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ABSTRACT

The utility of employing teacher reports about characteristics of students and their parents to assess family economic status was investigated using multiple regression analyses. The accuracy of teacher reports about parents' educational background was also explored, in addition to the effect of replacing missing data with logical, mean, or modal substitutions. Results indicated that although teacher reports were reasonably accurate, their utility in estimating family economic status was limited. Substitution for missing data did not adversely affect the accuracy of prediction. Suggestions were made for additional teacher report items that are more directly related to economic status. (Author/GDC)

ASSESSING FAMILY ECONOMIC STATUS FROM TEACHER REPORTS*

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A B S T R A C T

The present study investigates the utility of employing teacher reports about characteristics of students and their parents to assess family economic status using multiple regression analyses. The accuracy of teacher reports about parents' educational background is also explored, in addition to the effect of replacing missing data with logical, mean, or modal substitutions. Results indicate that although teacher reports are reasonably accurate, their utility in estimating family economic status is limited. Substitution for missing data does not adversely affect the accuracy of prediction. Suggestions are made for additional teacher report items that are more directly related to economic status.

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Educational researchers often wish to measure the income level or economic status of students' families. A valid measure can be obtained by interviewing the adult members of the family, but this procedure is costly both for the researcher and for the respondent. As an alternative, it may be possible to use teacher reports about certain characteristics of students and parents to estimate the family's economic status. The present study explores this possibility and examines some of the biases inherent in teachers' reports about parents' educational background.

The Sample and the Data Collected

Our sample consisted of 14,157 nationally representative students in grades 1-6 selected for the Participation Study (Breglio, Hinckley & Beal, 1978). For each of these students we had available complete socioeconomic data obtained from an interview with a parent between January and May, 1977. These data enabled us to determine the total money income and the appropriate Orshansky poverty level cutoff for each family. The Orshansky poverty index takes into account family size, number of children, age and sex of family head, and farm or non-farm residence. We used the ratio of money income to poverty level cutoff as our criterion because we felt that this measure was a better indicator of the family's economic status. As this measure correlates very highly with the family's total money income ($r=.95$, $N=12,598$), our analyses would not have been substantially affected had we used total money income.

From the Sustaining Effects Study (Hoepfner, Wellisch, Zagorski, 1977) we had data from teacher questionnaires reported in November, 1976, that related

at least indirectly to each student's family economic status. These data included an estimate of each parent's educational level (PARENTEDUC) and a report of whether English was the major language spoken in the home (OTHERLANG). The teacher also reported the following information about the student:

(1) whether the student received free or reduced-price lunch or breakfast (FREELUNCH);

(2) whether the student needed compensatory education (CENEED);

(3) whether the teacher had met with the parents to discuss discipline problems (DISCIPLINE), or the student's academic (ACADPROGRESS), or general progress (GENPROGRESS);

(4) the level of the student's reading (READLEVEL) and math class (MATHLEVEL);

(5) the student's pre-first grade academic experiences (KINDERGARTEN, HEADSTART, NURSERY, PRESCHOOL) and summer school experience (SUMMER); and

(6) the student's racial and ethnic origins (BLACK, WHITE, ASIAN, NATIVEAMER, HISPANIC).

Accuracy of Teacher Report Data

As we had data available from both parent interviews and teacher reports regarding the parents' educational level, we first examined the teachers' estimates for bias. We found that teachers provided no estimate (which was a valid response category) for over a quarter of the mothers and fathers in our sample. Whether they made an estimate or not was affected by the actual educational level of the parent. The lower the parent's education level, the less likely was the teacher to estimate it (mothers: $x^2(5)=320.6$, Gamma=-.24, N=13,899; fathers: $x^2(5)=240.8$, Gamma=-.22, N=11,680). Teachers were also less likely to make an

estimate if the degree of total parent involvement in the school was low (mothers: $X^2(2)=302.5$, Gamma=-.27; fathers: $X^2(2)=296.5$, Gamma=-.25). Although these two factors are themselves related (mothers: $X^2(10)=1,372.3$, Gamma=.35; fathers: $X^2(10)=1,105.8$, Gamma=.32), each of these influences on whether the teacher reported an estimate tended to persist even after controlling for the other (the first order partial Gamma was -.18 for mothers and for fathers).

When teachers estimated the parent's educational level, the accuracy of the estimate was not affected by the degree of parent involvement (mothers: Gamma=.81, partial Gamma=.80; fathers: Gamma=.82, partial Gamma=.80). Furthermore, teachers were about as accurate in estimating the father's educational level (Cramer's V=.48, r=.76, N=8,599) as the mother's (Cramer's V=.46, r=.72, N=10,367).

Examining the two-parent families in our sample, we found that the relationship within families between mother's and father's educational level based upon the parent interview was moderately high (r=.63, N=8,159). The relationship based upon the teacher report data was much higher (r=.75, N=8,159). Furthermore, this relationship was still rather strong even after controlling for both parents' actual educational levels (partial r=.52, N=8,155). These results suggest that the teacher is biased in reporting the two parents' educational levels as more similar than they actually are.

In sum, when teachers report an estimate of the parent's educational level, they are reasonably accurate. In those instances when they do not report an estimate, parents tend to have low educational levels. Finally, for two parent families, teachers tend to report the parents' education as being similar.

Prediction of Economic Status

The teacher reports were also used to predict family economic status employing stepwise multiple regression procedures. The sample was first divided into two random subsamples: one used to develop the models, the other used to validate them. A square root transformation was applied to the criterion, the ratio of total money income to Orshansky poverty level cutoff, in order to normalize its distribution. Many models were examined that varied with regard to how the parents' educational level and student's racial and ethnic origin were treated, including several in which race and ethnicity were allowed to interact with other variables. Our final models have no interaction terms and use the family's average parent education when the teacher provided estimates for two parents, and the single estimate when only one estimate was provided.

In large scale educational research the data are often edited prior to analysis primarily to enable the researcher to use all available information. Depending upon the nature of the data, missing and multiple responses are sometimes replaced with school or class means or modes for ordinal or interval scales, and with a predetermined value for nominal scales. In the latter case the decision rules may be derived from rather complex logical criteria. The present study compares the effect of omitting missing data from the analyses versus replacing them with logical substitutions and school mean or modal values.

Based upon only those cases with no missing or multiple responses, our final model has eleven (11) component variables and explains almost 34 percent of the variation in family economic status (see Table 1). An alternative model was derived from the data after most of the teacher items were edited to resolve missing or multiple responses through logical, school mean, or modal

substitutions.[1] This model is based upon 91 percent of the cases in the subsample, whereas the previous model uses only 63 percent. This model accounts for over 36 percent of the variation in family economic status. The items in the model are identical to those in the prior model with the addition of one item and the weights are quite similar in both models. The two models were found to hold up equally well under crossvalidation (r^2=.36, N=2,486; r^2=.36, N=3,419, respectively).

When one examines how well the models can simply dichotomize families into those above and those below the poverty level, one finds that the model based on the raw data correctly identifies 35 percent of the poor families and 96 percent of the non-poor in the crossvalidation sample ($X^2(1)$=380.0, phi=.39, N=2,486). The model derived from the imputed data performs similarly. It correctly classifies 38 percent of the poor and 95 percent of the non-poor ($X^2(1)$=519.9, phi=.39, N=3,419). These results, in conjunction with the fact that the models explain the same amount of variation in the sample, indicate that editing the teacher report data to resolve missing or multiple responses does not diminish the accuracy of predicting economic status. Furthermore, it enables one to use more of the available information producing a model with greater generalizability.

If teacher reports are to serve as a surrogate for family economic status, then the regression models must be accurate in their prediction. As an index of accuracy, the percentage of explained variance is not very meaningful.

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[1] Cromer (1978) correctly points out that these procedures artificially inflate the degrees of freedom and may artificially generate significant results. This is not a serious problem when sample sizes are very large and missing data are relatively few as in the present study.

A better measure is the size of the confidence interval around the regression slope. This interval indicates for a specified degree of certainty the possible range of actual values for a given predicted value. For 95 percent confidence, the present models require an interval that corresponds to over a fifteen thousand dollar range in actual income for a typical family at the poverty level. Thus, these regression models do not accurately predict family economic status, and these teacher reports do not constitute a good surrogate.

In conclusion, while it is possible to predict family economic status from teacher reports, one sacrifices a substantial degree of accuracy. The alternative of obtaining interviews from parents is extremely costly, however, requiring about $40-50 per interview. Although there are other means of obtaining such data from parents, such procedures are also expensive and result in lower response rates, increased missing data, and less reliable measures. If one employs the approach used in the Sustaining Effects Study, it would be wise to explore the utility of additional teacher report items that more directly assess family economic status. Such items may include teacher estimates of family income, determination of employment status, and classification of occupational category. While these teacher assessments may not be highly valid, they are likely to be more strongly related to family economic status than many of the measures employed in the present study and consequently contribute to better predictive validity.

Table 1

Two Stepwise Multiple Regression Analyses in Prediction of Family Economic Status[a] from Teacher Report Data

Based on Raw Data (N=5,533)			Based on Imputed Data (N=8,061)		
Predictor	r^2 [b]	B[c]	Predictor	r^2	B
FREELUNCH	.255	.432	FREELUNCH	.287	.431
PARENTEDUC	.325	.129	PARENTEDUC	.347	.126
PRESCHOOL	.329	.109	BLACK	.351	-.099
GENPROGRESS	.331	.046	PRESCHOOL	.354	.103
READLEVEL	.332	.056	GENPROGRESS	.356	.051
BLACK	.334	-.068	READLEVEL	.358	.050
KINDERGARTEN	.335	.052	KINDERGARTEN	.360	.056
ASIAN	.336	.125	NURSERY	.361	.051
NURSERY	.337	.049	ASIAN	.362	.135
MATHLEVEL	.338	-.041	OTHERLANG	.362	.058
CENEED	.338	.020	CENEED	.363	.018
Constant		.202	MATHLEVEL	.363	-.034
			Constant		.088
Standard Error of Estimate		= .42	Standard Error of Estimate		= .43

[a] square root of total money income divided by Orshansky poverty level

[b] coefficient of variation for model including variable on a given line and all variables above it

[c] unstandardized regression coefficient for final model

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