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Financial Aid and Persistence: Do the Federal Campus-Based Aid Programs Make a Difference?

by Richard A. Voorhees

Numerous conceptual studies have investigated the process of undergraduate persistence in recent years (Bean, 1979, 1983; Rootman, 1972; Spady, 1970; Tinto, 1975). While these works have advanced the use of theoretical orientations to the study of student persistence, they do not consider the impact of student financial aid programs as key variables that might explain persistence behavior. At a time when two of every three students who enter the nation's public colleges and universities require some form of financial assistance (Stampen, 1983), failure to direct attention to student finances as a potent determinant of persistence is a significant shortcoming (Tinto, 1982).

The dollars appropriated by the federal government comprise by far the greatest share of financial aid and have increased dramatically since passage of the Middle Income Assistance Act of 1978. Student financial aid is now the largest subsidy to higher education found in the federal budget. However, under the "market model" of financial aid established during the Nixon administration this subsidy is indirect; the majority of federal financial aid dollars flow first to students and, in turn, to the colleges that students choose to attend. Thus, institutions have a vested interest in recruiting new students and in maximizing rates of persistence of students once they are enrolled.

The prospects for increasing persistence rates through the way in which financial aid is distributed to needy students is a complex issue. The largest federal financial aid programs do not fall within the purview of financial aid officers to determine which needy students should be awarded from which programs and in what amount. The three federal campus-based aid programs, Supplementary Educational Opportunity Grants (SEOG), College Work Study (CWS), and National Direct Student Loans (NDSL), are important exceptions to the general inflexibility of most financial aid programs because of the control accorded to financial aid personnel in the awarding process.

The purpose of the present study was to examine the connection between the federal campus-based financial aid programs and the persistence of high need freshmen. A structural persistence model is used to focus on the role of financial aid in the persistence process.

Review of the Literature

Most research tracing the impact of student financial aid on persistence is quite dated. This is significant because the amount and types of financial aid available to

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students a decade ago is substantively unlike the amount and types of aid currently available. Astin (1975), for example, continues to influence much of the conventional wisdom about the influence of certain types of aid on persistence. In general, Astin reports that nonrepayable grants and on-campus work have favorable impacts on persistence while loans have a negative impact. The Pell Grant program (formerly the BEOG program) did not exist during the course of Astin's study and dollars available to students under both the College Work Study and National Direct Student Loan programs were substantially less than current levels. Jensen (1981) reported that by 1981 the amount of federal financial aid available to students had increased sixty-six times since 1968, a finding which strongly suggests that earlier conclusions about the effect of particular types of financial aid on persistence may be obsolete.

Few studies of student persistence and financial aid examine the manner in which different types of financial aid are combined (Hood & Maplethorpe, 1980). Typical studies of the impact of grants, loans, and work on persistence almost always examine each type of aid separately without paying attention to whether or not students also received additional types of assistance. Jensen (1981), for instance, reports that receiving financial aid makes a small contribution to persistence. However, this finding is made on the basis of a student's total aid award. Consequently, little guidance about the impact of a particular type of aid can be offered to financial aid personnel who must wrestle with day-to-day decisions about how best to build a total aid package.

Another weakness in the literature that examines financial aid and persistence is the overreliance on research designs that presuppose no underlying structure among variables selected for investigation. The result has been a profusion of "stepwise" multiple regression analyses and multidiscriminant analyses that dissect, or pull apart, variables without regard to how they might work together to impact persistence rates. While these studies offer interesting speculation about the "true" impact of types of aid on persistence, the practice of isolating a particular variable, or variables, ignores the fact that many of the variables with the potential to influence persistence are intercorrelated. The conclusions of such studies often contradict one another and thus, taken in total, fail to provide concrete direction to the financial aid practitioner.

Methodology

Linear Structural Relations (LISREL) was used to analyze relationships among the fourteen variables which comprise the model used in this study (Joreskog and Sorbom, 1981). LISREL is similar to a more general technique known as path analysis. Both techniques allow specification of *a priori* relationships in constructing an analytical model and provide for the analysis of variables thought to affect other variables while simultaneously controlling for the effects of each variable considered within a given model. However, LISREL is the more versatile technique because it allows researchers to relax certain of the more restrictive assumptions mandated by the use of traditional path analysis (see, for example, Pedhazur, 1980, p. 636).¹

LISREL incorporates a chi-square statistic which allows a statistical test of how well a given model fits observed data. In the present study, the chi-square statistic was employed to determine the significance at the .01 level of five successive improvements to the model shown in Figure 1.

Each time a new path suggested by the LISREL program was added to the model, the chi-square test was employed to evaluate whether inclusion of that path

¹A review of the literature indicated that this study is the first to apply LISREL to an analysis of the impact of student financial aid on persistence. An article focusing on this application of LISREL is forthcoming in *The Journal of Research in Higher Education* (Voorhees, R. A. Student Finances and Campus-Based Financial Aid: A Structural Model Analysis of the Persistence of High Need Freshmen, in press).

resulted in a significant improvement in the fit of the model to the data. When these improvements, in aggregate, attained statistical significance, the model became the basis to explain the strength of association among the variables selected for study.

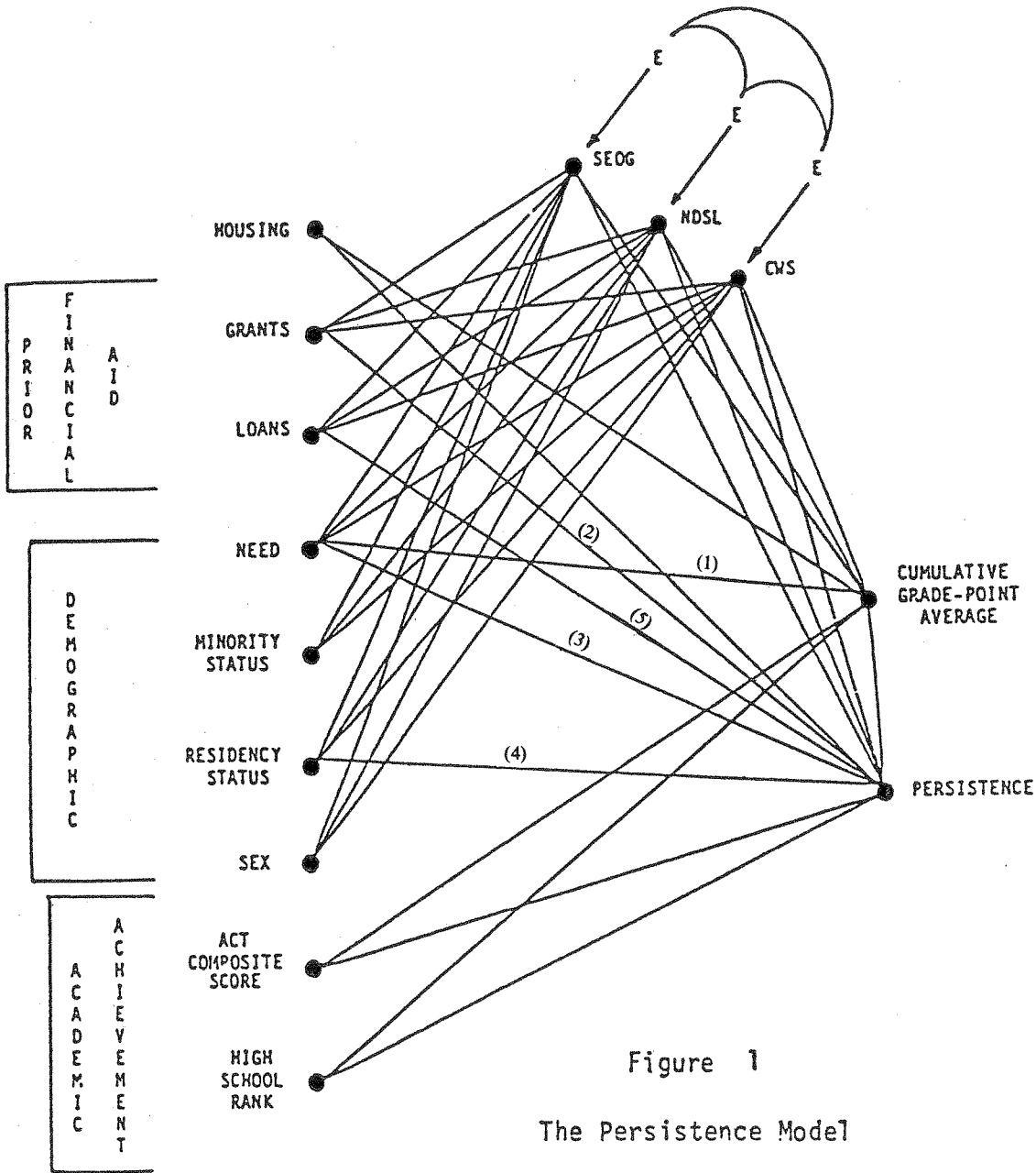


Figure 1

The Persistence Model

Note. Exogenous variables are correlated.

The five improvements are depicted as paths in Figure 1. In order of strength of association, they are (1) financial need to cumulative grade-point average, (2) grants to persistence, (3) financial need to persistence, (4) residency status to persistence, and (5) loans to persistence. Further attempts at improving the model were abandoned after three successive attempts proved not significant at the .05 level.

Subjects

The subjects of this investigation were 343 campus-based awardees who first enrolled at a large urban commuter university in the fall of 1980. The original group of subjects numbered 424. However, students for whom ACT scores, SAT scores, or high school rank were not available were excluded from the study. Average need for financial assistance among this group was \$3,832. Minority group members (26.5%) constituted a larger proportion of the subjects than was suggested by minority representation in the entering freshman class that fall (10.8%). Higher minority representation among the subjects is perhaps the result of higher need for financial assistance among minority students which, in turn, might be explained by relatively lower income levels among minority students or their families.

Variables

Persistence was defined as the number of regular semesters, excluding the intervening summer sessions, that students attended the university. No attempt was made to distinguish among nonpersisters who might otherwise have been classified as voluntary stopouts or dropouts, although the three semester time span used as a measure of persistence in this study is one in which decisions to leave an institution are often permanent or at least long term.

According to the model, persistence was assumed to be dependent on need, grants, loans, sex, minority status, residency status, high school rank, ACT Composite score, housing, the amount of aid awarded from each of the three campus-based aid programs, and cumulative grade-point average. Need was a standardized dollar measure of each student's relative cost of college attendance and was recorded from each subject's financial aid file. Grants and loans represent the dollar amount of financial aid subjects were awarded from sources other than the federal campus-based programs. Thus, the variable "grants" included the amount of entitlement aid from such sources as the Pell Grant program, the State Student Incentive Grant program, and, for Indian students, Bureau of Indian Affairs Higher Education Assistance Grants. The variable "loans" included the total amount of loan support other than that awarded from the campus-based NDSL program, i.e., Guaranteed Student Loans, Nursing Loans, and Law Enforcement Educational Loans. High School Rank was a percentile that indicated student standing relative to his or her high school graduating class. ACT Composite score was a standardized achievement score that provided an index of academic ability. Scores of students who had submitted only SAT scores to the university were converted to ACT Composite score equivalents according to concordance tables developed by Astin (1971).

In addition to persistence, other variables in the model assumed to be dependent on the variables described above included dollar amounts awarded students from the three federal campus-based aid programs and cumulative grade-point average. Error terms for the three campus-based aid programs were correlated, since it was assumed that discretion applied by financial aid personnel in determining which students would receive assistance from what campus-based aid program, or programs, would result in these programs having interrelated effects on persistence which could not be captured by the model.

Rationale for the Structure of the Model

The structure of Figure 1 was based on studies of persistence as described in the research literature and on consideration of the professional practice of awarding financial aid. The initial model specified that the impact of demographic variables and prior financial aid variables (grants and loans) on cumulative grade-point average and persistence was affected by the three federal campus-based programs. SEOG, NDSL, and CWS were considered to be critical collegiate influences in order to highlight their role in the persistence process. The federal campus-based aid programs may be viewed as approximate indicators of academic and social integration within the structure of the university environment, two principal components of the Tinto model (1975). Figure 1 also specified that housing, high school rank, and ACT Composite score had direct effects on cumulative grade-point average and persistence which were independent of SEOG, NDSL, and CWS. This relationship appeared logical since neither academic promise nor living in university residence halls were criteria for deciding the types or amounts of federal campus-based assistance students received. Further, it has been reported that campus residence increases the likelihood that students will be involved in campus life (Chickering, 1974). Similarly, prior academic achievement has been reported to have significant direct effects on student persistence. (Kohen, Nestle & Karmas, 1978; Pantages and Creedon, 1978).

Results

The final model had an associated chi-square value of 30.94 with 25 degrees of freedom. The corresponding chi-square probability of .191 indicated a moderately good fit of the model to the data. Table 1 displays the direct effects, or maximum likelihood parameters, for each path in the final model. The R^2 for all variables in explaining persistence was .417, meaning that the final model accounted for about forty-two percent of the variance in the persistence of new freshmen with high financial need.

Table 1
Maximum Likelihood Parameters for the Final Model

From	To	Persistence	Cumulative Grade-Point Average	SEOG	NDSL	CWS
Housing		.075	.142**	—	—	—
Grants		.242***	—	.484***	-.137*	-.204**
Loans		.132**	—	-.053	.041	.023
Need		-.239***	-.246***	.260***	.327***	.378***
Minority Status		—	—	-.014	-.177***	-.025
Residency Status		-.153**	—	-.110*	.171**	.009
Sex		—	—	.003	-.087	.029
ACT Composite Score		-.077	.116*	—	—	—
High School Rank		.027	.304***	—	—	—
SEOG		.113*	.036	—	—	—
NDSL		.259***	.180***	—	—	—
CWS		.224***	.186***	—	—	—
Cumulative Grade-Point Average		.487***	—	—	—	—
R^2		.417	.232	.435	.233	.111

*p < .05
**p < .01
***p < .001

Each of the federal campus-based aid programs had a statistically significant positive effect on persistence. The effect of the nonrepayable SEOG program, although significant, appeared to be about half of the direct effect of either NDSL or CWS on persistence. Both the NDSL and CWS variables had statistically significant positive direct effects on cumulative grade-point average while the direct effect of SEOG failed to reach significance. An explanation for this finding may be that both the CWS and NDSL programs require a commitment from the student that is not associated with the SEOG program. Under College Work Study, for example, students must work for an hourly wage, usually on campus, to receive their award. The National Direct Student Loan also requires a commitment, although delayed while the student is in school, to repay the amount he or she has borrowed. The Supplementary Educational Opportunity Grant, on the other hand, implies no immediate or future cost and therefore constitutes a "donation" to the student. Although the CWS and NDSL programs are not statistically superior to the SEOG program in their effect on the persistence of high need students, both CWS and NDSL appear to have a greater positive direct effect on student cumulative grade-point average than SEOG. Since cumulative grade-point average had the largest direct effect on persistence (.487) in the model, any variable that has a positive effect on cumulative grade-point average merits careful scrutiny.

Noncampus-based loans appeared to have statistically significant positive direct effects on persistence (.132). Taken together with the positive direct effect observed for NDSL on persistence (.259), no support was found in this study for the claim that loans are detrimental to the persistence of high need freshman. Noncampus-based grants also appeared to have a significant positive effect on persistence (.242).

Need (-.239 had the largest negative direct effect) on persistence, meaning that as a student's need for financial resources increased, the likelihood that he or she would persist decreased. Financial need also had a statistically significant negative direct effect on cumulative grade-point average. Student residency status had a significant negative direct effect on persistence. Observed persistence rates among nonresident students were lower than those observed for state residents.

Direct, Indirect, and Total Effects

Indirect effects are the product of parameter estimates between any variable and a mediating variable, and that mediating variable and the dependent variable. Total effects are the sum of both direct and indirect effects of a given variable on a dependent variable. Analyses presented in this section examine the way in which all of the variables considered in the model work together to impact both cumulative grade-point average and persistence. Tables 2 and 3 display the total effects of the variables under investigation on cumulative grade-point average and persistence in rank order.

Cumulative grade-point average had the largest direct effect on persistence of any variable observed within the model. Subjects with higher cumulative grade-point averages also persisted longer throughout the study. The positive direct effect of each campus-based aid program on cumulative grade-point average also meant that the total effects of these programs on persistence were stronger than their direct effects. For example, the second most potent variable in explaining persistence within the model was the National Direct Student Loan. The direct effect of NDSL on persistence was .259; the indirect effect of NDSL on persistence through cumulative grade-point average was .088. When direct and indirect effects were summed, the total effect of NDSL on persistence became .347. Similarly, the third highest total effect on persistence in the model is College Work Study (.315). The total effect of CWS was also higher than its direct effect (.242) because of the indirect effect of CWS on persistence through cumulative grade-point average (.091). The third

federal campus-based aid program, SEOG (.131), ranked eighth in total effect on persistence, a much lower total effect than either NDSL or CWS, because of its lower indirect effect on persistence through cumulative grade-point average (.018).

The total effect of other variables in the model that were found to be statistically significant in explaining persistence rates were grants (.194), high school rank (.175), loans (.147), housing (.145), and residency status (-.105). The total effect of variables that appear nonsignificant within the model in explaining persistence are need (-.093), minority status (-.071), ACT Composite score (-.021), and sex (-.021). It should be emphasized that the significant negative direct effects observed for financial need and minority status on persistence were ameliorated by the positive effects on persistence found for the federal campus-based aid programs and cumulative grade-point average, resulting in their insignificant total effect.

Table 2
Decomposition Effects of Cumulative Grade Point Average

Variable	Causal Effects		Total Effect	Rank
	Direct	Indirect		
High School Rank	.304	—	.304	1
CWS	.186	—	.186	2
NDSL	.180	—	.180	3
Housing	.142	—	.142	4
ACT Composite Score	.116	—	.116	5
Need	-.246	.139	-.107	6
Grants	—	-.045	-.045	7
Minority Status	—	-.037	-.037	8
SEOG	.036	—	.036	9
Residency Status	—	.029	.029	10
Loans	—	.010	.010	11
Sex	—	-.010	-.010	11

Table 3
Decomposition Effects of Persistence

Variable	Causal Effects		Total Effect	Rank
	Direct	Indirect		
Cumulative Grade Point Average	.487	—	.487	1
NDSL	.259	.088	.347	2
CWS	.224	.091	.315	3
Grants	.242	-.048	.194	4
High School Rank	.027	.148	.175	5
Loans	.132	.015	.147	6
Housing	.075	.070	.145	7
SEOG	.113	.018	.131	8
Residency Status	-.153	.048	-.105	9
Need	-.239	.146	-.093	10
Minority Status	—	-.071	-.071	11
ACT Composite Score	-.077	.056	-.021	12
Sex	—	-.021	-.021	13

Discussion

This study examined the complex interaction of federal campus-based and non-campus-based financial aid, demographic characteristics, academic achievement variables, on-campus residence, and cumulative grade-point average, and the persistence of new freshman with high financial need. An outcome of this investigation was an analysis of how each of the variables under consideration worked with other variables to influence persistence within the context of a structural model. It is important to note that the results of this study are based on a single group of subjects at a single urban commuter university. Until this model is replicated at other institutions, generalization of the findings reported here to other students should be approached with caution.

It is clear that the federal campus-based aid programs support the persistence of high need freshmen by diminishing the negative impact of financial need. While this study indicates that the direct effect of financial need is detrimental to both cumulative grade-point average and persistence, the mediating effect of the federal campus-based programs significantly lessens the negative impact of financial need on both variables. Although the observed total effect of SEOG on persistence was not as great as the total effects observed for CWS and NDSL, it is not appropriate to say that one program should be substituted in place of another to promote persistence since no single program was found to be statistically insignificant in its direct effect on persistence.

This study also demonstrates the vital importance to needy students of non-campus-based financial aid programs in the persistence process. Although such grant and loan programs are beyond the control of institutional financial aid administrators and therefore cannot be combined with the same degree of flexibility as the campus-based aid programs, the fact that they were found to be critical to the persistence of high need students should be articulated to national policymakers. This is especially crucial at a time when the federal government continues to contemplate significant reductions in allocations for student financial assistance.

No support was found in this study for the proposition that loans have a negative impact on new freshman persistence. Although previous literature argues strongly that loans are at best ineffective in promoting persistence (Astin, 1975; Wenc, 1983), the results reported here indicate the opposite to be true. Future commitment implied by receipt of a loan may pose sufficient incentive for students to approach college more seriously. The NDSL program, in particular, is attractive to colleges because borrowed amounts are repayed directly to the institution so that dollars are replenished for use by other students in future years. Accordingly, this renewable form of assistance should not be automatically discarded by financial aid personnel during the process of building aid packages for new freshmen with high financial need.

College Work Study was also found to have a positive total effect on new freshman persistence. The CWS program is also attractive since students work at jobs that benefit the institution. Moreover, students receiving CWS are more likely to become more involved with the campus activities than nonrecipients (Wenc, 1983). Greater integration within the academic and social structures of a campus has been shown to increase the likelihood of student persistence at commuter institutions (Chapman & Pascarella, 1983). It is clear from the growing body of research literature that institutions should explore any practical actions that might result in opportunities for increased student identification with the campus. This is particularly important for commuter institutions, where opportunities for student integration and identification with the campus are likely to be much less than at residential institutions.

Administrators of commuter institutions should be mindful of the importance of residence hall living when weighing policy alternatives for meeting the needs of new

freshmen with high financial need. In controlling for the effects of all other variables within the model, this study found that students living on campus earned significantly higher cumulative grade-point averages. It was also found that state residents who attend commuter institutions are more likely to persist than were nonresident students. Integration within an institution and identification with a particular campus appear to be key components in the academic performance and persistence of new freshmen with high financial need.

High school rank and ACT Composite score differed in their ability to explain persistence. Although this study indicates that ACT Composite score is significant in determining cumulative grade-point average, its ability to explain persistence was not significant. Conversely, the positive effects of high school rank on both cumulative grade-point average and persistence were significant. A distinction between these measures of academic achievement may be that high school rank is more indicative of past academic performance, a subset of which would include student study habits, orientation to mastery of course material, and persistence in a high school environment. Conversely, ACT Composite scores measure aptitude for college-level work, the effects of which are probably independent of a student's commitment to persist at a given institution or of his or her performance in high school as measured by class rank at time of graduation.

Minority status, by itself, was not significant in explaining persistence within the model. This finding is possibly attributable to the larger representation of minority students among the subjects than was suggested by the proportion of minority students who entered the university that fall. Additionally, the finding that minority status has no significant impact on persistence when financial need and academic ability are controlled is consistent with other research (Pedrini & Pedrini, 1976; Peng & Fetters, 1978). For the same reason, gender also was found to be an insignificant factor in explaining persistence within the model.

The implications of the findings reported here for institutions and financial aid personnel are evident. The programs of federal campus-based aid appear to play a major role in the persistence of new freshmen with high financial need. This study also demonstrates the vital role of noncampus-based grant and loan programs in diminishing the deleterious impact of financial need on persistence. Other factors which are usually beyond the immediate control of financial aid offices are also worthy of close inspection. For example, controlling for other variables in the model it was found that the academic performance of subjects living in campus residence halls was significantly higher than students who lived off campus. Since cumulative grade-point average is clearly linked to persistence, an effective institutional policy might dictate mandatory campus residence for high need freshmen. Such a policy would require the cooperation of other parts of the institution to implement and calls for the close involvement of the financial aid office. This is but one such instance in which financial aid personnel might take an institutional initiative in promoting student persistence.

The goal of increasing student persistence is perhaps the single most important objective now facing the survival of many of the nation's colleges and universities. Financial aid offices, because they serve as a first link between the institution and high need students, should take an active part not only in the effective distribution of student assistance but also in establishing policy for other areas of the institution that may have heretofore gone their separate way. In light of the findings presented in this study, the success of institutional strategies to increase the persistence of needy students depends in no small way on the involvement of the financial aid professional.

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