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Although a great deal of work has been done on the role of buying intentions and other variables in influencing durable goods purchases,* the low goodness of fit obtained from the cross-section data and the frequent inconclusive nature of the results suggests that considerable room remains for further contributions to this stock of knowledge. This paper explores an avenue that, to judge by past work, may increase the significance of buying plans or attitudes in explaining consumer purchases, in this case of automobiles.

This avenue of investigation relates to the improvement that might be obtained in our understanding of the role of buying intentions on purchases through the use of panel data, that is, by considering buying plans reported at any one time as part of a time sequence of information on a possible future event. Clearly it seems plausible that trends and changes in reported plans over time should be more indicative of future purchases than a single intention, though the nature of the relationship may not be of the usual linear form.

This possibility is investigated in this paper, using a set of panel data that provide a disproportionately high number of purchase plans and purchases of durable goods because the population sampled is recently married couples with the husband aged 30 years or less at time of marriage. More specifically, the frame for the sample consisted of

*See, for example, Heald, Gordon, "The Relationship of Intentions to Buy Consumer Durables with Levels of Purchase," British Journal of Marketing, Summer, 1970, pp. 87-97; Ferber, Robert, "Anticipations Statistics and Consumer Behavior," American Statistician, Oct. 1966, pp. 20-24; Murray, J.A., "Canadian Consumer Expectational Data; An Evaluation," Journal of Marketing Research, Feb. 1969, pp. 54-61. Juster, F.T., Anticipations and Purchases. Princeton: Princeton University Press, for the National Bureau of Economic Research, 1964. An earlier summary of this work is provided in Ferber, Robert, "Research in Household Behavior," American Economic Review, March 1962, esp. pp. 38-40.

couples married in the summer of 1968 in Decatur or Peoria, Illinois, two medium-sized industrial cities in Central Illinois selected partly because of their varied industrial structure and partly because they contained experienced interviewing staffs of the Survey Research Laboratory of the University of Illinois. Available resources permitted beginning with a panel of 300 such couples, and 313 were in fact interviewed in the first wave, in the fall of 1968. As many couples as possible were reinterviewed every six months through the fall of 1970, when lack of funds necessitated a temporary halt in the data collection until the winter of 1971-72.

The data used in this study relate to the first six waves of interviews. During these interviews the couples were asked on every wave for their subjective probabilities of purchasing autos and other durable goods as well as on various aspects of their asset (and debt) accumulation and money management. Various attitudinal and personality tests were administered to each member of the couple separately. Separate buying probabilities were sought from each member only on the fifth wave (by hindsight it is unfortunate that this was not done from the beginning).

The focus of this paper is on the use of these different variables in conjunction with the buying plans and actual purchase information on automobiles to explain as of a given time the factors accounting for the likelihood of the purchase expressed at that time and also the factors accounting for the purchase or non-purchase of a car during the interval between the current interview and the interview on the next wave. This interval is generally six months except for the time between the fifth and the sixth waves, when the interval was a complete year.

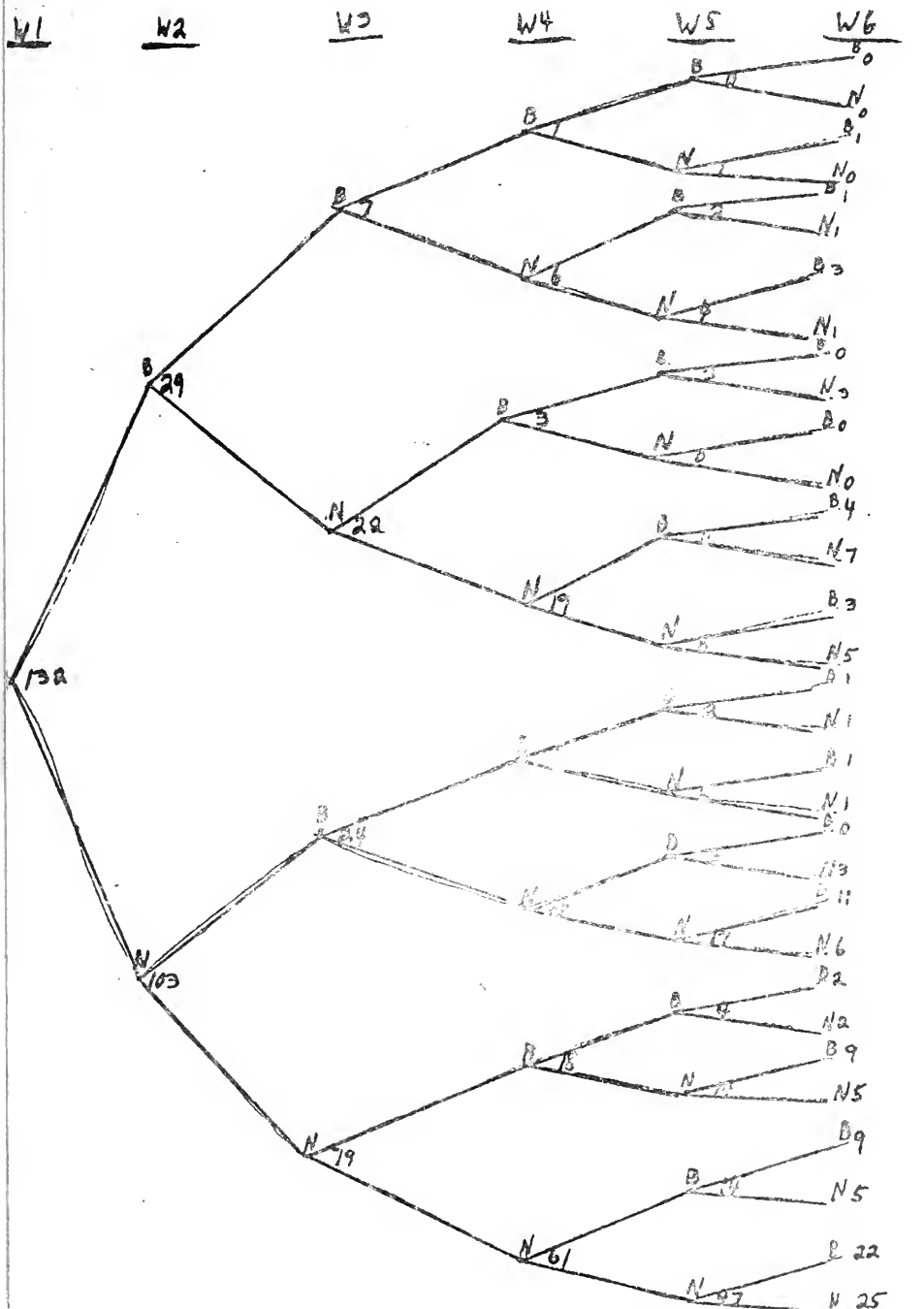
In order to exploit the potentialities of the panel data, the sample for this analysis is restricted to those families who were interviewed on all six waves and that provided information on all the variables used in this study. When this criterion is imposed on the data, we find the eligible sample is restricted to 132 of the initial 313 families.

Comparisons of frequency distributions on four demographic variables for these 132 families with those interviewed on the first wave suggest that the subsample is somewhat more likely to contain families with older and more educated husbands and families where the wife is more likely to be working. While the medians for age of husband, years of formal education of husband, husband's occupation, and wife employment status are unchanged, a slightly smaller proportion of the husbands in the subsample had less than high school education and a slightly higher proportion of the wives were employed (76% as compared to 70%).

The conceptual base for the analysis that follows, as well as information on the number of families that purchased or did not purchase a car in each wave, is provided in the tree diagram of Figure 1. This diagram exhibits a factorial scheme whereby the number of families interviewed initially are split on the second wave between auto buyers and non-buyers, and are split in a similar manner on each of the succeeding waves, but with continual reference to what their car purchase behavior had been on preceding waves. Hence, as of Wave 6, a complete picture is available since the start of the study on the car purchase behavior of every family in the sample.

At the same time, it should be stressed that a major limitation of the diagram is that no information is available, other than ownership, of car purchase behavior prior to the first round of interviews. For this reason, therefore, to the extent that the time sequence of purchase or non-purchase is relevant, it should show up much better on the later waves.

Figure 1. Auto Purchase-Nonpurchase Patterns Over Waves 1-6



Plan of Analysis

The empirical work in this paper has been designed to test two distinct hypotheses, namely:

H_1: the availability of automobile plans and purchase data on a panel basis provides better explanations of these two types of variables than could be obtained without the panel data.

H_2: the extent to which automobile purchase intentions enter into the explanation of actual purchases will vary with which member of the couple provides the buying plans information as well as with the differences in the personality characteristics of the members of the couple.

The manner in which each of these hypotheses is tested on the data is explained in the following paragraphs.

Analytical Models

Two dependent variables are involved in this analysis. One is automobile purchase intention (L), expressed by the respondent on a subjective probability, or likelihood, scale with values ranging from 0 (no likelihood) to 100 (certainty). The other is whether or not a purchase was made (B) on the particular wave, expressed as a dichotomous variable.

With each of these dependent variables and on each of the waves from Wave 2 through Wave 6, three types of models are formulated and tested on the data. The first model is one that makes use only of automobile likelihood and auto purchase variables, Model A. Its purpose is to explore the extent to which variables of this type when used alone can explain the variations in the dependent variables, and also to investigate the marginal effect of time sequences of independent variables of this type, as will

be explained shortly. The second type of model, B, seeks to explain variations in the dependent variables in terms of relevant variables other than past auto purchases, and purchase plans; this includes socio-economic variables, general personality factors, and variables relating to the characteristics of the present automobile owned, if any. This model also serves as a yardstick for evaluating the effectiveness of the performance of the various variants of Model A.

Finally, the third model, C, seeks to combine the most effective variables from the prior two models into a single, "best" equation to explain the variations in the dependent variables and, in the course of doing so, to examine the net effect of the purchase likelihood and actual purchase variables, both on a current basis and as a time sequence.

Model A: Purchase and Plans Variables Only

All three models begin with Wave 2. In the case of Model A, beginning with Wave 2 is the earliest set of data possible if likelihood and actual purchase are to be explained in terms of prior variables of the same type.

For each of the two dependent variables for each wave, two alternative formulations of Model A are presented. These formulations are outlined for each dependent variable separately.

Purchase Likelihood. Three variables are known relating to purchase or to purchase likelihood as of Wave 2 (L_2). These variables are if a purchase was reported on the Wave 1 interview (B_1), if a purchase was reported on the Wave 2 interview (B_2), and the purchase likelihood reported on the previous wave (L_1). One specification is therefore to relate the three known variables to the dependent variable in simple linear fashion, namely:

$$L_2=a_o+a_1B_1+a_2B_2+b_1L_1$$

An alternative formulation is to reason that these variables may interact with each other, especially the interaction of the purchase likelihood on Wave 1 with the purchase report on Wave 2. Thus, one set of plausible assumptions is provided by the following tabulation, which assumes that L_2 will be very low if a car is reported to have been purchased on Wave 2, will be low also if no car was purchased but L_1 was low, but will be high if no car was purchased as of Wave 2 but L_1 was high, i.e.:

L_1	B_2	Dummy variable	Estimate of L_2
High	Yes	D_1	Very low
High	No	D_2	High
Low	Yes	D_3	Very low
Low	No	D_4	Low

By this approach, each combination of L_1 and B_2 would comprise a separate dummy variable, and it would be these dummy variables that enter into the explanatory equation for L_2, plus perhaps B_1 (on the premise that a reported purchase on the first wave would probably serve to depress the likelihood reported on the second wave). Accordingly, the alternative formulation is:

$$L_2 = c_0 + c_1 D_1 + c_2 D_2 + c_3 D_3 + d_1 B_1$$

On Wave 3 we have information on purchase reported in the first three waves and the purchase likelihoods over the first two waves as a basis for explaining L_3. Since two purchase likelihoods are available, we can test whether L_3 is related not only to the previous likelihood but also to the change in the purchase likelihoods reported on the first two waves. Adding the reports of actual purchases, the first formulation for L_3 is:

$$L_3 = a_0 + \sum_1^3 a_i B_i + b_1 L_2 + b_2 (L_2 - L_1)$$

The alternative formulation is essentially the same as before, involving the interaction effects, this time among L_2, L_2-L_1 and B_3 in affecting L_3. One such set of hypotheses is reflected in the following tabulation:

L_2	L_2-L_1	B_3	Dummy variable	L_3
High	+	Yes	E_1	Very low
High	-	Yes	E_2	Very low
Low	+	Yes	E_3	Low
Low	-	Yes	E_4	Low
High	+	No	E_5	Very high
High	-	No	E_6	Low
Low	+	No	E_7	High
Low	-	No	E_8	Low

The accompanying equation is:

$$L_3 = c_0 + \sum_{1}^{8} c_i E_i + \sum_{1}^{2} d_t B_t$$

The equation formulations for Waves 4-6 are essentially similar to the previous two except that to be fully complete many more terms would be involved as the wave number increases. However, all possible such terms are hardly feasible in view of the limited number of observations, plus the fact that it makes little sense to include all possible combinations of interaction effects or of purchase reports or purchase likelihoods going back two or three years. Accordingly, the following compromises were made:

1. In the linear formulation, actual purchase and purchase likelihood were used only for the preceding two waves. In other words:

$$L_t = a_0 + \sum_{t-2}^{t} a_i B_i + b_1 L_{t-1} + b_2 (L_t - L_{t-1})$$

2. In the alternate formulation, the interaction variable is based on only eight combinations involving purchases reported in the current wave and likelihood in the preceding two waves, as shown in the tabulation on page 9. In other words, this equation in its general form is:

$$L_t = c_0 + \sum_{1}^{8} c_i E_i + \sum_{t-2}^{t-1} d_t B_t$$

Actual Purchases. At the time of the second wave, information is available on the purchase likelihood reported on Wave 1 and whether a purchase was made on that wave, as a basis for explaining whether a purchase was made on Wave 2. These two variables are the only ones that therefore can be used for explaining B_2, and hence the simple linear formulation of the equation is:

$$B_2 = a_0 + a_1 B_1 + b_1 L_1$$

The alternative formulation corresponds to that developed for the purchase likelihood function, and involves the interaction between L_1 and B_1 in a set of dummy variables, as indicated in the following tabulation:

L_1	B_1	Dummy variable	Estimate of B_2
High	Yes	F_1	Doubtful
High	No	F_2	Highly probable
Low	Yes	F_3	Not probable
Low	No	F_4	Not probable

The equation form is, accordingly:

$$B_2 = c_0 + \sum_{1}^{4} c_i F_i$$

For Wave 3 and later waves, the same basic approach is used as for the purchase likelihood functions, namely to restrict the set of independent variables to the prior two waves, and to have one formulation specifying a linear relationship, based on the interaction among purchases reported on the prior wave, purchase likelihood on the prior wave and the change in purchase likelihood over the preceding two waves. The construction of these dummy variables and the inference made with regard to actual purchase is illustrated for Wave 3 in the following tabulation:

B_2	L_2	L_2-L_1	Dummy variable	B_3
Yes	High	+	G_1	Probable
No	High	+	G_2	Highly probable
Yes	High	-	G_3	Doubtful
No	High	-	G_4	Doubtful
Yes	Low	+	G_5	Doubtful
Yes	Low	-	G_6	Not probable
No	Low	+	G_7	Doubtful
No	Low	-	G_8	Not probable

Accordingly, the linear formulation in its most general form:

$$B_t=a_0+\sum_{t-2}^{t-1} a_i B_i+b_1 L_{t-1}+b_2(L_{t-1}-L_{t-2})$$

The alternate formulation, involving the use of dummy variables for interactions, is:

$$B_t=c_0+\sum_{1}^{8} d_i G_i+d_1 B_{t-2}$$

Model B: Purchase and Plan Variables Omitted

The same two dependent variables are used in this model as before, though one might question why any attempt is made to explain purchase likelihood in terms of other variables. However, this seems useful at the least as a yardstick to indicate how well purchase likelihood is a proxy for these other variables, and whether the later inclusion of the latter (in Model C) makes much difference in the explanation of purchase likelihood.

For this model, unlike the previous one, a single set of variables and a single formulation are used to explain both dependent variables. This is because the attempt in the present case is to define the best fitting subset of these independent variables to serve as a yardstick for measuring the additional contribution the Model A variables might make to the regressions. A statistical search operation--starting with a set of all possibly relevant and available variables--would therefore be indicated. This does not necessarily exclude variables relating to automobiles as long as they do not include purchase likelihood or actual purchase.

In fact the variables included in this model relate to the current automobile owned, to the financial position of the couple, to their socioeconomic characteristics, and to certain personal characteristics that may influence their propensity to buy a car or express a particular purchase likelihood. More specifically, these variables include:

1. Age of and satisfaction with, the present car owned (if more than one car, age of oldest car)

2. A set of socioeconomic variables including family income, occupation of head of household, age of husband, education of head of household, number of children, employment status of wife and home ownership.
3. Attitudes of the husband and wife separately on such factors as reasonableness of prices, interest in bargains, tendency to try new things, and quality consciousness.*

It is at this stage that variables are introduced relating to the second major hypothesis of this paper, namely, the differential effect of husband and wife on auto purchases and purchase plans. The test of this effect involves the use of separate variables for husband and wife in the case of attitudes and of such classifying characteristics as education and occupation, to see to what extent husband and wife effects differ for the same characteristic.

The formulation of this model is in linear arithmetic terms, with the same variables used for all waves, although the values of some of these variables will of course change from one wave to another.

Results

The results obtained for the two variants of the model using purchase likelihood variables, with purchase likelihood as the dependent variable, are shown in Table 1. As is evident from this table, both variants explain between roughly 10 and 20 percent of the total variation in purchase likelihood, with fairly large differences from one wave to another. On balance, however, the first variant (Model A1) seems to yield somewhat better results,

*A complete list of variables is shown in the appendix.

1. Results Obtained for Likelihood of Purchase Functions, Models A1 and A2*

	A1							A2						
Variable	L_2	L_3	L_4	L_{5h}	L_{5w}	L_{6h}		L_2	L_3	L_4	$L_{h'1}$	L_{5w}	L_{6h}	L_{6w}
L_{t-1}	.337[b]	.645[b]	.520[b]	.505[b]	.359[b]	.348[b]	.362[b]							
$L_{t-1}-L_{t-2}$		-.352[b]	-.291[b]	.076	-.108	-.194	.260[a]							
B_t	-.224[b]	-.293[b]	-.220[b]	-.400[b]	-.261[b]	-.337[b]	.336[b]							
B_{t-1}		-.117	-.110	.059	-.340	-.018	-.052		-.093	-.058	.043	-.044	-.011	-.005
B_{t-2}			.140	-.031	-.126	.200[a]	.214[b]			.097	-.041	.146	.198[a]	.170
D_1								.016						
D_3								.373[b]						
E_1									.008	-.026	.020	-.027	.074	.029
E_2									.018	-.080	.041	-.042	-.078	.043
E_3									.094	-.080	.020	.011	-.264[b]	-.181[a]
E_5									.288[b]	.209[a]	.368[b]	.248[b]	-.093	.082
E_6									.437[b]	.361[b]	.312[b]	.205[a]	.233[b]	.148
E_7									.006	.072	.176[a]	.047	.020	-.041
R^{*2}	.111	.240	.181	.232	.101	.150	.146	.123	.205	.132	.146	.061	.129	.036

Notes: a -- significant at .05 level; b -- significant at .01 level

*Two Wave 6 functions are shown in each case, the first with the husband's Wave 5 likelihood, and the second with the wife's Wave 5 likelihood.

at least in terms of goodness of fit. The principal reason is clearly the strong autocorrelation between purchase likelihood at the current time and the likelihood one time earlier. A highly significant correlation is also apparent between reported purchase of a car on the current wave and purchase likelihood for the near future, with a negative sign as would be expected.

On the other hand, the change in purchase likelihood from two periods earlier to the previous period, as well as actual purchases of a car two periods earlier are statistically significant only part of the time, which is not strong support for the value of panel data in improving the explanatory value of the function.

The second variant of the likelihood-of-purchase function (Model A2) also yields significant goodness of fit but, as a rule, not as high as the first variant. Most of the interaction terms are not statistically significant; the only terms to be significant on a consistent basis are those that involve a high previous likelihood of purchase.

Turning to the results obtained for the purchase functions (Table 2) we find a different picture. The goodness of fit tends to be lower, the value of R^2 (adjusted) not exceeding .15 and the variant containing the interaction terms proving better in terms of goodness of fit than the variant containing simple linear lags. Thus, with actual purchase as a dependent variable, no relationship is apparent with purchase of a car on a previous wave, and the relationship with purchase likelihood on the previous wave while positive is much less tenuous. On the other hand, the interaction terms in the second variant are frequently statistically significant, at least frequently enough that the goodness of fit with those terms is higher than that obtained with the first variant. Overall, however, the level of the goodness of fit for

2. Results Obtained for Purchase Functions, Models A1 and A2

Variable	A1						A2				
	B_2	B_3	B_4	B_5	$B_6{}^h$	$B_6{}^w$	B_3	B_4	B_5	$B_5{}^h$	$B_6{}^w$
L_{t-1}	.263[b]	.378[b]	.184	.298[b]	.247[a]	.274[a]					
$L_{t-1}-L_{t-2}$		-.051	.015	.007	-.094	-.138					
B_{t-1}		.040	-.011	.112	-.071	-.097					
B_{t-2}			-.056	.070	.037	.051		-.064	-.083	.037	.038
G_1							.069	.088	.270[b]	.145	.065
G_2							.207[a]	.005	-.039	.174[a]	.106
G_3							.121				-.107
G_5							.372[b]	.239[b]	.222[a]	.188[a]	.161
G_6							.254[b]	.107	.218[a]	.200[a]	.122
G_7							.008	-.028	.037	.278[b]	.044
R^{*2}	.062	.101	.013	.072	.022	.025	.142	.027	.086	.064	.000

Note: a -- significant at .05 level; b -- significant at .01 level.

the purchase functions is generally lower than the level of the goodness of fit with the likelihood-of-purchas functions (Table 1).

The results obtained with Model B, shown in Table 3, differ depending on whether likelihood of purchase or actual purchase is the dependent variable. In the former case, scattered variables are statistically significant, especially variables that measure dissatisfaction with the car, age of the car and income level. Even so, the goodness of fit is generally not as high as with either Models A1 or A2. However, the purchase function containing the socioeconomic variables yields as a rule a much better goodness of fit than either of the models utilizing purchase plans, primarily because of the significance of a fair number of attitudinal and personality variables. The goodness of fit is now much better than with either of the two variants of Model A, rising in one case (Wave 3) to as high as 26 percent.

To what extent do the likelihood variables remain significant when the two models are combined? The answer is provided in Table 4. The variables listed under the columns for the purchase likelihood functions represent the combination of the process of combining Model A1 with the variables having a t-ratio of 1.0 or more from Model B and listing only those variables that contain coefficients with t-ratios of 1.0 or more in the combined model. In the case of the purchase functions, the final function represents a combination of the variables from Model A2 (except for Wave 2 where Model A1 was used because a Model A2 version was not possible) with the variables from Model B shown in Table 3.

The results again seem to vary substantially by the nature of the dependent variable, although some form of likelihood variable seems to make a contribution to the goodness of fit in almost all cases. This is especially so for the

3. Coefficients with t-Ratios of 1.0 or More, Model B

Likelihood of Purchase						Purchase				
2	3	4	5h	5w	6	2	3	4	5	6
A^a_{8w}	A^a_{5h}	A_{2h}	A_{6h}	A_{2h}	A_{1h}	A_{2h}	A^a_{2h}	A^b_{1w}	A_{1h}	A_{2h}
A^a_{9w}	A_{1w}	A^a_{6h}	A^b_{1w}	A^a_{3h}	A_{1w}	A_{2w}	A_{4h}	A_{2w}	A_{2h}	A_{3h}
D	A_{4w}	A_{8w}	A^b_{2w}	A_{4h}	A_{2w}	D	A^b_{5h}	A^a_{3w}	A_{3h}	A^a_{1w}
N	A_{6w}	A_{9w}	A_{8w}	A^a_{1w}	A_{4w}	I	A^b_{4w}	A_{5w}	A_{2w}	A_{3w}
O_4	A_{8w}	C	O_5	A^a_{6w}	A_{9w}	M_h	A_{5w}	A_{6w}	A_{3w}	A_{5w}
T	D^a	I	P_{1h}	H^a	A_{9w}	O_1	A_{8w}	A^b_{8w}	A^b_{5w}	A_{7w}
	F_w	O^a_1	W^a	O^a_1	O^a_4	O^a_2	F^a_w	F_w	F_h	A_{8w}
	I^b	O^a_2	Y	O^a_2		O^b_3	H^a	I	H	
	O_7	O_5		O^a_3		O^b_4	I^a	O_1	I^b	
	P_{1h}	P_{1h}		O^a_4		O_5	O_1	O_3	O^a_1	
	P_{1w}	Y		O^b_5		O_6	S_h	S^a_w	O^b_2	
	P_{2w}			O^b_6		P_{1w}	S_w		O^a_3	
	S_h			O_7			Y		O^b_4	
	S_w			P_{1h}					O^b_5	
	Y			S^b_w					O_6	
				Y^a					P_{2w}	
									W^b	
.098	.181	.040	.138	.174	.062	.067	.260	.123	.218	.039

4. Coefficients with t-Ratios of 1.0 or More, Combined Model

Likelihood of Purchase							Purchase					
2	3	4	5h	5w	6h	6w	2	3	4	5	6h	6w
L^{b}_{t-1}	L^{b}_{t-1}	L^{b}_{t-1}	L^{b}_{t-1}	L^{b}_{t-1}	$L^{b}_{t-1,h}$	$L^{b}_{t-1,w}$	L^{a}_{t-1}	G_1	G_1	G^{a}_{1}	G_1	
	ΔL^{b}_{t-1}	ΔL^{a}_{t-1}	ΔL_{t-1}	ΔL_{t-1}	ΔL_{t-1}	ΔL_{t-1}		G^{b}_{2}			G_2	G_2
B^{a}_{t}	B_t	B^{b}_{t}	B^{b}_{t}	B^{a}_{t}	B^{b}_{t}	B^{b}_{t}						G_3
	B_{t-1}	B_{t-1}	B_{t-1}			B^{a}_{t-2}		G^{b}_{5}	G_5	G^{a}_{5}	G^{a}_{5}	G_5
								G^{a}_{6}		G^{a}_{6}	G^{a}_{6}	G_6
											G^{b}_{7}	
A_{8w}	A_{5h}	A_{2h}	A^{b}_{1w}	A^{a}_{3h}	A_{1h}	A_{1h}	A_{5h}	A^{a}_{2h}	A^{b}_{1w}	A_{2h}	A^{b}_{2h}	A_{2h}
A^{a}_{9w}	A_{1w}	A^{a}_{6h}	A^{b}_{2w}	A_{4h}	A_{2w}	A_{2w}	D	A_{4h}	A_{2w}	A_{3h}	A^{b}_{1w}	A^{b}_{1w}
D N	A_{4w}	A_{9h}	O^{a}_{5}	A_{7h}	A^{a}_{4w}	A_{4w}	F_h	A^{b}_{5h}	A^{a}_{3w}	A_{2w}	A_{3w}	A_{3w}
O_4	F^{a}_{w}	A_{8w}	W	A_{1w}	A_{8w}	A_{8w}	I	A^{b}_{4w}	A_{5w}	A_{3w}	A_{7w}	A_{7w}
P_{1h}	O_7	C		A_{2w}	A^{a}_{9w}	A_{9w}	O_2	A^{a}_{6w}	A_{6w}	A^{b}_{5w}	A_{8w}	A_{8w}
T	P^{a}_{1h}	I		A_{6w}	O_4	O_4	O^{a}	F^{a}_{w}	A^{b}_{8w}	F_h	P_{2h}	P_{2w}
	S_w	O^{a}_{1}		H^{a}			O^{a}	I^{a}	F_w	I^{b}		
	Y^{a}	O_2		O_1			O_5	O_1	I	O_1		
		P_{1h}		O_2			O_6	P_{1h}	O_1	O^{b}_{2}		
				O_3				P^{a}_{1w}	O^{a}_{3}	O^{a}_{3}		
				O_4				S_h	S^{a}_{w}	O^{b}_{4}		
				O_5				S^{a}_{w}		O^{a}_{5}		
				O_6				Y		O_6		
				O_7						W^{b}		
R^{*2} .175	.305	.211	.311	S^{a}_{w} .232	.197		.106	.359	.117	.253	.126	

purchase likelihood functions where the combination of the two previous models leads to a marked increase in the goodness of fit even above that obtained with Model A1, the value of R^2 (adjusted) rising to 30 percent for two of the functions. In each of the six functions of this type shown, the purchase likelihood in the previous wave is highly significant and dominates the regression. The reported purchase of a car in the current wave is also generally highly significant. Indeed, these two variables together add generally between 35 percent and 55 percent to the explained variance of purchase likelihood, a highly significant addition (at the .01 level) on the basis of an F test.

In the case of the purchase functions the interaction terms that include purchases and past purchase likelihoods are significant occasionally but not on any consistent basis, and the same is true of the purchase likelihood variables in the previous period. These combinations of purchase and purchase likelihood variables make a statistically significant addition (.05 level) to the explained variance for three of the six purchase functions in Table 4--Waves 2, 3 and the Wave 6 function with the husband likelihoods from Wave 5. In other words, the socioeconomic and attitudinal variables are relatively much more important in explaining actual purchases, and the moderately good values of R^2 for most of the waves is primarily due to those variables. Within this set of variables the influence seems primarily that of family income, occupation of the head, and attitudes of husband and wife toward purchasing and shopping. Indeed, it seems to be more the attitudes of the wife than the attitudes of the husband that enter into the explanation of the car purchase, particularly quality consciousness.

In this sense, therefore, obtaining individual attitudes from husband and wife does seem to contribute to the explanation of purchase behavior. However, an attempt to explore the possibilities of further improvement by means of this distinction did not prove successful. This attempt consisted of using in these functions for each couple the attitudes of that member who exerted the principal control over the family finances, namely, the family financial officer.* The goodness of fit obtained with the functions after making this substitution was, however, no better than obtained from using the attitudes of the wife only or the attitudes of the husband only.

Conclusions

The results of this exploratory study suggest that the availability of panel data on purchase likelihood and past purchases can make a moderate contribution to the improvement of the explanation of both purchase likelihood and actual purchase of a car. These variables are especially useful in explaining purchase likelihood, but also are clearly relevant to the explanation of the actual purchase. In terms of a panel operation, data that go back two periods seem to be all that are necessary. While this is a highly tentative inference, since longer lags were tried only on a casual basis, there seems to be little evidence to support the possibility that purchase likelihood or purchase data going back more than one year would be relevant for these purposes, at least on a cross section basis with the

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* See Ferber, Robert and Lee, Lucy Chao, "Husband-wife influence in Family Financial Behavior," Working Paper 81, College of Commerce and Business Administration, University of Illinois at Urbana-Champaign, 1973. If the husband and wife acted jointly as the family financial officer, their attitudes on each of the variables was averaged.

individual family as the observation.*

Interaction variables that involve some combination of occurrence or past auto purchase and past purchase likelihood seem to be especially effective in explaining car purchases and definitely merit further exploration in future studies.

In closing, it should be stressed that this study was carried out on a highly restricted population and a specific geographic area. This emphasizes all the more the tentative nature of the findings and the fact that the results should be interpreted primarily as a basis for hypothesis formation.

This is not to say that longer lags would not be significant with some other unit of observation or with time series data. The statement is meant to apply only to the explanation of car purchases by individual families with a time interval of six months.

List of Variables

A_1 -- Quality consciousness

A_2 -- Economy mindedness

A_3 -- Prone to experimentation

A_4 -- Extravagant mindedness

A_5 -- Conservative mindedness

A_6 -- Bargain seeking

A_7 -- Timidity in buying

A_8 -- Price consciousness

A_9 -- Life full of opportunities*

C -- Number of children

D -- Dissatisfaction with auto

F_h -- Family financial officer is husband*

F_w -- Family financial officer is wife*

H -- Home ownership*

I -- Family income, 1969

N -- Age of auto

O_1 -- Professional*

O_2 -- Managerial*

O_3 -- Clerical, sales*

O_4 -- Skilled, craftsman*

O_5 -- Semi-skilled*

O_6 -- Unskilled*

S_h -- Years of formal education of husband

S_w -- Years of formal education of wife

W -- Wife gainfully employed*

Y -- Age of husband

*Dichotomy