IDENTIFYING NON-COGNITIVE GAINS WITH THE MAGS:
A VALIDATION STUDY

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SUMMARY

An instrument to identify gains in academically-important non-cognitive areas demonstrated the value of a compensatory elementary education program.

INTRODUCTION

A group of elementary school pupils were identified as disadvantaged and in need of special attention in the Orange County public school system in Orlando, Florida. A grant to operate a remedial program and evaluate improvement of experimental subjects as compared to controls was made to Florida Technical University. [1]

The project aimed at changing the pupils' attitudes, preferences, interests, and approach to academic work. The MAGS (Multidimensional Assessment of Gains in School) had just been developed to measure such non-cognitive gains in school (Guertin and Graves, 1972). It was expected that experimental - control comparisons would show greater gains of this sort for the experimental children. Previous experience with enrichment programs for the disadvantaged around the country had shown how difficult it is to bring about direct changes in academic achievement in only a one-year program. However, the non-cognitive gains, which are viewed as an intermediate stage necessary for future academic achievement, should be demonstrated if an appropriate instrument is employed.

Control subjects were drawn from three other schools. Almost half of the pupils were in the fifth grade. Pre-testing was done in October with post-testing the following May.

It is not the purpose of this paper to detail the project itself but only to report the results of measuring change. Separate forms of the MAGS and associated scoring subscales are used for males and females; therefore, separate analyses of gains must be examined.

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[1] The data analyses reported herein and the scoring for subjects were performed at no cost to any of the agencies.

TABLE 1
MAGS Standard Scores on the Seven Male Scales

Condition	Scales						
	1	2	3	4	5	6	7
Exp. Pre (N=11)	-.43	-.13	-.28	-.50	.13	.42	-.79
Post	-.03	.11	-.13	-.03	.50	.48	-.15
Dif.	.40	.24	.15	.47	.37	.06	.64**
Cont. Pre (N=35)	.03	.06	.03	-.03	-.07	.18	-.44
Post	.03	-.16	.09	.03	.13	.00	-.47
Dif.	.00	-.22	.06	.06	.20	-.18	-.03

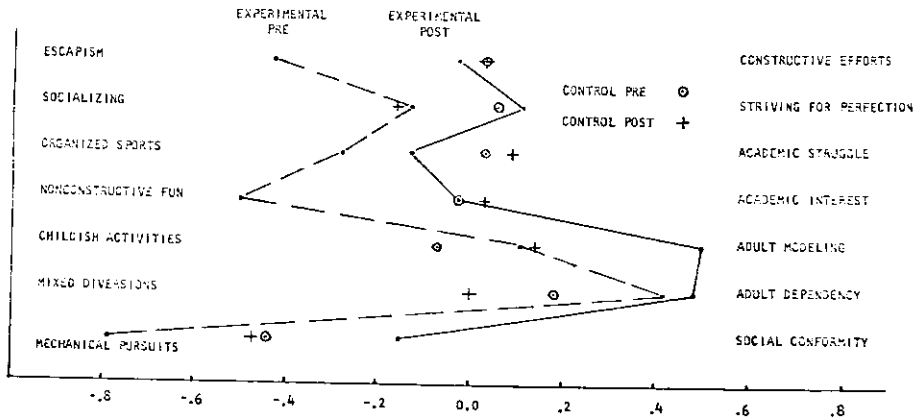** $p = .02$ level of significance (t-test for related scores)

FIGURE 1. Pre and Post Scores of Experimental Males on MAGS (Control males shown as points only)

Absences of pupils during pre or post testing periods, moving to another school, or non-cooperation resulted in a loss of almost 50% pre-post matches. Since the failure to obtain complete pre-post data oper-ated similarly in the control group the comparisons between the groups should not be biased.

The experimental males were not selected for inclusion in the program on the basis of MAGS pre-test scores. Yet they had an average standard score (Z score) of -.23. This is low when compared to the male control average Z score of -.03.

Condition	Scales								
	1	2	3	4	5	6	7	8	9
Exp. Pre (N=18)	.00	.50	.09	-.05	-.79	.50	-.29	-.27	-.21
Post	-.03	.53	.00	-.13	-.44	.15	-.44	-.30	-.14
Dif.	-.03	.03	-.09	-.08	.35	-.35	-.15	-.03	.07
Cont. Pre (N=42)	.11	.30	.38	-.03	-.13	-.04	-.12	-.15	-.26
Post	-.03	.30	.20	-.08	-.13	.19	-.24	.18	-.02
Dif.	-.14	.00	-.18	-.05	.00	.23	-.12	.33***	.24

*** p = .01 level of significance (t-test related scores)

[2] The nine female scales are as follows:

Negative End	Positive End
1. Sport Activities	Social Submission
2. Unrealistic Escapism	Constructive Conformity
3. Popularity Concern	Adult Interests
4. Whimsical Indulgence	Academic Conformity
5. Selfish Interests	Social Responsibility
6. Non-Constructive Activities	Constructive Diversions
7. Constructive Activities	Striving for Perfection
8. Childish Interests	Adult Responsibilities
9. Escape	Succorance

The experimental females did not show the low level that the males did. Their Z score was -.06 while the female controls had a .01 Z score.

Table 1 gives pre-test, post-test, and gains for male experimental and control subjects. The same data are plotted in Figure 1 to display the remarkable gains for the experimental males in all seven subscales as contrasted with the obviously small, chance gains for the controls. Rather large gains appeared on scales 1, 4, 5, and 7. These represented movement during the year:

> from Escapism toward Constructive Efforts
> from Nonconstructive Fun toward Academic Interest
> from Childish Activities toward Adult Modeling
> from Mechanical Pursuits toward Social Conformity

There were only 11 matched pre-post tests in the male experimental data, thus significant gains are hard to establish. The t-tests gave significance only for scale 7 (p=.02, two-tailed). This indicated significant movement from Mechanical Pursuits toward Social Conformity for the experimental males. None of the gains in subscale scores for controls were as large as those four found for the experimental males.

Table 2 gives pre-test, post-test, and gains for female experimental and control subjects. The gains for the female experimental

group are small and in the wrong direction. The female control group also shows small gains. Therefore, there is little of note and these values have not been plotted. None of the t-tests for the experimental females showed significant gains. Inspection shows that the pre-post gain scores on MAGS leads to the conclusion that the experimental females did not gain through the special program.

In contrast to the experimental group, the female controls show that the gain in scale 8 is significant (p=.01, two-tailed). While the female experimental group showed no change the controls moved from Childish Interests toward Adult Responsibilities. This difference in gains between experimental and controls suggests that the experimental females may have been adversely affected by their experience, at least in this one respect.

So far, discussion has focused upon the individual MAGS subscale scores but MAGS provides for computing an overall weighted gain score for each person. The Project Director specified the weights to be used in totaling up gains across subscales. These weights were chosen to reflect the relevance of a particular subscale and its direction of change to the project goals.

All the weights for female subscales were positive; meaning the Director anticipated an increase (positive gain score) in all post-test subscales. Two of the male weights were negative and low in value. The male weights were in the order of the scales: 5, -2, 6, 7, 4, -1, 3. Female weights were: 1, 4, 5, 9, 8, 7, 6, 2, 3.

Weighted mean standard score total gains by groups are:

Male	Experimental	.32
	Control	.08
Female	Experimental	-.03
	Control	.02

Analysis of variance of total gain scores showed significant differences among the four groups (p=.01). Further analysis of variance revealed that the difference between experimental and control groups males was significant at the .05 level. Sex grouping was significantly different at the .05 level also. Interaction of sex and group was significant at the .01 level.

It is concluded that the project program was successful in bringing about important changes in the male pupils in the fifth grade. These intermediate non-cognitive gains, so important for future achievement in school, can be measured. Benefits for the female subjects were not observed in the test results.

REFERENCES

Guertin, W. H. and Graves, W. H. The Multidimensional Assessment of Gains in School (MAGS): A Consumer-oriented product. Florida Journal of Educational Research, 1972, 14, 16-22.