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A STUDY OF THE INTERACTION OF ANXIETY AND ASSIGNED HOMEWORK ON THE ACADEMIC ACHIEVEMENT OF ELEMENTARY SCHOOL CHILDREN

Counsellors are often asked to help teachers plan classroom strategies designed to help children with various learning and behaviour problems. Since there is a paucity of research into the interaction between various personalities and behaviour characteristics on the one hand, and instructional techniques on the other, it is highly probable that most of the decisions made have been largely intuitive.

Among the personality variables of great interest to professional people working with young people has been the tendency for some children to have a greater than usual number of fears and worries, both fears and worries in general, and fears and worries related specifically to school work.

The importance of these fears and worries to school adjustment and academic performance has been the subject of numerous investigations during the last two decades. For the most part, the results are inconclusive, leading only to the generalization (I. G. Sarason, 1960: Ruebush, 1963) that there is usually a non-significant or small negative correlation between children's fears and worries, as measured by anxiety scales or questionnaires and measures of academic achievement. In several recent studies concerned with the interaction of anxiety and other variables related to school achievement, Philips (1962) found statistically significant interactions between sex, social class, and anxiety with achievement; Knight and Chanksy (1964) found neglible correlations between anxiety and achievement but a moderate relationship between study problems and achievemnt; and Munz and Smouse (1968) investigating the relationship between anxiety and item-difficulty sequence in achievement tests found some significant interactions between these variables. Finally, in a study with elementary school children, Allison (1970) failed to discover a significant interaction between general anxiety or test anxiety and various testing situations designed to produce stress with group intelligent test performance.

In spite of these findings many counsellors and teachers still suspect that fearful or anxious children are unfavourably affected by some classroom situations.

An interesting possibility is suggested by research (S. B. Sarason, 1960; Philips, King & McGuire, 1959) indicating that high-anxious individuals are more adversely affected by unstructured situations than those which are more highly structured. Since these findings could have direct implications

for classroom practice, the present study was designed to investigate the effect of a highly structured learning situation, regularly assigned drill-type homework, on the academic performance of high-and-low anxious elementary school pupils.

It was hypothesized; (1) that high-anxious students will have higher scores on an achievement test when they are given regularly assigned homework than when no homework is assigned. That is, under a more highly structured situation where they know exactly what they should do, high-anxious students will be more at ease and will perform better than they will under a more unstructured situation, where no homework is assigned. Because test anxiety scales are more directly related to children's fears and worries about school and school achievement than are tests of anxiety in general, it was also hypothesized; (2) that the relationship between anxiety and achievement will be greater when anxiety is measurd by a test-anxiety scale such as the Test Anxiety Scale for Children, rather than a general anxiety scale such as the Children's Manifest Anxiety Scale.

METHOD

SAMPLE

The present investigation was conducted in two grade six classes of a middle income suburban area elementary school in British Columbia and was part of a larger study of the affects of homework in a modern arithmetic program. Of the 64 pupils in these two classes, 4 were absent for the achievement test given at the end of the first experimental period and 5 were absent at the end of the second period.

INSTRUMENTS USED

Test anxiety and general anxiety were assessed by the use of two anxiety questionnaires: the Test Anxiety Scale for Children (TASC) (S. B. Sarason *et al* 1958); and the Children's Manifest Anxiety Scale (CMAS) (Castaneda, McCandless & Palmero, 1956).

Pre-test arithmetic scores were obtained from:

a.) The British Columbia Arithmetic Tests, Part I Arithmetic Computation and Part II Arithmetic Reasoning (B.C. Tests, 1941).

b.) The Dutton Test of Arithmetic Understanding (Dutton, 1964).

Henman-Nelson IQ scores for all of the subjects were obtained from the school records.

Achievement was measured at the end of each of the experimental periods tests prepared by the experimenters and based on the arithmetic content covered.

PROCEDURES

Within each class the subjects were assigned at random to two treatment groups, A and B. The study extended over two four-week periods, the first in November and the second in February. To control for curriculum effects, the experimental periods were organized to assure that both groups in each class received similar instruction on identical topics with a minimum of interruption by testing and holiday periods.

Four weeks before the first experimental period, all of the students were given the TASC and CMAS by the experimenters. Pre-tests of arithmetic understanding and achievement were administered a week later and IQ scores were obtained from the school records.

During the first period, group A was given three twenty-minute homework assignments per week and group B was given no homework assignment. During the second period, the treatments were reversed so that group B was assigned homework and group A was not. An arithmetic achievement test was administered to all students present at the end of the first experimental period and a second arithmetic post-test to all present at the end of the second.

RESULTS

Pupils were classified as high- or low-anxious on the basis of their scores on each of the two anxiety scales. In each case, the division was made as close as possible to the median anxiety score. The intercorrelations, means, and standard deviations of the measures of achievement and anxiety are presented in Table 1.

TABLE 1

INTERCORRELATIONS, MEANS, AND STANDARD DEVIATIONS OF THE MEASURES OF UNDERSTANDING, ACHIEVEMENT AND ANXIETY.

Variable[a]	1	2	3	4	5	6	7	8	Mean	S.D.
1. IQ	—								113.50	9.47
2. Arith. Reasoning	.57**	—							23.20	3.66
3. Arith. Computation	.28**	.51**	—						29.48	4.83
4. Arith. Understanding	.51**	.62**	.45**	—					18.14	4.90
5. 1st Arith. Post-test	.41**	.46**	.30*	.38**	—				19.31	3.93
6. 2nd Arith. Post-test	.37**	.47**	.03	.33*	.54**	—			22.02	2.25
7. TASC	—.21	—.16	—.22	—.05	—.02	—.14	—		13.53	5.11
8. CMAS	.12	—.01	—.19	.09	.03	—.08	.76**	—	17.89	7.55

a N for the two arithmetic post-test is 55. In all other cases N is 64.
*Significant at the .05 level.
**Significant at the .01 level.

From this table it can be seen that the correlations between the anxiety and the intelligence and achievement scores are of the same order as those reported elsewhere (I. G. Sarason, 1960; Ruebush, 1963). None are significant.

The means, standard deviations, and adjusted means of the scores obtained on the two arithmetic post-tests by high- and low-anxious boys and girls under two experimental conditions are presented in Table 2.

The significance of differences between these mean achievement scores was analyzed by 2 (anxiety) x 2 (sex) x 2 (method) analyses of covariance. Four covariates were used: intelligence test scores and the three sets of arithmetic pre-tests scores. This analysis was repeated four times—once for each of the anxiety scales and once for each experimental period. A com-

TABLE 2

Means, Standard Deviations, and Adjusted Means on the Two Arithmetic Post-tests Obtained by High-and-Low Anxious Boys and Girls Under Two Experimental Conditions.

		First Period N = 60			Second Period N = 59				
		N	Mean	S.D.	Mean	N	Mean	S.D.	Mean
Test Anxiety	Hi	29	19.72	3.50	19.83	29	21.72	2.34	21.58
	Lo	31	19.13	3.51	19.03	30	21.83	2.34	21.97
Manifest Anxiety	Hi	30	19.10	3.33	19.04	29	21.72	2.35	21.51
	Lo	30	19.73	3.33	19.79	30	21.83	2.34	22.04
Sex	M	27	19.04	3.03	18.78	29	21.62	2.44	21.19
	F	33	19.42	4.04	19.86	30	21.93	2.28	22.50
Method[a]	A	29	18.86	3.53	19.32	28	21.21	2.94	21.20
	B	31	19.94	3.71	19.42	31	22.29	1.82	22.30

a During the first period group A was assigned homework and group B was not. During the second period conditions were reversed so that group B was given homework and no homework was given group A.

puter program that permits unequal number of cases in the cells (BMD-05V) was utilized so that the interaction between the three main effects could be evaluated.

Since a previous study (Gray & Allison) has shown no significant difference in arithmetic achievement attributable to the effects of homework, teacher or sex differences, no significant F ratio due to the main effects of sex and method was anticipated. However, the diffeernces due to anxiety and the interaction between anxiety, sex and method were judged to be relevant to the purpose of this study. The result of the covariance analyses are summarized in Table 3.

From this Table it can bee seen that in all cases, for the TASC and the CMAS and for both the first and second experimental periods none of the effects of the main independent variable and only one of their interactions was significant at the .05 level. The only significant F ratio shown is for the interaction of anxiety as measured by the CMAS and sex, during the first experimental period.

These results do not support either of the hypotheses. The first hypothesis, concerned with the interaction of anxiety and assigned homework, failed to receive support because of the lack of significant findings in the covariance analyses, and the second hypothesis which predicted that test anxiety would be more closely related to academic performance than manifest anxiety could not be tested since non-significant results left no basis for comparing the TASC with the CMAS. In the absence of any hypothesis that

TABLE 3

Covariance Analyses of Arithmetic Post-Test Scores for Both Experimental Periods; using IQ, Arithmetic computation, Arithmetic Reasoning, and Arithmetic Understanding Scores as Covariates.

Source of Variation	First Period					Second Period				
		TASC		CMAS			TASC		CMAS	
	d.f.	M.S.	F	M.S.	F	d.f.	M.S.	F	M.S.	F
Anxiety	1	4.611	0.36	16.211	1.46	1	2.743	0.51	3.519	0.64
Sex	1	17.462	1.36	12.793	1.15	1	11.317	2.09	13.252	2.24
Method	1	3.014	0.23	0.206	0.02	1	11.867	2.19	8.850	1.62
Anxiety x Sex	1	17.110	1.33	88.174	7.95*	1	0.698	0.13	0.002	0.00
Anxiety x Method	1	1.212	0.09	8.594	0.78	1	2.504	0.46	0.338	0.06
Sex x Method	1	1.144	0.09	0.826	0.07	1	0.690	0.13	0.432	0.08
Anxiety x Sex x Method	1	3.279	0.26	0.381	0.03	1	1.490	0.27	1.716	0.31
Error (Within)	48	12.848		11.084		47	5.427		5.479	
Total	55					54				

*Significant at the .01 level.

might explain a significant interaction between general anxiety and sex during the one experimental period and not the other, no interpretation of this finding is attempted.

Discussion

While there is some research evidence to suggest that high-anxious students may benefit from a more structured classroom routine, the results of this study indicate that as far as academic achievement is concerned, regularly assigned homework is of no particular advantage to high-anxious elementary school children.

However, it should be noted that the design of this study did not make it feasible to assess any difference in attitude toward homework between the high- and low-anxious children. Since it is possible that the high-anxious children felt more secure about their work when they were given regular homework assignments, research into children's attitudes toward their school work under a variety of different classroom conditions would be of great interest. Such evidence would be of value to counsellors in advising teachers about pupil adjustment problems as they may be related to instructional procedures.

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UNE ETUDE SUR L'INTERACTION DE L'ANXIETE, DES DEVOIRS IMPOSES A LA MAISON ET LES SUCCES SCOLAIRES DES ENFANTS A L'ELEMENTAIRE

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Comme il est fort possible que les élèves super-anxieux puissent profiter de structures d'apprentissage mieux élaborées, cette étude a essayé de trouver l'interaction entre l'anxiété et les devoirs habituellement imposés à la maison et les succès scolaires des enfants de sixième année en arithmétique.

Après administration du *Test Anxiety Scale for Children, The Children's Manifest Anxiety Scale* et trois questionnaires de compréhension et de rendement en arithmétique les classes furent divisées en deux groupes.

Pendant une première période le group A fit des devoirs à la maison, tandis que le groupe B n'en faisait pas.

Pendant une seconde période on inversa la situation.

A la fin de chaque période on fit le compte des résultats.

A l'analyse on découvrit que les étudiants super-auxieux ne retiraient aucun avantage marqué du fait que les devoirs à la maison étaient plus structurés.