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The Development, Testing, and Execution of
A New Marketing Strategy At AT&T Long Lines⁺

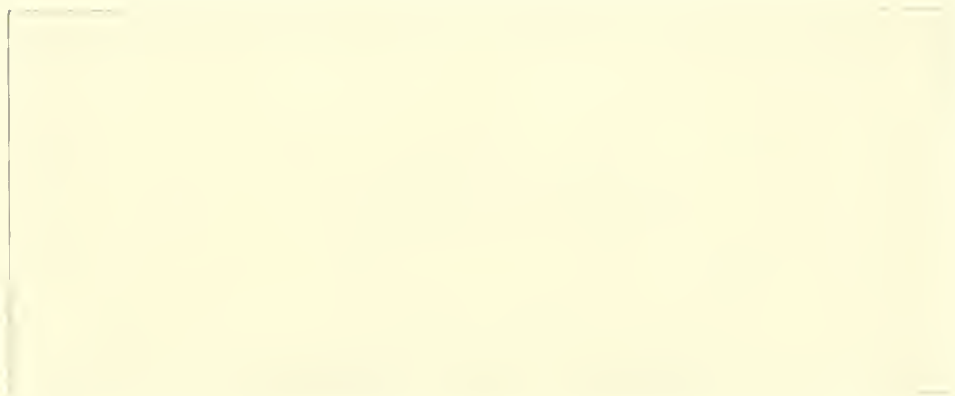
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SSM W.P. #1352-82

September 1982

THE MARKETING CENTER

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The Development, Testing, and Execution of
A New Marketing Strategy At AT&T Long Lines[†]

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Abstract

AT&T has developed a new marketing strategy for its residence long distance marketplace. The strategy is the result of five years of research starting with overall market segmentation, continuing with concept testing, and culminating with a large scale field test experiment of the new ad campaign. This experiment demonstrated, with a unique level of precision, that 1) the ad copy changed usage behavior and, 2) AT&T should generate an additional \$100 million by implementing the new campaign.

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INTRODUCTION

How can the benefits of an advertising campaign be established? That question has been debated for years. Does advertising have much impact at all? If it does, how can that impact be measured? A recent article in the Wall Street Journal compared advertising to religion. It stated that most companies were not quite certain exactly what happened when they advertised. However, many of these companies had almost a blind faith that by continuing to advertise, eventually something good would happen to their firm. There is little consensus in the advertising industry about how and under what conditions advertising works or even on how to test the effectiveness of a campaign (Ramond 1976). The best measure would be actual purchase or use of the product. Because purchase and use can be difficult to measure, advertisers rely on other process or surrogate measures such as top-of-mind awareness, recall, preference, and purchase intent. AT&T Long Lines has introduced a national advertising campaign for its residential long distance customers to enhance its highly successful "Reach Out" campaign. A substantial part of the multi-million dollar annual advertising budget is devoted to this new "Cost of Visit" campaign. The campaign, which stresses how inexpensive a twenty-minute telephone "visit" can be, is more than just a switch from an emotional to a pragmatic appeal. Careful research segmented the long distance market and found a group of people who have reasons to call long distance but who limit their calls because of a price barrier. "Cost of Visit" uses a new way to present the price of long distance calling to this consumer. It also encourages calling during off-peak hours.

The concept behind the new campaign resulted from a concerted, long-term effort using various research tools in an almost "textbook" approach. However, the final decision to go ahead with the new campaign was based on the

results of an experiment used to test the "Cost of Visit" strategy. This procedure was unusual in a number of respects, including its precision. The experiment was conducted on a dual cable television system which enabled the performance of the new campaign to be compared to that of the established "Reach Out" strategy. AT&T's own long distance usage tracking system was used to measure the effects each had upon long distance telephone usage.

The most gratifying result of the experiment was that the "Cost of Visit" campaign produced a statistically and economically significant increase in calling over "Reach Out." For the company that means millions of calls made during off peak hours. Because services are not as much in demand during those hours and the additional traffic can be handled at little additional expense, these incremental calls are highly profitable. Estimates for 1982 show that by switching \$30 million in advertising from "Reach Out" to "Cost of Visit," the company will gain \$22 million more for its investment. In five years, that figure should top \$100 million - all with very little extra expense for the company.

BACKGROUND

American Telephone and Telegraph, the world's largest company, is the foremost supplier of telecommunications services in the United States. Prior to 1969, long distance phone service in the U.S. was a regulated monopoly. During the 1970s, however, the Federal Communication Commission began encouraging competition in the long distance telecommunications marketplace. As a result, AT&T began competing with other companies to provide long distance service to residential customers. Since 1980 the number of those competitors has grown dramatically and they are no longer fledgling firms.

RESEARCH PROGRAM

The research leading to "Cost of Visit" began in 1975 and culminated in 1980 with the field experiment. This research program consisted of four projects: 1) a segmentation study of the residential long distance market, the first conducted by the Bell System; 2) tracking studies to test customer awareness of interstate phone rates; 3) qualitative research on customer attitudes to develop an advertising concept; and 4) a large scale field experiment that measured the effects of alternative advertising strategies in the marketplace. The total cost of the research was approximately \$1 million.

The Residential Long Distance Usage Study

In 1975, a residential Long Distance Usage Study was conducted which divided the market into "Heavy, Medium, Light and Non-user" segments. The most important discovery was that a large group of light telephone users looked a lot like heavy users in terms of demographics and psychographics, except for a psychological "price barrier." Since the lights had, on average, four or more friends/relatives living more than 50 miles away, and their demographic characteristics did not preclude them from being potentially heavier users, they were designated "Potential Telephone Users" (PTU's). Researchers hypothesized that this group's usage might be stimulated through advertising, and the groundwork was laid for the development of "Cost of Visit." The PTU's represented a substantial portion of the residential market -- even a slight increase in this group's phone use could represent a large increase in overall long distance calling.

Customer Interstate Rate Awareness Study

For several years AT&T Long Lines has conducted an annual study which focuses specifically on long distance rate awareness. Some 3,000 residential telephone users are surveyed by mail. Each year the same general conclusion is drawn: most customers do not know the cost of a long distance call, or when it's cheaper to call. Most overestimate the cost of those calls by 50%.

The long distance rate structure consists of three rate periods:

1. Full rate period: 8 a.m. to 5 p.m., Monday through Friday.
2. Discount calling period: 5 p.m. to 11 p.m., every night except Saturday.
3. Deep discount calling: Friday 11 p.m. until Sunday 5 p.m. and every week night from 11 p.m. till 8 a.m.

Calls were discounted 35% during the discount calling period and 60% during the deep discount calling period. (In 1982 the 35% discount was increased to 40%).

Concept Development Study

The next step was a three-phase concept development project carried out in 1977.

Phase I

The attitudinal data collected in the 1975 segmentation study were used to identify possible alternative advertising positions. Each of the 68 individual attitudinal items employed in that study was screened as a possible positioning concept using two types of criteria. The first was essentially statistical and concerned the extent to which the attitude varied across the usage segments. The second criteria was a judgmental one relating to whether

or not the particular item represented an attitude that might be influenced by means of advertising. Seventeen attitudinal items emerged from this screening process as potential advertising concepts or themes. These items were then sorted judgmentally on the basis of content similarity into five position alternatives described below.

Phase II

In the next phase, the five position alternatives identified previously were translated into written concept statements and further developed and tested in focus group interviews conducted with PTU's. These sessions provided insights into the psychological aspects of long-distance calling which were used to refine the initial concepts.

The revised position conceptualizations were then exposed to a second round of focus groups. The final copy positions used were:

- 1) Lifeline It's easy to drift apart when you're far away from family and friends. Long distance can help keep you together.
- 2) Cost of Visit Many people are still depriving themselves of long distance because they think it costs too much. If they only knew how inexpensive it really is!
- 3) Feel Good When you're feeling happy, it can make you even happier. When you're feeling down, it can cheer you up. However, you feel, long distance can make you feel better.
- 4) Letters When you stop to think of the advantages of long distance calling, you've got to wonder why some people still only write letters.
- 5) Comfortable A lot of people don't realize how easy it is to have a relaxed long distance conversation.

Phase III

The five positions outlined above were subsequently turned into slide-tape presentations and used in individual in-depth interviews. These interviews were conducted with small samples of both PTU's (light users) and heavy/medium users to ensure that the strategy developed for lighter users would not "turn off" those who already called frequently.

"Cost of visit" emerged as the dominant alternative as judged by various structured and unstructured measures of respondent reaction following exposure to the five positions. It was the only strategy that successfully attacked people's rigid perceptions of price/value. After viewing the commercial, customers indicated that a 20-minute call was reasonable in length and a relaxing way to visit someone, a marked contrast to their perceptions of previous strategies where customers felt the "rate meter" was running after three minutes. Additionally, "Cost of Visit" directly dealt with another common problem -- although customers sometimes know how much off-peak calling is discounted, they usually miscalculate the discount's effects on rates. For instance, some mistakenly believed that under full rates a 20 minute call could cost as much as \$20. When they heard that calls were being discounted 60 percent they calculated that the call would still cost them \$8.00. In fact, during 1979, the call was never more than \$3.33. Finally, "Cost of Visit" also promoted visiting by telephone as pleasurable. (Figure 1 presents the story boards for one of the Cost of Visit commercials.)

* * * *

INSERT FIGURE 1 HERE

* * * *

The "Cost of Visit" theme contained several important elements:

- . Surprise (most people are unaware of the low calling cost)
- . The appropriateness of 20-minute visits (a reasonable amount of time to talk)
- . It costs less than \$3.33
- . No hidden extra costs (all taxes included)

These elements were incorporated into the finished TV commercials which were then tested in a field experiment.

Large Scale Field Experiment

To test "Cost of Visit"'s effectiveness in stimulating calling, a study was designed using the AdTel Company's dual cable television system in a particular geographical area. (Under the terms of a contract with the cable company, the test location cannot be disclosed publicly). In the AdTel system, two cables are used to distribute signals to subscribing households who can receive both regular (e.g. network) and restricted-access channels and programming. The geographical area is sub-divided into a checker-board pattern where each square consists of a cluster of 40 to 50 subscribers. Households within a given square receive their signal from one cable but those in an adjacent square are served by the second cable. Signals transmitted over the two cables can be controlled through a cut-in facility making it possible to vary the frequency, timing, or content of the commercials aired over the two cables. Using this capability, one group of cable subscribers received the "Reach Out" campaign being broadcast on national network television, while the second group was exposed to the "Cost of Visit" commercials cut into the same programming and time slots as those in which "Reach Out" was aired.

Split cable facilities have been widely used for advertising experiments. Rhodes (1977) provides detail on the AdTel system. His paper and that

of Adler and Kuehn (1969) report some of AdTel's experience in advertising experimentation, including case examples. Technical accounts of split cable advertising experiments concerned with spending levels may be found in McGuire (1979) and Winer (1980).

To measure the relative effectiveness of two advertising strategies is an ambitious undertaking and so steps were taken to obtain high precision. Whereas split cable experiments usually measure sales effects by using panels of roughly 2,000 households, the present experiment involved a much larger sample. The household sample size was 7,192 for the "Cost of Visit" cable and 7,334 for "Reach Out." Furthermore, unlike consumer products that are distributed through middlemen and so are subject to uncontrolled variations in price, availability, display, etc., the opportunity to use the telephone is relatively constant and stable. Finally, records of actual telephone usage among active telephone numbers were tracked during the period. Measures of the effects of the two alternative strategies were in terms of calls/telephone number, minutes/call, and revenue/telephone number. These variables were examined during 1) the daytime full rate period, 2) evening discount period, and 3) weekend/night deep discount period.

The objective of the "Cost of Visit" campaign was to encourage all user groups to call during discount off-peak periods -- particularly the 60% "deep discount" period. In addition, specific attention was given to the light users who traditionally made only 2 or 3 calls a month. The basic hypothesis was that this substantial "Potential Telephone User" group would respond to the "Cost of Visit" campaign.

The results of the study supported the strategy that grew out of the earlier segmentation and developmental research. The "Cost of Visit" strategy resulted in more long distance calling during the treatment period than "Reach

Out", particularly among the light users. (See Figure 2). "Cost of Visit" had its greatest advantage in stimulating calls over "Reach Out" during the 60% discount period among all usage segments, especially during the weekend. Overall, calling during the deep discount period increased by an average of over a half a call per household over the 15 month posttest period. These results were highly significant in statistical terms (at the 99% confidence level) and in economic terms. They also indicate the high precision of the experiment. Furthermore the targeted lighter users increased calls by an average of over one and a half calls per household during the 15 months. Households were changing their normal behavior and calling more during off-peak hours -- all because of a change in the advertising copy. Additionally, the group which was the target of the research, the lighter user, responded the most. (See Figure 3).

* * * *

INSERT FIGURES 2 AND 3 HERE

* * * *

Comparing "Cost of Visit" to "Reach Out," there was a significant improvement in revenue. For the targeted light user groups, revenue increased by over 15% during the night/weekend period. For all user groups and rate periods combined, the revenue increase was approximately 1%. This increase was particularly notable because the standard for comparison was the "Reach Out" strategy, already a proven winner.

Post-Assessment

In the post-assessment phase the test commercials were withdrawn from the cable systems and replaced with the current Long Lines national campaign being run elsewhere at that time. Tracking of household long distance calling was continued for seven months to evaluate the durability of the treatment effects. During the post-assessment phase usage differences remained positive

but were much smaller and no longer statistically significant. This raises interesting questions for future research regarding the interactions between sequential copy treatments and the role of continued advertising in reinforcing customer behavior.

Because attitude research played a key role in development of the "Cost of Visit" strategy, there was considerable interest in determining whether pre-post shifts in customer attitudes toward long-distance calling could be detected. As well, the relationship between attitude change and behavior change is a perplexing and highly controversial matter in advertising research (Ramond 1976). Analysis of the post-assessment data showed that there were numerous shifts in attitude, generally in a positive direction. These shifts were typically small -- one-to-two-tenths of a point on a six point scale, or 4-5% of the respondents. More importantly, statistically significant differential effects on attitudes toward rates were observed between the two cable samples for two attitude items: "I think the cost of a long distance call is good value for the money," and "When I make a long distance call to keep in touch, I don't worry how long I talk." (See Table A2 in the Appendix.)

The fact that caller attitudes toward rates and lengths of calls changed favorably is consistent with the increase in calling experienced with the "Cost of Visit" campaign. However, since the attitude change was so slight when compared with the actual behavior change, national projections of the results were done by weighting groups with similar calling habits, rather than attitudes. In general, usage has generally been superior to attitude as a predictor of future behavior.

One issue arose during the actual implementation of the ad campaign. During late 1981, AT&T raised its long distance rates. Now the question was whether it still made sense to make customers aware of exactly how much it

cost to make a long distance call. A separate series of customer focus group sessions indicated that the answer was still yes -- continue with the Cost of Visit campaign with revised rates. Since customers had previously over-estimated the cost of calling by over 50%, awareness of the revised rates still produced an overall perception of lower prices. Also, customers said they expected gradual price increases during an inflationary period and perceived that long distance rates were not rising as much as other things they bought.

BENEFITS

The "Cost of visit" campaign successfully persuaded customers to call during times that are both cheaper for them and more profitable for the company. This marketing campaign helped solve a classical "peak-load" problem. It also lowered peoples' perceptions of AT&T long distance calling prices, which should have a high payoff for the company in today's newly-emerging competitive telecommunications market. When projected nationally, the increase in calls for 1979 would have been about fifteen million using "Cost of Visit." Since the annual revenue base for all of AT&T Long Distance calling was over \$7 billion, a one percent increase in revenue would be approximately \$70 million in incremental dollars per year on a national basis. A separate study on the "Reach Out" campaign concluded that if \$30 million were spent on "Reach Out," approximately \$150 million in incremental revenue would be generated over 12 months. By using that \$30 million for "Cost of Visit" advertising on a limited geographic basis during 1982, some \$172 million in revenues will be realized. The difference between the two campaigns in 1982 alone will be \$22 million, given the planned advertising schedule. The \$22 million represents only a portion of the \$70 million of

incremental revenue that would be realized if the entire media budget were spent on "Cost of Visit" in all areas of the country. Conservatively projecting the use of this ad campaign over the next 5 years it will produce about \$100 million more than the "Reach Out" campaign. (See the Appendix for a description of the projection model.)

This project is one of a handful of published studies that has reported finding a significant effect on purchasing or usage behavior due to changes or variations in advertising copy strategy (Bloom, Jay, and Twyman, 1977; Rao, 1978; Rhodes, 1977). Failures to find copy effects in sales experiments have also been known to occur (e.g., Dhalla, 1975) and negative results are probably underrepresented in the literature. Such evidence has high managerial relevance now when long standing criticisms of traditional advertising pre-testing procedures appear to have escalated to new levels of severity (Honomichl, 1981). As Little (1979) has shown, the accumulation of empirical studies can contribute to the advancement of management science in advertising by revealing important phenomena that decision models should encompass. Much remains to be learned about the dynamics of response to changes in copy strategy and the durability of such effects. The present work also lends support to the type of creative advertising policy advocated by Gross (1972) in the sense that it represents a case where the difference in the potential profitability between the alternative strategies was clearly sufficiently large to justify the heavy expenditures required to develop alternative campaigns and test their relative effectiveness in a full scale sales experiment.

CONCLUSIONS

AT&T Long Lines has embarked on the new national "Cost of Visit" campaign with confidence, because of the extremely precise AdTel experiment that demonstrated the strategy was more effective than the highly successful "Reach Out" campaign. Most encouraging is the fact that the market segment most responsive to the new campaign was the target group of customers who make relatively few long distance calls. Further, measures of attitudinal responses showed positive change in some items related to long distance rates.

The national television campaign starts with \$30 million during 1982. Over the next five years the company can expect to earn at least \$100 million more, primarily from light users, than it hoped to gain using "Reach Out" alone. Further, this \$100 million can be made with little expense to the company since existing telephone facilities will be used to handle the incremental calling and advertising costs will not increase above their originally projected levels.

ACKNOWLEDGEMENTS

Any management science project this large has benefited from the contributions of many people along the way. We would especially like to acknowledge the efforts of R. Emond, R. Brookmeyer, and B. Carlson who had primary responsibility for the project during the segmentation study and initial design of the field experiment; W. West, M. Leone, D. Dolan, and J. Redfern who were product managers of residence interstate service; R. Golden of N.W. Ayer, who contributed to the concept development process; M.E. Caro,, S. Marg, G. Smit of AT&T Long Lines and S. Chow and J. Lattin of MIT, who contributed to the data analysis of the field experiment and B. Wood of AT&T Long Lines, who assisted in writing this article.

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TECHNICAL APPENDIX

Overview

Several different analytical tools were used in this series of studies, including cluster analysis, factor analysis, linear regression, analysis of variance, and contingency table analysis.

The national segmentation study consisted of a survey sample based on area probability sample projected to four regions served by the Bell System. A total of 806 households were interviewed. In married households, both the male and female head were separately interviewed, and this resulted in 1351 total interviews.

The validity of the sample was checked by comparing the demographics of the respondents to those of the total population as reported by census data. In addition, a comparison was made of the long distance usage rates of respondents vs. non-respondents. Both of these checks demonstrated that the sample was a valid and projectable one. See Table A-1 for a sample-census comparison.

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INSERT TABLE A1 HERE

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The first step was a factor analysis of the 68 attitude items included in the survey. The specific factor analysis technique used was a principal component analysis with a varimax rotation. The second multivariate analysis involved the grouping of individual respondents according to the similarity of their factor scores. The end result of this analysis was a set of segments of individuals with relatively similar patterns of responses to the attitude

items. In other words, respondents grouped through this procedure into a segment had a pattern of responses to the attitude items that was different from that of all other segments. The specific cluster analysis technique used in this study was the Howard-Harris Profile Similarity Program.

The final step in the analysis involved the tabulation of the responses to the questionnaire items for the various consumer clusters or segments. This analysis allowed for a comparison of each segment's long distance usage, media habits, life style, etc., and guided the formulation of marketing strategies to stimulate long distance usage among those segments judged to have the highest potential.

The concept development study process looked at these attitude items and judgmentally selected out 24 items which appeared changeable. These items were again judgmentally sorted into 5 factors to be used as a basis for advertising copy positions. A comparison of these five concept development factors to the factors generated in the segmentation study indicated that they were similar. With this confirmation, the ad copy was generated and tested using individual questionnaire measures on an eleven point scale of "intent to call" as the deciding measure to rank order the copy positions.

In the AdTel strategy experiment, the measure of interest for the behavioral data was the relative advantage of "Cost of Visit" (Cable B) over "Reach Out" (Cable A). For each variable (calls, minutes, revenue), the overall average difference between cables was calculated for each weekly interval. Using linear regression, these weekly values were analyzed in order to determine the percentage increase. Briefly, the technique compared the pre-test average with the test period average -- i.e., the difference between

Cable B and Cable A in the test period minus the difference between Cable B and Cable A during the pre-period.

In projecting the results to the nation, base behavioral measures were first obtained for the whole Bell System. Then the incremental gains in percentages observed in the test market were applied to those base figures separately for each usage segment and each rate period. For instance, light users in the 60% discount period showed a particular gain in the test market. For any other geographical area, this gain can be applied to the base behavior shown by light users in the 60% discount period in that area. This was done for each usage segment and each rate period for the Bell System as a whole. The separate results were summed to obtain an overall result, which represents the incremental gain that could have been expected if "Cost of Visit" had been implemented nationwide.

The AdTel analyses were done at MIT where research on several issues is continuing using data from the AdTel Strategy experiment.

AdTel Usage Analysis

1. Usage Segments

In marketing, one normally expects different behavior from light and heavy users. In the present instance, the "Cost of Visit" strategy was designed specifically to appeal to light users. Accordingly, five usage segments were defined based on calling behavior in the pre-period. Specifically, all households (i.e. telephone numbers) were classified into one of the five segments based on the calls over 50 miles made in the 4-week period, October 15 - November 11, 1978. This time period was chosen because it was

after the summer vacation period and before the high calling periods of Thanksgiving and Christmas.

Even if a household made no calls in the 4-week definitional period, it did not, of course, mean that the household never made long-distance calls. In fact, the zero-call group averaged 1.3 calls/4-weeks over the 15 months of the treatment period.. It was clear, however, that the segmentation identified large differences in average calling behavior and hence the operational definitions of the usage segments were indeed meaningful.

All analyses were done by segment and expressed in terms of usage/household/unit of time. The measures of usage were calls, minutes of calling, and revenue in cents. Only calls over 50 miles were considered.

When we wished to show overall population effects in the experimental groups, we used the comparisons within individual segments on a usage/household basis and then synthesized the total population effect by weighting each individual segment effect by its fraction of the total population. The fractions were calculated across the two cables combined. This is different and substantially more accurate than comparing two groups in aggregate. Below, we give an example to illustrate why this is important (see the section on "Importance of Segmentation").

2. Calculation of Strategy Effect

The calculation of the differential effectiveness of the strategies administered, say, Group 1 and Group 2 is:

[mean usage/household/week in Group 1 during treatment period
- mean usage/household/week in Group 1 during pre-period]

-[mean usage/household/week in Group 2 during treatment period
- mean usage/household/week in Group 2 during pre-period].

The possible groups are the two cables. Usage may variously be calls, minutes or cents.

An easy way to do this calculation and at the same time develop standard errors and confidence limits based on econometric techniques is to use linear regression. For example, let:

USDF = difference in usage/household per week between treatments
("Cost of Visit" minus "Reach Out"),

UNOFF = dummy variable for existence of advertising difference by week,

= 0 for pre-test weeks,

= 1 for treatment weeks,

ϵ = Disturbance term.

The regression:

$$USDF = \alpha + \beta * UNOFF + \epsilon,$$

will model the difference in usage/household/week between cables as a pre-period constant, α , and a treatment period constant ($\alpha + \beta$, where the regression will calculate α to be the mean difference between cables in the pre-period and $\alpha + \beta$ the mean difference in the treatment period. Then $\beta(=\alpha + \beta - \alpha)$ is the mean treatment period difference adjusted for the pre-test difference. β is the desired strategy effect in units of usage/household/week. The week-to-week variation in USDF provide a measure of error in a standard econometric way. Various graphical analyses and other checks indicated that a single parameter regression model was the appropriate choice for analysis. In calculating USDF or any other usage variable that cuts across segments, the usage differences were calculated by individual segment and aggregated by weighting with the segment fractions of the two cables combined.

Cumulative plots were the principal device for displaying the data and standard regression methods were used to carry out the appropriate statistical analyses. Several properties of the cumulative plots should be noted.

- (1) A constant difference in effect between cables appears as a constant slope on the cumulative.
- (2) A period of no difference between cables creates a flat segment on the cumulative plot.
- (3) The units on the vertical axis are incremental calls per household to date. In other words, the number of calls at the end of the experiment is the total cumulative incremental calls made by the average household over the course of the 15 months. We obtain the same number by multiplying the advertising coefficient from the regression by sixty-five weeks.

The four pre-period weeks used to define segments were omitted from the regression. This is considered to be a conservative procedure to protect against any possible threat from "regression to the mean" phenomena. The threat seems to be minor because of the controlled nature of the experiment but we take the step as an extra precaution. In addition, for individual segment analyses, the definitional weeks were clearly atypical and would distort standard error estimates.

3. Aggregate Results for the Cable Population

The overall results plotted in Figures 2 and 3 show the cumulative difference in usage/household measured from the start of the experimental treatments on January 1, 1979. The cumulative effect of the entire 15 month treatment period was looked upon as the natural measure of effectiveness for evaluating the strategies. Since the the difference calculated is "Cost of Visit" less "Reach Out", positive values indicate incremental usage for "Cost of Visit." The difference has been adjusted by the pre-period average (see Figures 2 and 3, above).

We note the experiment is remarkable for its high level of precision. The standard errors for the aggregate results are about .5 calls, 5.7 minutes and \$1.24 per household over a 15 month period. These standard errors are calculated by multiplying 65 (the number of weeks in 15 months) times the per week value of the standard error. In Figure 3, for example, the t statistic is 3.85 with a 99% confidence level for the light user segment. The standard errors at other points on the cumulative curves can be closely estimated by multiplying the appropriate value of the standard error by the number of weeks since the start of the treatment.

Attitude Change Analysis

Table A2 summarizes the pre-post shifts in attitudes relating to long distance rates observed for the two treatments. We analyzed the pre-post attitudinal changes in two different ways and compared the results. Each approach has its own advantages and limitations but in certain respects the methods complement one another. First, we made use of an analysis of variance for repeated measures. The ANOVA method is well suited to detecting differential strategy effects but, of course, requires that the necessary distributional assumptions be met. A weakness of the repeated measures ANOVA method here was that it assumed that the pretest level does not influence the magnitude of change and does not provide a test for the presence of an interaction of the treatment effect with the pretest.

A second method involved comparisons of contingency tables (Goodman, 1963) formed by cross-tabulating the pretest and posttest ratings for each treatment sample and carrying out χ^2 tests to detect differential patterns of change between samples. Here the attitude ratings were treated as discrete measures and the hypothesis tests required no special distributional assump-

tions. An advantage of this mode of analysis here was that it allowed comparisons to be made between samples with respect to posttest attitudes controlling for any between-samples differences in the pretest attitudes.

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Importance of Segmentation

Early in the process of analyzing the data we found that, when the cables were compared in simple aggregation, often little or no effect was found, but when the cables were compared segment by segment, effects emerged. The reason is that modest imbalances in numbers of households in different segments can distort the aggregates. This is most easily seen in an example. Close inspection of the numbers below, which are drawn from actual data, will show the surprising result that:

- (1) Cable3 has greater calls/household than Cable4 in both "low" and "high" segments;
- (2) Cable4 has greater calls/household than Cable3 in aggregate.

* * * *

INSERT TABLE A3 HERE

* * * *

Clearly the segment analysis is the appropriate one. If we wish to determine the calls/household for an aggregate population we can weight the segment calls/household by the average (across cables) number of households in each segment.

Projection Model

The purpose of the revenue potential model was to project the results obtained in the AdTel experiment cities to other geographic areas. Of special interest is the Bell System as a whole. One may think of the revenue potential calculation as consisting of a data base, inputs, the model itself, and outputs. The model combines data base and inputs to produce the outputs. The data base contains strategy response measurements from the AdTel Cities experiment and geographic usage data from AT&T's Market Analysis of Revenue Calls (MARC) system.

From the AdTel experiment comes the incremental percentage gains of the "Cost of Visit" (COV) strategy relative to the "Reach Out" (RO) strategy on calls, minutes and dollars per household. The gains (which in certain cases can be negative) are broken out by rate period (full rate, 35% discount and 60% discount) and by usage segments defined in terms of prior telephone usage by the households. MARC provided 1979 annual data on calls, minutes and revenue per household for a set of selected geographic areas and total Bell System. This is broken out in the same categories as the AdTel response data. Throughout the experiment and in the projection, only calls over 50 miles are considered. "Household" is used to refer to a residence telephone number or account.

The model consists of a cell by cell projection and aggregation. Thus incremental usage is calculated by applying the experimentally determined percentage gains to each combination of usage segment and rate period for a geographic area and summing to obtain the total effect. The basic projection assumption is that the households of a usage segment in an arbitrary area will, on average, respond to the COV strategy in the same percentage terms as the households in the corresponding usage segment in the Test Cities. How-

ever, the actual incremental gains will differ considerably from area to area because of different numbers of people and variations in their calling habits.

The inputs to a run of the model are the Advertising Areas of Dominant Influence (ADI's) to be considered and the type of output desired. It is also possible to make "what if" assumptions about strategy response by segment and rate period. Outputs are incremental usage for the ADI's or Bell System, broken out by whatever aggregations of the basic data may be requested.

The model involves individual population cells whose projected calling behavior is calculated from past usage and experimental results. Summation over cells yields the projected effect for the total population of interest. Let:

- i = 1, ..., I = index of cells (usage segments),
- j = 1, ..., J = index of calling categories (rate periods),
- Z_{ij} = usage measure household in cell i for calling category j for an ADI Area of Dominant Influence,
- n_i = number of households in cell i for the ADI,
- P_{ij} = percent increase (expressed as a fraction) in usage/household for COV relative to RO in cell i and category j ,
- y = incremental usage in the ADI.

Then:

$$y = \sum_{i=1}^I n_i \sum_{j=1}^J Z_{ij} P_{ij}$$

TABLE A-1

1975 NATIONAL SEGMENTATION STUDY
DEMOGRAPHICS OF THE SAMPLE CONTRASTED TO 1970 CENSUS DATA

	<u>Sample for this Study</u> %	<u>1970 Census</u> %
<u>Marital Status</u>		
Married	84	75
Divorced, widowed, separated	12	19
Never married	4	6
<u>Age</u>		
Under 34	34	37
35-44	18	17
45-54	17	17
55 or over	28	29
<u>Sex</u>		
Male	45	48
Female	55	

Table A-2

DIFFERENCE IN THE MEAN OF ATTITUDE ITEMS MEASURED BEFORE AND AFTER THE TEST PERIOD FOR EACH OF THE ADVERTISING STRATEGIES

Items Measuring Attitudes Toward Long-Distance Rates*	Treatment Group		
	RO	COV	
I try very hard to limit my long distance calling in order to keep the phone bill down.	4.757	4.701	Pre
	<u>4.701</u>	<u>4.650</u>	Post
	+0.056 ^a	+0.051 ^a	Difference
I make a special point of waiting for the low rate time for most of my long distance calls.	5.055	5.011	
	<u>5.049</u>	<u>5.047</u>	
	-.006	+0.038	
I think the cost of a long distance call is a good value for the money.	4.320	4.403	
	<u>4.429</u>	<u>4.615</u>	
	+0.109	+0.212	
I would probably make many more long distance calls than I do now if the rates were cheaper	4.882	4.926	
	<u>4.802</u>	<u>4.806</u>	
	+0.078 ^a	+0.120 ^a	
When I make a long distance call to keep in touch, I don't worry how long I talk.	3.108	3.185	
	<u>3.087</u>	<u>3.284</u>	
	-.021	+0.099	

* Ratings are on a 6-point scale, in which a higher score indicates more agreement.

^a Wording of item is such that a decrease in the mean score indicates an increase in the favorability of the respondents' expressed attitude toward long distance calling.

For each item the figures shown are (in order) the pre-test mean, the post-test mean, and the difference (Post-Pre).

TABLE A3

Raw Data (from week of October 15, 1978)

	Cable3		Cable4	
	<u>households</u>	<u>calls</u>	<u>households</u>	<u>calls</u>
low segments	5,074	1,292	5,277	1,277
high segments	<u>2,795</u>	<u>6,911</u>	<u>3,054</u>	<u>7,482</u>
	7,869	8,203	8,331	8,748

Analysis

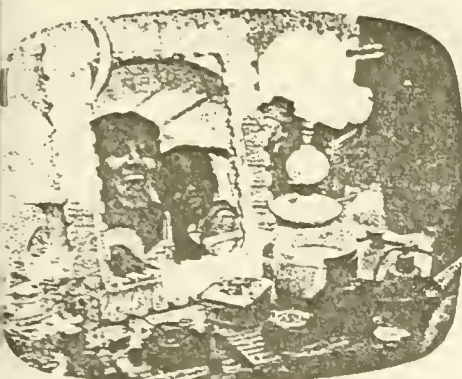
calls/household

	Cable3	Cable4
low segments	.2546	.2399
high segments	2.4726	2.4499

Combined	1.0426	1.0501

Title: "Sister"
Commercial No.: AXLL2074
Length: 30 Seconds

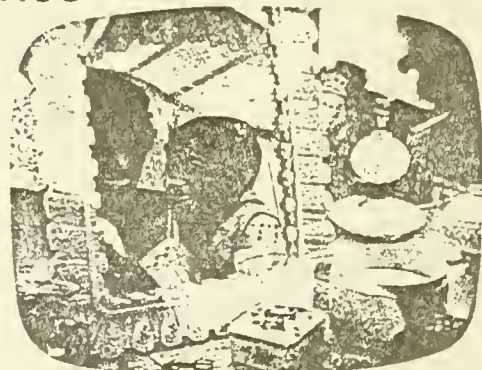
AT&T Long Lines Residence



(MUSIC UNDER)



WOMAN VO: On Saturday nights, my sister



Laurie was official perfume tester



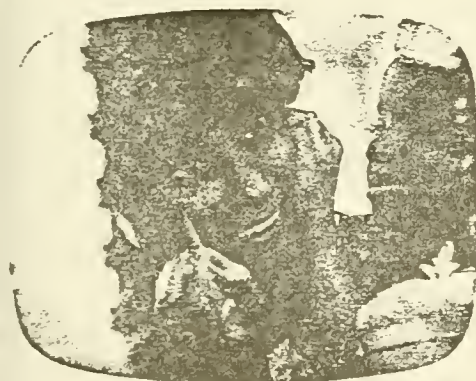
and



make-up adviser.



An all around little miss fix-it.



And she's still my biggest fan,



even though we're miles apart.



WOMAN (OC). We call each other most every weekend, when it's cheaper so we can visit longer.



ANNCR VO: Stay close to someone you love this weekend,

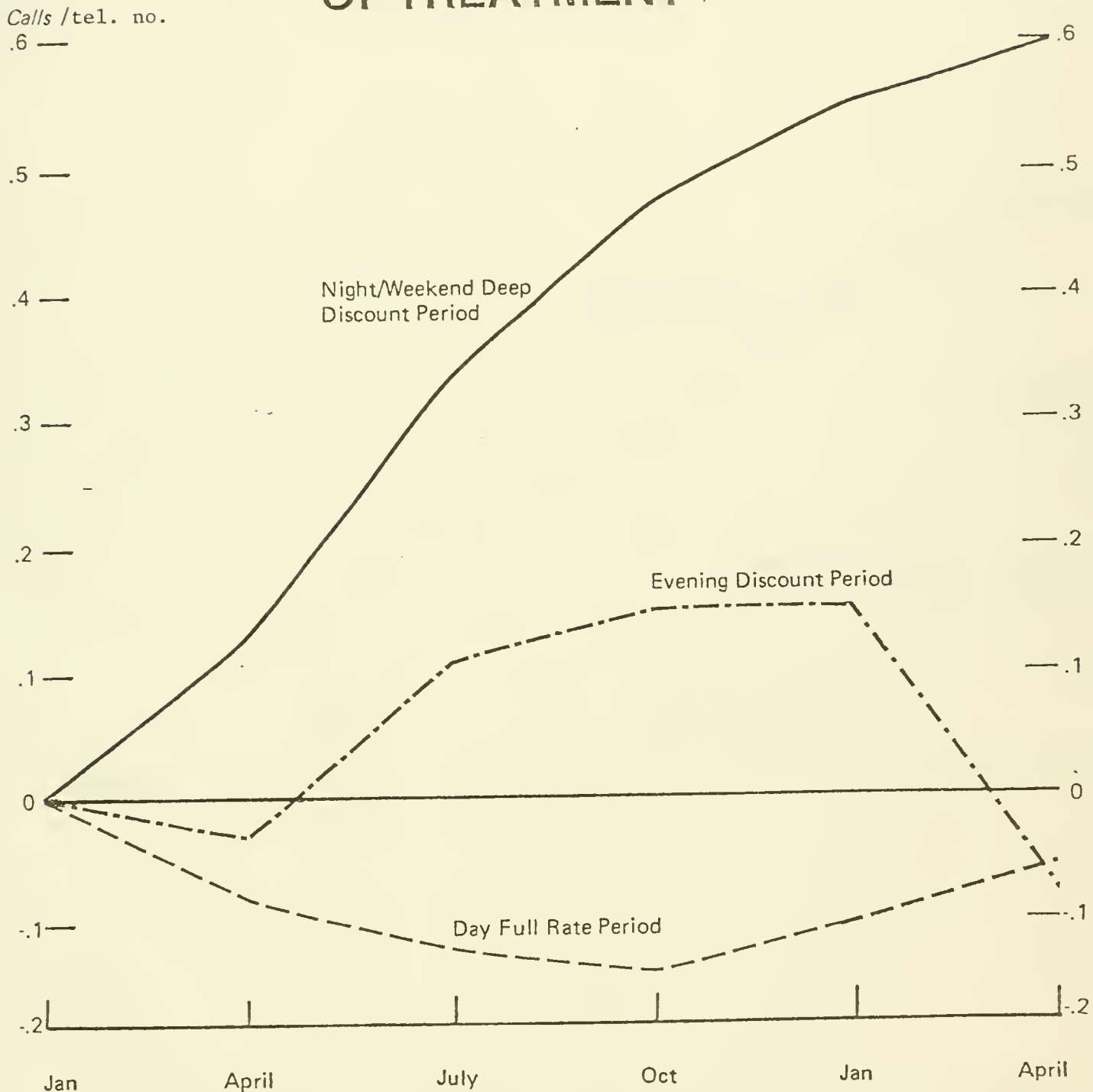


when a 20-minute state to state call is only \$4.06 or less, tax included.



Figure 2

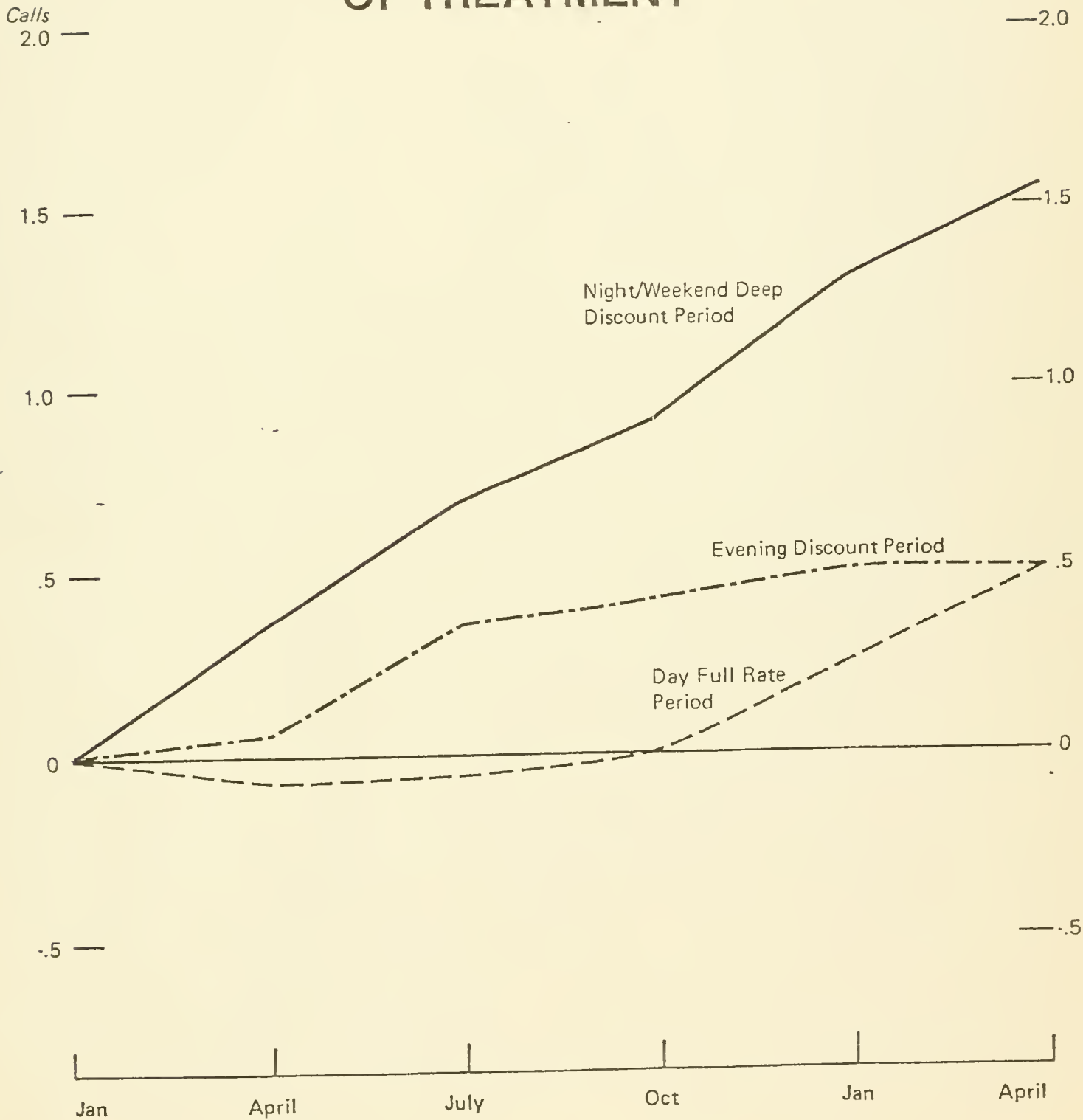
ALL USAGE SEGMENTS COMBINED CUMULATIVE DIFFERENCE IN CALLS/TEL. NO. SINCE START OF TREATMENT



The Night/Weekend Deep Discount
Period Responds The Most

Figure 3

LIGHT USAGE SEGMENT CUMULATIVE DIFFERENCE IN CALLS/TEL. NO. SINCE START OF TREATMENT



The Light User Migrates To Heavier Usage

BASEMENT

Date Due

OCT. 1 1 1984

Lib-26-67

HD28.M414 no.1352- 82
Kuritsky, Alan/The development, testin
745048 D*BKS 00136960



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