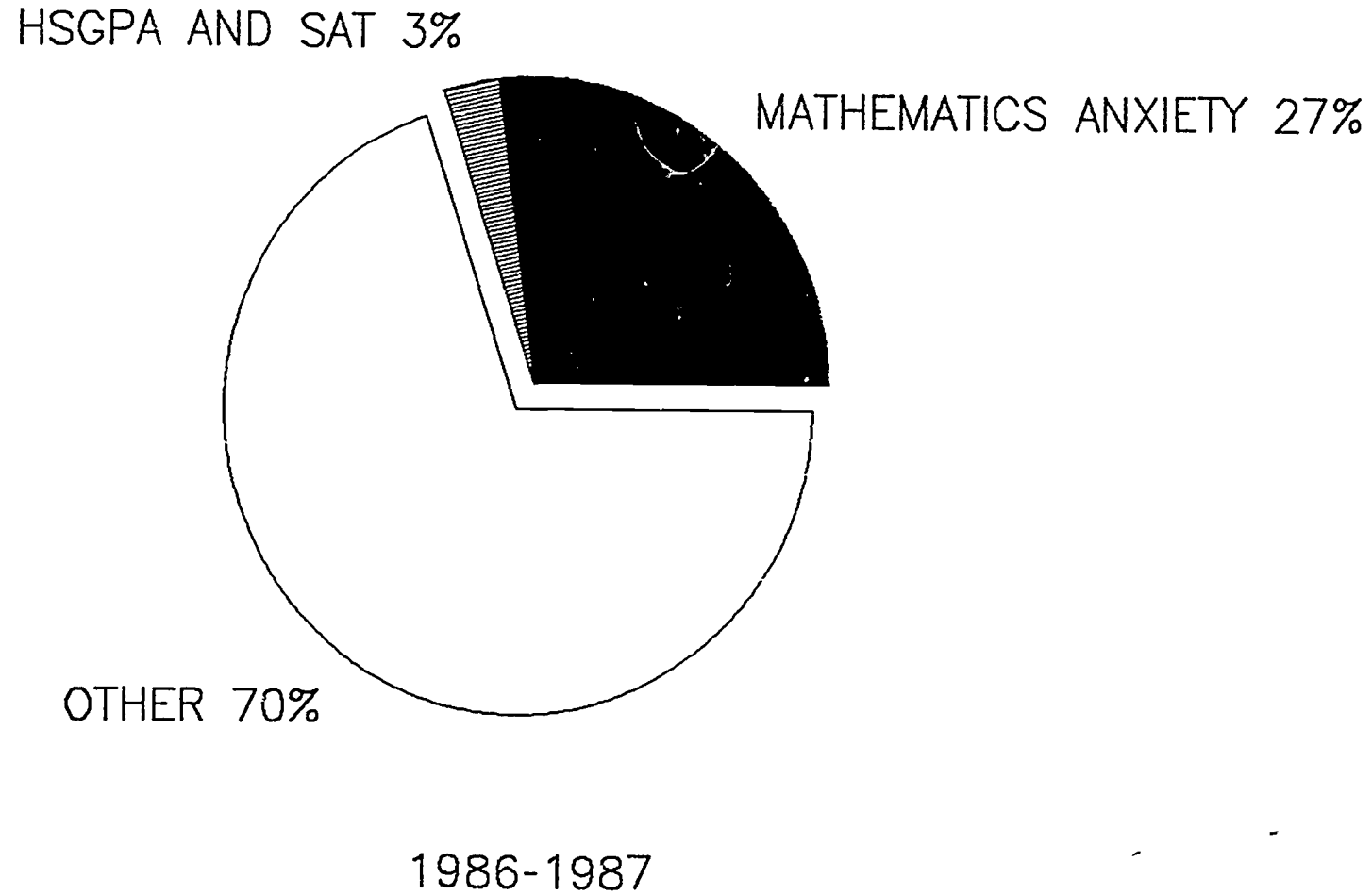

Figure 2

Research Findings

VARIABLES AFFECTING MATHEMATICS GRADE

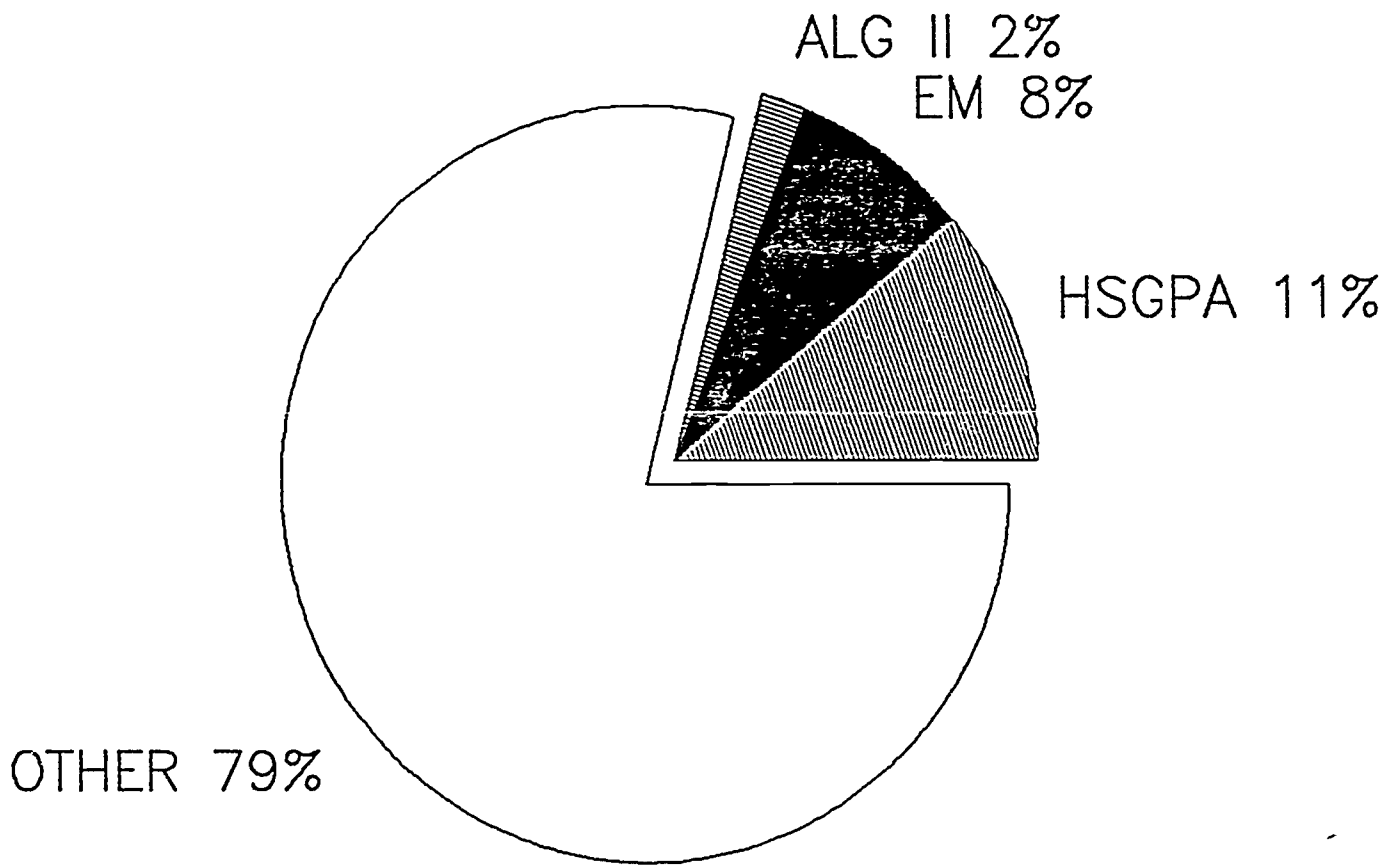

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Figure 3