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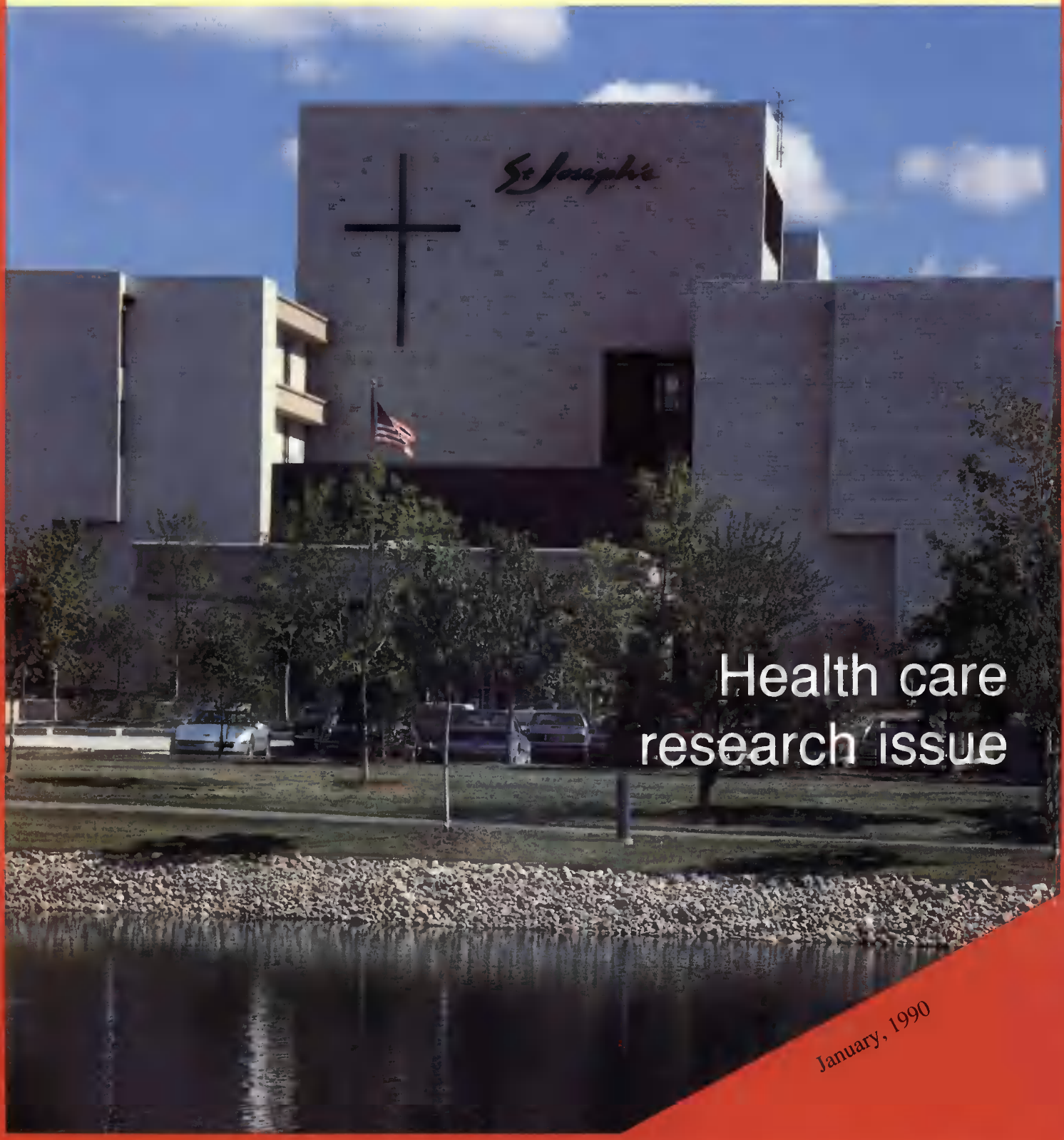

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January, 1990

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Quirk's
MARKETING RESEARCH Review

Vol IV, No. 1 January, 1990

Cover

St. Joseph's Health Network, Mt. Clemens, Mich., monitors its market with data analysis. See p. 6. Photo courtesy of St. Joseph's Hospital.

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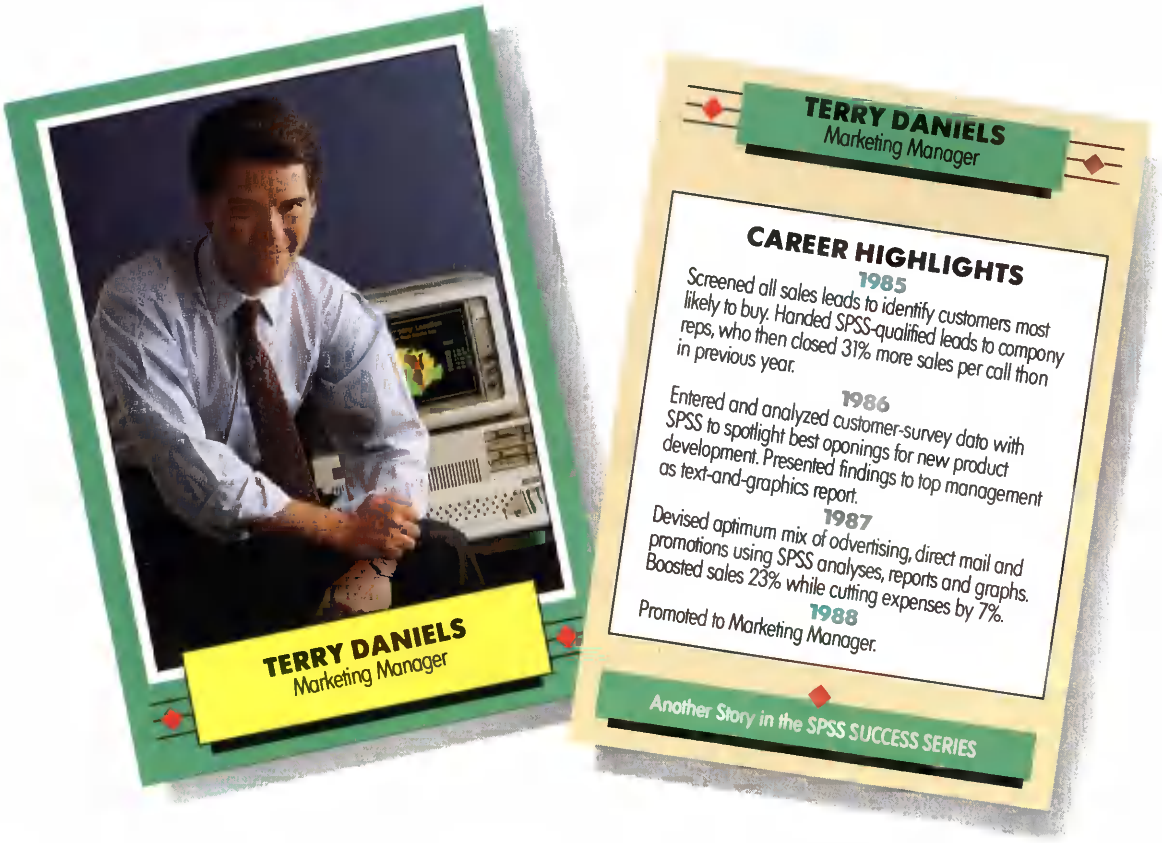

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Monitoring the vital signs

Extensive data analysis keeps a Michigan healthcare provider competitive

Situated in Macomb County, Michigan, 30 miles north of Detroit, the St. Joseph's Health Network was founded in 1898, when the Sisters of Charity built a sanatorium in the town of Mt. Clemens that included a 50-bed hospital. With steady expansion of that site over the next several decades and the addition of new hospitals and other facilities, St. Joseph's now provides the county's 700,000-plus residents with a wide array of healthcare-related services from many locations.

But it's not alone. In addition to facing competition from HMO's, urgent care centers, and satellite clinics, the network is finding that as Detroit's metropolitan area expands, Mt. Clemens is becoming more and more attractive to that city's major healthcare providers, says Fred Towns, St. Joseph's director of marketing.

"Most of the heavy hitters are located in the Detroit area and since their consumer base is getting more and more precarious all the time, they have been looking northward into the more affluent suburbs. In certain areas we have formed alliances with them, but in others we're working in direct competition."

To monitor the competition and guide the network's development, St. Joseph's relies on a highly developed database and a number of data analysis tools, says Maryanne Moore, St. Joseph's vice president of planning.

"We're in a high growth area, that's why we see a lot more people trying to enter our market and why we feel that we need to continually improve and keep track of the information so that we know what's going on within our market.

"Along with competition from the acute care, typical hospital system side, you have independents, hospitals that have entered into the HMO business, and some that have found creative ways to joint venture, in addition to four or five other HMO's in the metropolitan area."

Using the Baxter Healthcare Corp.'s Market Model software package—which integrates internal and external databases to generate market projections of area and hospital admissions—in conjunction with other data sources, Moore says St. Joseph's performs strategic planning tasks, monitors the strength of existing care programs, and analyzes the potential of new ones.

For example, the network recently completed a market analysis to assess gains and losses of market share over a four-year period. Moore says a presentation to management based on this work cleared up some misperceptions and made people acutely aware of just who the

hospital's main competitors were.

"We wanted to gauge the impact as certain hospitals expanded and either put group practices or outpatient facilities within our area. We wanted to find out if we were gaining or losing market share, and if our competitors were doing the same thing. We tracked that information by key competitor and applied it to a map and identified two competitors that were increasing their share in our market. I think it helped us identify not only where they were gaining on us, but also who were the primary (competitors) that we needed to address."

Determine market share

Using the Baxter model, St. Joseph's research analyst Kristina Johnson says it is possible to project area admissions and determine the network's market share.

"It allows you to adjust for various factors in your service area. For example, if we feel that outpatient business is a bigger component in a certain major diagnostic category—ophthalmology, for instance, where a lot of work is being done on an outpatient basis—we can adjust for that."

In addition to hospital case mix/discharge data, hospitalization rate data, and ZIP code data, Market Model supplies demographic and socioeconomic data obtained from Donnelley Marketing Information Services, which Johnson says requires updating with supplemental information because of its 1980 Census population base.

"Although adjustments are made, the data may not appropriately reflect the population shifts that have happened in our county. We have a better handle on the various housing developments changes in the area, so we can adjust for those factors and then do another projection."

The Market Model also provides regional hospitalization rates, but to get rates specific for Michigan, St. Joseph's turns to the Michigan Hospital Association (MHA).

"Market Model uses a national rate, but we don't find that national rate very helpful since Michigan is really a different type of market, it's much more competitive, so we go through the MHA for rates specific to our area," Johnson says.

Three key capacities

St. Joseph's uses the data in three key capacities: long-range strategic planning (typically a five-year projection with yearly analysis and updating), program and product development, and physician recruitment.

"Right now we're getting close to the fourth and fifth year of the plan and we're conducting a strategic audit to look at our

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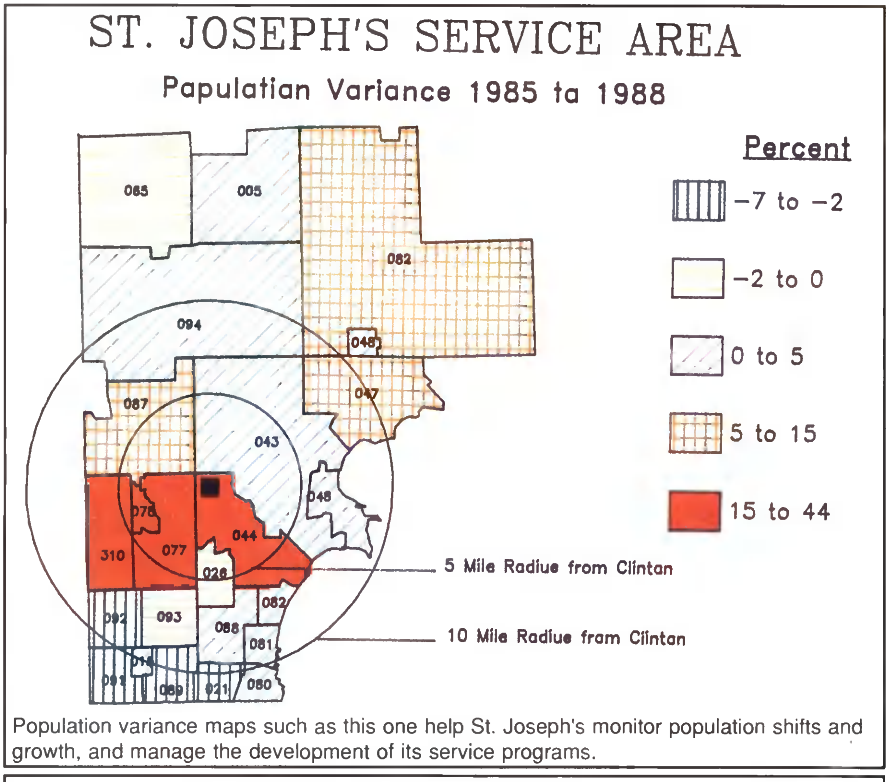
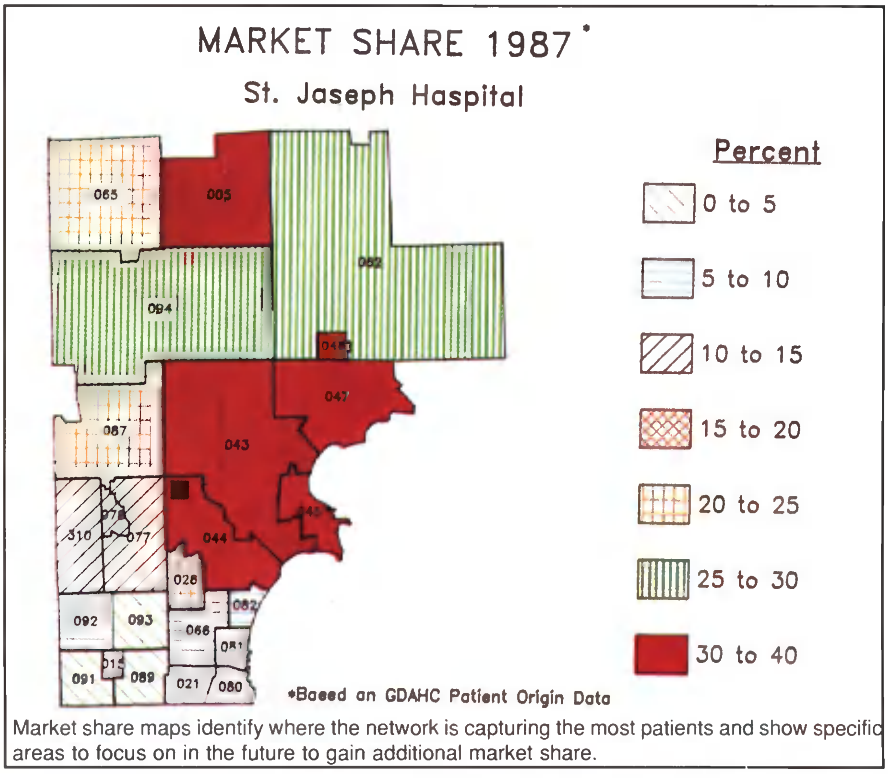


Population variance maps such as this one help St. Joseph's monitor population shifts and growth, and manage the development of its service programs.



Market share maps identify where the network is capturing the most patients and show specific areas to focus on in the future to gain additional market share.

To progress you must first regress

by Joseph L. Kreitzer

Joseph. L. Kreitzer is president and CEO of Loon Valley Software, Inc. and author of ForeProfit, a forecasting and linear programming package. He has a Ph.D. in economics from the University of Iowa and he is currently an associate professor at the College of St. Thomas, St. Paul, Minnesota.

Regression. The very word glazes the eyes of capable researchers. It fills their minds with thoughts of their former selves and conjures dark, Freudian images among those with psychology backgrounds.

The reality of regression analysis, however, is that it provides a tool offering all of the analysis potential of ANOVA (Analysis of Variance), but with the added ability of answering important questions ANOVA is ill-equipped to address.

If regression isn't a Freudian term, then just what is it?

There are many statistical techniques for determining the relevance of one measure, e.g. purchases, to another, e.g. price. The strongest of these techniques are analysis of variance, goodness of fit (GOF) (e.g. cross-tabulations), and regression analysis. Each is capable of answering the same basic question of whether or not variation in one measure can be statistically related to variation in one or more other measures. Only regression analysis, however, can specify just how the two measures are related. That is, only regression can provide quantitative as well as qualitative information about the relationship.

For example, suppose that you need to address the question of whether or not sales (in numbers of units sold) can be related to your price. Suppose further that you use ANOVA and find a statistically significant relationship does exist. That's it. You've gone as far as ANOVA can take you.

Regression analysis offers additional information which neither ANOVA nor GOF can provide. Specifically, regression analysis can tell you how much an additional dollar (i.e. change in price) can be expected to change sales. This information provides an objective basis for the infamous "what if" problems so central to Lotus-type simulations.

A second advantage of regression analysis is its ready application to graphic imagery. Regression is sometimes referred to as "curve" or "line" fitting. The regression output, indeed, yields an equation for a line which can be plotted. The old adage about "a picture is worth a thousand words" holds especially true for regression lines. The image of actual data plotted against predicted values is instantly accessible to even the staunchest statistical cynic. A regression which has been well-specified provides its own pictorial justification.

In the beginning there are numbers

Suppose that you have measured the numbers of units sold in various weeks and kept track of the price you had charged during the same weeks. Table 1 contains some hypothetical pairs of sales and prices. A scatter plot, depicted in Figure 1,

Figure 1

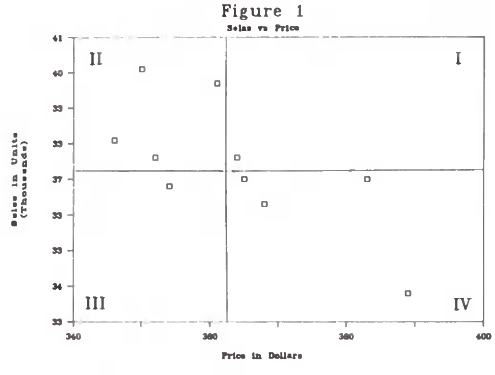


Table 1
Hypothetical Sales and Prices

Week	Sales (Units)	Price
1	33,800	389
2	37,000	383
3	36,300	368
4	39,700	361
5	36,800	354
6	37,600	352
7	37,600	364
8	37,000	365
9	38,100	346
10	40,100	350

provides some immediate sense of the relationship between the two measures.

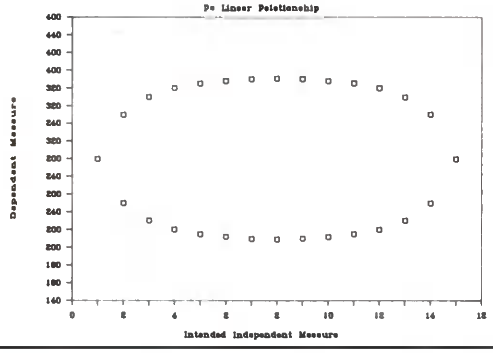
Both correlation analysis and regression analysis work from the respective average values of the two measures. In effect, they attempt to determine if systematic deviation exists of one

measure from its mean to corresponding deviations of the other measure from its mean. The dotted lines which note the location of the respective mean values split the scatter diagram into four quadrants, labeled I, II, III, IV.

In our example, we would like to know if above average sales could be systematically related to less than average prices (and therefore less than average sales could be related to above average prices). If this situation exists, then the preponderance of points in our scatter diagram should lie in quadrants II and IV.

If we demonstrate that this relationship exists, we can evaluate the wisdom of decreasing the price as a tool for increasing sales. This scenario is illustrated in Figure 1. If no systematic deviation can be shown, then one could not count on any predictable response in sales to variations in the price. Essentially, the numbers of sales would be unpredictable (by price). Knowledge of the price in relation to average price would not cause you to change your projected numbers of sales from the average of all past weeks. This case is illustrated in Figure 2.

Figure 2



In the former case, a line drawn through the points would have a negative slope, i.e. an increase in price would be associated with a decrease in sales. The line forms the basis for projecting likely sales for any price. In the latter case the best fitting line would be a horizontal line, i.e. a line with a slope of zero.

(This case does occur, by the way. In one instance a firm's price had no statistically significant impact on their sales. The reason, as it turned out, is that the firm was a price "follower" who adjusted price in relation to the industry leader. The significant price turned out to be the competitor's, not their own.)

In the middle there is methodology

I remember my introduction to regression. After carefully plotting points on a scatter diagram, we were instructed by the prof to take out a ruler and place it across the diagram in what we considered to be the best location. After sketching in our "fitted" lines we were to come up with the equation of the line we had drawn in, which was simple enough, although altogether subjective.

After everyone reported their variants of the same equation, we learned the unambiguous technique of least squares. Least squares is a mathematical solution to the problem of finding the "best" line. It does so by finding the equation of the line which has the least residual (remaining) variation of actual values from the fitted line. Any other line you draw in will have a larger typical error.

In addition to its unambiguous solutions, the least squares method is able to incorporate more than just one explanatory

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Field testing the National Health Interview Survey evaluation questionnaire

Editor's note: The following article is an excerpt from a U.S. Dept. of Commerce report, "Approaches to Developing Questionnaires."

The National Health Interview Survey (NHIS) is a repetitive survey which collects health and demographic information from a national sample of about 40,000 households each year. Field operations for the survey are performed by the Bureau of the Census under specifications established by the National Center for Health Statistics (NCHS).

With the objective of fielding a revised NHIS questionnaire in the early 1980's, a series of field tests was planned to test an evaluation version of the NHIS questionnaire. The evaluation version, or experimental questionnaire, was designed to eliminate redundancies, define health concepts more explicitly, present topics in a more logical order and enable interviewers to use the material efficiently and smoothly. In conjunction with the results of a statistical analysis of the test data, the feedback from an extensive program of observation provided the basis by which to judge whether the objectives of the redesign had been achieved.

The testing was conducted in three phases.

1. Phase I (June). The first version of the evaluation questionnaire was administered in 250 households in Springfield, Ohio, by 15 Bureau of Census interviewers. The primary purpose of this informal test was to form a qualitative or subjective assessment of the draft instrument.

2. Phase II (October-December). This phase of the testing was designed as a formal (split sample) test to quantitatively assess the revised evaluation questionnaire by comparing selected estimates produced by the standard NHIS document and the experimental document. The control group, consisting of the fourth-quarter NHIS sample (10,500 households), received the standard questionnaire. The experimental group receiving the evaluation questionnaire contained 5,000 households selected in the same manner as the control sample. Randomization of questionnaire versions among interviewers was not possible because of the risk that the fourth-quarter estimates from the continuing survey (the control group) could be affected by interviewer confusion of the two complex sets of rules and procedures. Instead, a separate group of interviewers administered each questionnaire version, the groups being matched as closely as possible on years of experience with the NHIS. The interviewers that had to be hired to meet the 50 percent increase in overall sample size were equally distributed among control and experimental groups.

3. Phase III (August of the following year). Based on the outcome of the Phase II experiment, the evaluation questionnaire was again revised and used in an informal test in York, Pa. Like Phase I, the purpose of the test was largely qualitative. The size of the sample and interviewing staff were also similar to those in Phase I.

Programs of observation: Phases I and III

Since the design and objective of the Phase I and III informal tests were similar, their observation programs can be described together. Because both NCHS and the Census Bureau are involved in conducting the NHIS, observers from both staffs took part in the tests. The NCHS observers represented all of the disciplines involved in the survey's development, including questionnaire design, data analysis, and methodological design. The Census Bureau sent field supervisors and persons responsible for writing the training material and the interviewers' manual. Such a large and diverse observation team allowed for broad coverage of interviewers and a range of professional experience by which the adequacy of the training and questionnaire could be judged.

The test site and sample of households were selected by Census Bureau specialists in accordance with demographic, budgetary, and other procedural requirements. The households to be observed were determined indirectly by pairing observers with interviewers so that all

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interviewers were observed for at least one day, but not more than one day, by the same observer. Observations were conducted throughout the five-day field test period. Approximately half of the test interviews were observed. The interviewer training session and the interviewer debriefing were also observed.

Observers from NCHS relayed their impressions in three ways: (1) observation forms—observers were asked to time major sections of the interview, pay particular attention to new or difficult questions and concepts and indicate whether questions were understood, needed elaboration, or were difficult to ask (some of these observations could be tallied to give an indication of how frequently each problem occurred); (2) observer debriefing—lead by one of the questionnaire designers; (3) written reports—specifying problems and solutions.

Census Bureau observers attended a separate debriefing which focused on the training materials, training session, interviewers' manual, and questionnaire.

Program of observation: Phase II

Organizing a program of observation for the national split sample test phase posed many more logistical difficulties than the single-site tests in Phases I and III, since interviews were spread out geographically and over time. Only the experimental group interviews were spread out geographically and over time. Only the experimental group interviews using the evaluation questionnaire were observed.

1. Interview Observations. At least one interviewer in each of 12 regions of the country was observed. An effort was made to observe both experienced and inexperienced interviewers. About 12 to 16 interviews were observed for each interviewer.

For each interviewer, observers completed a brief observation sheet. This form obtained times for the many questionnaire sections and provided space for comments. In addition, observers were given a detailed memo about potential problems in the questionnaire. It should be noted that all observers were extremely familiar with the data collection instrument and its underlying concepts and objectives. Based on their accumulated observations, observers were asked to submit a written report.

2. Interviewer Debriefing Sessions. After data collection had been completed,

interviewer debriefing sessions were held in each regional office. These sessions were observed by NCHS staff and Census Bureau staff. Their written reports, summarizing interviewers' comments, were submitted to NCHS questionnaire designers.

3. Interviewer/Supervisor Evaluation Forms. Every interviewer and interviewer supervisor was asked to fill out a lengthy questionnaire evaluating the adequacy of the training materials, training session, interviewers' manual and the NHIS questionnaire.

4. Regional Supervisors' Debriefing Sessions. NCHS survey planners conducted and observed a debriefing session of the Census Bureau regional supervisors at the end of the data collection period. Because supervisors had conducted the interviewer training sessions and had observed all interviewers in their region, their comments on the adequacy of the training materials and questionnaire were valuable.

In conjunction with the results of the quantitative data analysis which compared estimates of key health variables obtained from the two NHIS questionnaire versions, the results of the more subjective field observations led to important revisions in the experimental questionnaire. This version was then tested in Phase III.

Results of tbe Observation Program

The questionnaire currently used in the National Health Interview Survey is the product of this multistage test in which observational feedback was as important as statistical analysis of the data. The evolution of the questionnaire during the phases of testing is illustrated by the series of questions asked to elicit reporting of visits to doctors during the two-week period preceding the interview.

The NHIS concept of a doctor visit is defined as a consultation with a physician in person or by telephone for examination, diagnosis, treatment, or advice. This service may be rendered directly by the physician or by a nurse or other assistant acting under the physician's supervision or authority. The standard NHIS questionnaire used three probes to elicit reporting of doctor visits. They were:

"During the past two weeks, how many times did you see a medical doctor?" (Do not count doctors seen while a patient in the hospital.) *Parentheses around parts of a question indicate to the interviewer that the statement is to be included conditional upon circumstances reported earlier in the interview. In this case, the statement is read only if the individual has previously reported a hospitalization.*

"During that two-week period, did anyone in the family go to a doctor's office or clinic for shots, x-rays, test or examinations?"

"During that period, did anyone in the family get any medical advice from a doctor over the telephone?"

NCHS analysts suspected that the concept of physician visits was not being fully understood by respondents. Of particular concern was the under-reporting of visits to certain types of medical specialists, such as ophthalmologists and psychiatrists. Also, visits in which the patient saw a physician's assistant rather than the physician, phone calls made to obtain prescriptions, advice or test results, and visits occurring in places other than the usual doctor-patient settings were overlooked by respondents.

1. Phase I Version

The first version of the experimental questionnaire was designed to communicate the comprehensive definition of physician visit to respondents. The new questions were worded as follows:

"These next questions determine whether anyone has recently received health care from any kind of medical doctor—including general practitioners and any types of specialists, such as pediatricians, psychiatrists, ophthalmologists, and so forth. Also include health care received from a doctor's assistant or a nurse working under a medical doctor's supervision."

1. "During the two-week period outlines in red on that calendar, how many times did —— see or talk to a medical doctor or assistant? (Do not count times while an overnight patient in a hospital.)"

2. "(BESIDES THOSE TIMES) During that two-week period, did anyone in the family see a doctor or assistant for any surgery or operations, shots, X-rays, medical tests or treatment, or physical or mental examinations? (Do not count times while an overnight patient in a hospital.)"

3. "(NOT COUNTING THE TIMES YOU HAVE ALREADY TOLD ME ABOUT) During the two-week period, did anyone in the family receive health care at home or make any (other) visits to receive health care at a hospital, or doctor's office, a clinic of any kind, or any other place?"

4. "During that period, did anyone in the family get any (other) medical advice from a doctor or an assistant over the phone?"

Observers attending the informal Phase I test reported that the experimental questions were much too verbose. Respondents frequently interrupted the introduction to answer, "No," and would then become irritated at being asked the remaining questions. Instead of communicating the scope of the doctor visit concept, the wordy definition and qualifications seemed to badger the respondent.

2. Phase II Version

For the national split sample test, the introduction was shortened so that it became a transition statement between questionnaire sections while the function of defining the doctor visit concept was distributed among the follow-up probe questions. The probe about the nature of treatment received was eliminated entirely, while the types of telephone calls to be included were stated more explicitly. The questions were:

"These next questions are about health care anyone in the family may have recently received."

1. "During the past [the two weeks outlined in red on that calendar] how many times did —— see or talk to a medical doctor? [Include all types of medical specialists, such as dermatologists, psychiatrists, and ophthalmologists, as well as general practitioners.] (Do not count times while an overnight patient in a hospital.)" *Statements in brackets were read the first time the interviewer asked the question in the household.*

2. "We are also interested in the number of times anyone received health care from a nurse or anyone else working with or for a medical doctor. (Besides the time(s) you just told me about) During those two weeks did anyone in the family receive care at home or go to a doctor's office, clinic, or hospital to receive health care?"

3. "(Besides the time you already have told me about) During those two weeks

did anyone in the family get any medical advice over the PHONE from a doctor, nurse, or anyone else working with or for a medical doctor? Include calls to get prescription or test results."

A comparison of the estimates yielded by the control group questionnaire and the experimental questionnaire showed that the experimental questionnaire produced the desired reporting patterns. Major changes in the questions were not deemed necessary; however, some awkwardness was noted during the field observations. Observers reported that the questions were still too wordy, that respondents often gave a negative response to the introduction and that respondents answered Question 3 before the instruction to "include calls to get prescriptions or test results."

3. Phase III Version

To remedy these deficiencies, further revisions were made in Questions 2 and 3 for Phase III, informal test. Question 1 remained unchanged.

2. "(Besides the time(s) you just told me about) During those two weeks, did anyone in the family receive care at home or go to a doctor's office, clinic, hospital, or some other place to receive health care? Include care from a nurse or anyone working with or for a medical doctor."

3. "(Besides the time(s) you already told me about) During those two weeks, did anyone in the family get any medical advice, prescriptions or test results over the PHONE from a doctor, nurse, or anyone working with or for a medical doctor?"

4. Final NHIS Version

Following the Phase III test, the experimental or "evaluation" questionnaire was revised for the last time before becoming the standard core NHIS instrument. Consensus among observers and interviewers was that the questions were still unnecessarily verbose. Although the basic structure and concepts were not changed, the final version of the questions reflects the effort to reduce them to their essential elements.

"These next questions are about health care received during the two weeks outlined in red on that calendar."

a. "During those two weeks, how many times did —— see or talk to a medical doctor? [Include all types of doctors, such as dermatologists, psychiatrists, and ophthalmologists, as well as general practitioners and osteopaths.] (Do not count times while an overnight patient in a hospital.)"

b. "(Besides the time(s) you just told me about) During those two weeks, did anyone in the family receive health care at home or go to a doctor's office, clinic, hospital or some other place? Include care from a nurse or anyone working with or for a medical doctor. Do not count times while an overnight patient in a hospital."

c. "(Besides the time(s) you already told me about) During those two weeks, did anyone in the family get any medical advice, prescriptions or test results over the PHONE from a doctor, nurse, or anyone working with or for a medical doctor?"

In this example, the repeated qualitative assessments made by observers (and interviewers) resulted in a more efficient series of questions. Statistical analysis of the formal test data in conjunction with observers' evaluations indicated at what point the benefits of a thoroughly defined concept were outweighed by the costs of a verbose questionnaire. ❑

Executives offer expectations for 1990

According to a recent survey by Opinion Research Corp., most corporate executives predict that the low-inflation, slow growth "soft-landing" the economy has been experiencing will continue, at least until the third quarter of 1990. Hardly any foresee sharp economic declines, but a modest proportion do see some reversing of the economy's performance over the next 12 months.

The survey interviewed 500 upper- and mid-level executives at America's 1,500 largest firms. The nationwide sample includes a proportionately high representation of the upper echelon of management: 216 (43%) corporate officers.

Specifically in regard to overall economic growth, 40% of executives believe growth over the next 12 months will increase, while one out of four (26%) sees the economy continuing to grow at its current pace. However, almost one-third (32%) predict a downward turn from current growth levels. Executives are not so confident that inflation will remain under control: as many as half (51%) believe it will increase over the next 12 months. The rest say inflation will either stay at its present level (36%) or will decline (13%) through the second quarter of 1990.

A plurality (45%) of executives believe revenues will increase at least somewhat over the next 12 months, and one in four (24%) sees revenues holding steady. Profit increases are foreseen by just over one-third (34%) of executives, and one out of four 27% expects current profit levels to continue.

Despite the predominance of bullish opinion, there is a substantial proportion of executives (including equal numbers of officers and nonofficers) who foresee sales and profits actually declining in their industries. One in three (30%) predicts industry revenues will decline, while a slightly larger proportion (38%) predict a decrease in their industry's profits over the next 12 months.

Industrial goods manufacturers appear to be more pessimistic than their peers concerning profits in their industries. Forty-five percent of the managers at industrial goods manufacturing companies believe their profits will decrease over the next 12 months. In comparison, only about one in three executives in consumer goods industries (33%), and in the service sector (35%), have a similarly negative outlook.

Survey investigates unlisted telephone households

An analysis of the demographics of unlisted telephone households in the U.S. by Survey Sampling Inc. (SSI) has uncovered a number of interesting findings. The research found that age is the most likely correlate of unlistedness. 49% of the adults interviewed in unlisted telephone households were ages 18 to 34. And, as the age of the respondent increased, the unlistedness declined. It had long been believed that the mobility of younger people was associated with unlistedness, but the study indicates that age has a greater impact than mobility. Although most unlisted households were mobile, unlistedness declined with age for both new movers and nonmovers.

In her report in SSI's newsletter *The Frame*, Linda Piekarski, research manager for Directory Data, a division of SSI, wrote: "59% of respondents who had moved to their current address in the past two years were unlisted. 53% of all renters and 50% of respondents living in multi-family units were unlisted, significantly above the mean unlisted rate of 39%.

"In terms of household composition, unlisted households tended to have more single, divorced, and separated householders, and fewer widowed. In one-person households, males and females aged 18 to 34 were 10% to 15% more likely to be unlisted, while those over 55 were

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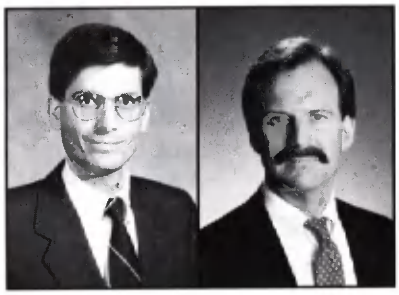
NAMES OF NOTE

Opinion Research Corp. (ORC), Princeton, NJ, has named **Diane H. Schmalensee** vice president and senior consultant of the firm's Service Quality Measurement Practice area. Prior to joining ORC she was vice president of research operations for the Marketing Science Institute. In addition, **James C. Fink** has been named Chief Operating Officer; and **Gretchen K. Wilmot** has been named vice president and general manager of the company's Pharmaceutical Practice area. Previously Wilmot was vice president and executive director of Scott-Levin Associates.

Dehra A. Beatty has joined Wilkerson & Associates, Louisville, KY, as division manager with responsibilities for packaged goods market research. Previously she was with Brown & Williamson Tobacco Corp.

Scott T. McGurn has been named market research officer at First Citizens Bank in Raleigh, NC.



McGurn Pedersen

Thomas J. Pedersen has been named president and chief executive officer of Coffman Systems, Inc., Cerritos, CA.

Dana Simmons has joined National Planning Data Corp, Ithaca, NY, as senior vice president of sales and marketing. Also, **Andy Paul** has been named chief operating officer, and **Dehhie Reynolds-Diot** has been promoted to vice president of sales.

Eveline Van der Meulen has been named marketing research manager, Donnelley Directory-Northeast region, New York.

Lynn Bowden Buzzard has been named business development vice president for Bellomy Research Inc., Winston-Salem, NC.

Consumer Pulse, Inc. announces the following appointments: **Mary Taras** has been named manager of the company's Detroit facility; **Lora Reinholz** has been named manager of the Milwaukee facility in the Grand Avenue Mall; and **Pamela Jones** has been named manager of the Baltimore facility in the White Marsh Mall.

Dan L. Margherita has joined TMR, Inc., Broomall, PA, as senior account executive.

Simmons Market Research Bureau, Inc., New York, has named **Ellen Cohen** president and chief executive officer.

Edward Roth has been appointed director of Toy Services for the NPD Group, Inc., Port Washington, NY. Previously he was marketing information director for Hasbro, Inc.

R.H. Bruskin Associates, New Brunswick, NJ, has named **David Bender** president and chief executive officer. Previously he was vice president, research, at USA Network.

Richard F. Palesh has been named vice president, advertiser/retailer services at Arbitron/SAMI, New York. In addition, **Ronald Breeden, Jan Burns,** and **Steven Wenderfer** have been named vice president, divisional managers.

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Equifax Marketing Services, on behalf of its **Quick Test** unit, has acquired **Wade West**, a California-based data collection company with 11 mall, focus group, and telephone interviewing locations This acquisition includes locations in New York, St. Louis, Greensboro, Corpus Christi, Los Angeles, San Francisco, and Seattle. Equifax acquired all Wade West operating assets and accounts receivable for an undisclosed amount of cash.Wade West, founded in 1968, was headquartered in Van Nuys, CA. The company projected its 1989 revenue to be approximately $3.5 million.

◆

Decision Analyst, Inc. announces the expansion of its National Survey Center in Arlington, TX. With a total of 82 interviewing work stations and 11 quality-control monitoring workstations, the expansion of the Center increases Decision Analyst's centrally-located interviewing capacity by 60%.

◆

Radley Resources, Inc. has moved to new offices at 141 South Avenue. Fanwood, NJ, 07023. Telephone 201-232-1600.

◆

Ecker & Associates have opened a new focus group facility at 222 Front St., 3rd Floor, San Francisco, CA, 94111. Telephone 415-871-6800.

New service provides in-deptb market analysis

The New York-based firm Find/SVP announces the launch of its new Business Plan Support Program. The firm's Strategic Research Division (SRD) helps companies take an objective look at their industry by analyzing key factors affecting their business. The program comprises four components. SRD first studies the business environment, outlining economic, political, and technological forces which have an impact on a market (including pending legislation, EPA rules, foreign trade restrictions, emerging technologies, and inflation). Next, an analysis of the overall market estimates the demand for products and services and the outlook for growth based upon product life cycles and industry dynamics. This is followed by an investigation of the competition, revealing their relative strengths and weaknesses as well as past, present, and future market shares. Finally, an assessment of the company's customers examines customer needs, segments the market into groups, and identifies the most attractive business opportunities to pursue in the future.

Companies can purchase any one of the four components separately, or together as a package. The end result is a formal written report that can be inserted directly into the client's business plan or used on its own as a free-standing analysis.

Mainframe capabilities from PC-based mapping software

Strategic Mapping, Inc., San Jose, Calif., announces Atlas*GIS, a desktop GIS (Geographic Information System) that gives business users the capabilities of mainframe mapping software with the ease-of-use of a desktop mapping program. Designed for non-technical users, the package combines a database, drawing and editing tools, and map presentation and analysis software, allowing anyone with a geographical database to publish maps and create database reports. The system uses the U.S. Census Bureau's new TIGER files, computerized street maps of the entire country which incorporate digital cartographic data including streets, roads, waterways, railroads, up-to-date boundaries for census tracts, cities and postal zones.

The PC-based strategic mapping system uses pop-up menus and on-screen windowing to create a simplified user interface. The software analyzes and displays geographic relationships such as concentrations of customers, emerging demographic patterns, the buying power of neighborhoods, and market penetration. Users can highlight areas where important events occur, track customer

information, or interpret market intelligence or other vital statistics. Business applications include retail site selection, distribution channel tracking, target marketing, sales territory design, and mailing list selection. Atlas*GIS will ship in March 1990. For more information, telephone 408-985-7400.

Firms unite for hospital research and planning

Connecting research, planning, and communications is the goal of four consulting firms that have formed The Strategy Team. This group will help hospitals identify and act upon business opportunities in their markets; evaluate, improve, and refine current program offerings; and assess product line, program, and service opportunities. The participating firms are KCA Research, Vacca Associates, Geriatric Health Systems, and Gwen Amos Design. For more information, telephone 916-920-3774.

New research tool for financial institutions

Customer Insight Company (CIC), Englewood, Col., has introduced MarketSavvy, a marketing research analysis and reporting tool for financial institutions. The program's quarterly databases are an accumulation of hundreds of market-specific survey responses regarding consumers' uses of financial services. This information is then compiled and reported in a series of graphs and reports that show the financial institution its position within the marketplace. The databases are also accessible via CIC's Customer Insight and Ondesk marketing customer information file systems. Both of these systems include cross-tab reporting system that allows marketers to view research information on a single report, rather than gathering information from multiple reports. For more information, telephone 303-790-7002.

Merger expands business database

National Decision Systems has entered two new business relationships that will enable the company to introduce a comprehensive database of U.S. business locations to the marketplace by June, 1990. These two relationships are with Trinet, Inc. of Parsippany, New Jersey, and American Business Lists, Inc. (ABL) of Omaha. The affiliations will merge the business information databases of the two companies to create a new, unduplicated business marketing database of approximately 10.5 million business locations.

Trinet, a supplier of verified business information, has developed a database of 7.6 million businesses. ABL builds business databases directly from the telephone Yellow Pages; their database contains a total of 8.4 million business locations.

With the new database, the specific latitude and longitude of each business location will be calculated and appended to each record to enable marketers to retrieve and analyze information for any desired area of any shape or size located anywhere in the U.S. This resource will be available on NDS' desktop marketing system called Infomark. For more information, telephone 619-942-7000.

Data Use

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variable and has known statistical properties. Without the knowledge of statistical properties one could not definitively note dependence of one measure on another measure. The inability to do the former yields an inappropriately naive view of the world.

In the end there will be more numbers

Fortunately, knowledge of the mechanics of the regression algorithms are unnecessary for successful application and interpretation of a regression line. Regress, if you will, to sixth grade math, when you learned the intricacies of graphing lines. A simple line consists of two parts. The intercept of a line gives the value of a dependent measure, sales, when the independent measure, price, has the value zero.

In our example, the intercept would provide the number of sales which are likely to occur when the product was given away free. Notice the apparent silliness of this interpretation. Don't fret about it, however, as this intercept should not be literally interpreted this way. It is necessary for the statistical interpretation to have an intercept. The regression algorithm would tell us that this number is 69,438.

The second part of the line is the interesting one. It shows how to transform one measure into the first by means of a "slope." The slope gives the change in the dependent measure for a one unit change in the independent measure. In our example, it shows the additional sales related to the change in price of one unit, e.g. $1. The regression-supplied estimate of this number is -88. (The package I used reported this number to be -88.2120, but for clarity of illustration we needn't bother with all of the extra digits. The same is true of the intercept reported above.)

The regression would then take on the form:

$$Q = 69{,}438 - 88\,P$$

where: Q is sales in units P is price in dollars

If you wanted to know the likely number of sales when the price is set at 300, you would solve the equation:

$$Q = 69{,}438 - (88 * 300) = 69{,}438 - 26{,}400 = 43{,}038$$

Similarly, sales at a price of 350 would likely be:

$$Q = 69{,}438 - (88 * 350) = 69{,}438 - 30{,}800 = 38{,}638$$

How much will a $1 change (which implies a positive change, or increase) in price affect sales? Simply read the slope coefficient. A $1 change in price will decrease sales by 88 units. A $10 change in price will decrease sales by 880 units. A $5 decrease in price will increase sales by 440 units.

Finally, there is reality

It would be a rare day in the real world when variation in a measure could be explained solely by variation in only one other measure. In our example we might well expect, and find, that our advertising and our competitors' prices influence sales of our product. Regression analysis can incorporate these new measures in the same manner as our price.

Each new explanatory measure is equipped with its own, unique slope which transforms the variations of the new measure into variations of the dependent measure. The interpretation and arithmetic for each additional measure are as above.

Suppose that we included information about our advertising when estimating our regression line. The comparable advertising figures, for example, numbers of column inches published per week, are listed in Table 2. It seems only reasonable that the more we advertise, the higher the likely number of sales. The regression algorithm reports this number to be 145. This means

that one additional column inch of ad space increases sales by 145 units.

Since our advertising now can explain part of the sales

Table 2
Hypothetical Advertising Amounts

Week	Advertising
1	995
2	1010
3	995
4	998
5	982
6	981
7	992
8	992
9	976
10	978

variations, the role of price in sales can become clearer. We see this in a different coefficient for the price variable, -178, as well as a different intercept, -41,794.

The revised regression now looks like:

$$Q = -41{,}794 - 178\,P + 145\,A$$

where: A is our advertising space in column inches

If we charged a price of $350 and purchased 1000 column inches of advertising then our likely sales could be estimated as:

$$Q = -41{,}794 - (178 * 350) + (145 * 1000) = -41{,}794 - 62{,}300 + 145{,}000 = 40{,}906$$

The slope coefficients are interpreted in the same way as above, with one important warning. The coefficients yield the expected change in the dependent measure for a one unit change in each respective independent measure, assuming that the other independent measure(s) do not change in value. Specifically, a one dollar change in the price will likely decrease sales by 178 units, assuming no change in advertising. Similarly, a one unit change in advertising will increase sales by 145 units, assuming price remains constant.

If both price and advertising are to be changed then the effects are simply added together. If price is to be reduced by 5 (i.e. changed by -5) and advertising increased by 2, then the net change in sales would be given by:

$$\text{Change in } Q = -(178 * -5) + (145 * 2) = 890 + 290 = 1180$$

Adding additional information, such as competitors' prices and advertising, causes similar modifications in the equation and its interpretation.

Evaluating a regression's fit

Anyone can draw a line through a set of points. But clearly a (straight) line drawn through a circle does not describe the circle. One must be able to evaluate the reasonableness of a regression to use it wisely. Effective use of regression is clearly an acquired skill, but even a novice should be able to make some preliminary judgments regarding a regression's fit. There are basically three diagnostic processes in evaluating a regression: comparing coefficients' signs, determining significance of each variable, and evaluating the overall fit.

Signs. The first step in evaluating a regression is to consider the signs of the parameters. If you have reason to believe two measures are positively correlated then the regression coefficient should be positive. If a negative coefficient showed up then you basically have two conclusions: you were wrong in expecting the positive correlation or your regression equation is misspecified, i.e. contains redundancies or inadequate information. Misspecification is a serious problem, and is discussed in greater detail below.

If the regression coefficients have the expected sign, as ours do, then you have some assurance that you have chosen the "correct" set of independent measures. The next question to address is whether or not those coefficients are meaningful. The

problem is that we have only sampled the relationship between sales, price, and advertising. As is true with any sample, the observed value needn't, and in all probability won't, coincide with the "true" value.

Significance. One coefficient value, in particular, is of great concern. If the true coefficient value is zero then the two measures are not related. (Their correlation coefficient would be zero and the partial F statistics insignificant.) Even if the two are unrelated, unfortunately, a sample coefficient would not likely be zero. In most cases a Student's t test is employed to determine the significance of the coefficient. If sufficient numbers of observations are available then a normal distribution can be used.

In our case, the estimated t values for the price and advertising measures are -4.06 and 2.48, respectively. The regression has 7 degrees of freedom (10 observations minus three estimated coefficients). Using a .05 level of significance, the critical t value is 2.36. Since both estimated t values exceed the critical value we can conclude that the measures are significant in explaining variation in sales. (If you used ANOVA to test for a relationship you would obtain significant F values for both measures.)

Note that the magnitude of the coefficient isn't sufficient information to determine significance. Large coefficients might not be "large enough" to be significantly different from zero while some very small coefficients might be more than "large enough" for significance.

Fit. One could have a regression for which the signs were correct and the coefficients significantly different from zero, but which has little practical value.

The most intuitive explanation of overall fit is the "coefficient of determination" most commonly called R2, or "R squared." It reports the percentage of the total variation of the dependent measure which is explained by the regression equation. The number ranges from 0 to 1, where one hopes for larger values. A regression with an R2 of .1 is not very complete, casting doubts on the accuracy of the estimated coefficients. An R2 approaching 1 suggests that the regression's independent measures can explain virtually all of the variations of the dependent measure.

A mathematical quirk allows this R2 measure to increase as more independent measures are added. To counteract this inflationary tendency a second R2 called the "adjusted R2" is calculated which handicaps the R2 by the number of independent measures used in the regression. It is interpreted the same way as the R2, and is considered the more accurate of the two statistics.

In our case these numbers are 72.9 and 65.2, respectively. The regression can be said to explain 65.2 percent of the variation in sales. Is 65.2 percent "enough" to justify the technique? Fortunately there is a statistical test, you ANOVA users have been thinking about for several paragraphs, which can answer this question. The R2 statistic is simply a variant of the F statistic. Indeed the F statistics generated by an ANOVA routine and by a regression routine are identical. If the F statistic is significant, then the explained variation is significantly greater than that left unexplained. In our case the F statistic is 9.45, greater than the critical value of 4.74.

One additional statistic generated by a regression is the standard error of the regression. It is a measure of the residual variance. In our example the remaining variance is 1039, representing an average percentage error of only 1.7 percent.

Figure 3

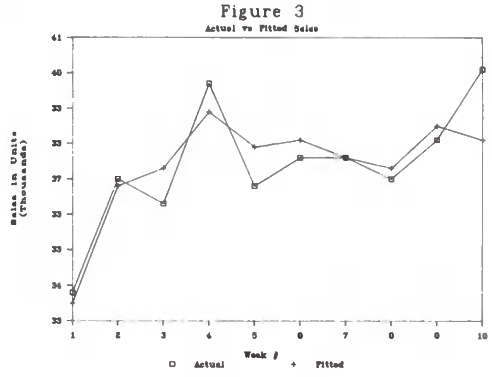

Figure 3 shows the actual and fitted values for each of the 10 weeks, using both price and advertising to explain variations in the sales volume.

If only it were this simple

There are pitfalls in regression analysis that can undermine the veracity of the entire estimated equation. Basically there are two categories of problems, only one of which typically poses major problems for the researcher.

The more benign types of problems generally lead to inflated error terms—therefore decreased accuracy. They do not, fortunately, lead to biased estimates. There are problems in reliably interpreting individual coefficients in these cases but not for using the equation as a whole. These problems are:

Multicollinearity. The independent measures are, themselves, closely correlated. This causes confusion in determining the importance of any single measure. For example, if one firm "followed" the pricing of a competitor then inclusion of both prices would be redundant.

Autocorrelation. The error terms are related sequentially. This type of problem is common in time series data, where sales might fluctuate around some long-term growth path. Much like the concept

of a business cycle, you might find the regression consistently over-estimating values for sequential periods, only to begin a pattern of underestimation.

Heteroscedasticity. This problem arises when a regression fits "better" for some values of an independent measure than for other values. An example would be an equation for sales, which seems to compound over time. By virtue of its compounding, the equation will generate smaller absolute errors early in the series rather than later, when the magnitudes of the measure are much larger.

At this point it is worth noting simply that techniques have evolved which neutralize many of the effects these complications generate. Failure to deal with these problems yields greater uncertainty than is necessary, but does not, in general, tend to seriously mislead the analyst.

By contrast, specification errors are serious. Failure to deal with these problems can cause major difficulties. There are three major types of misspecification.

Failure to include relevant information, omitted variables, forces the regression to allocate explanatory power among too few independent measures. It is much like trying to explain sales only by using price, as we did originally. Notice the difference in coefficients in the two equations. When price was forced to explain "everything," the coefficient was only -88 compared to -178 when part of the explanatory burden was assumed by the advertising measure.

High R2 statistics suggest the regression does include most of the relevant information. Lower R2 values, 65% in our example, suggest, but do not conclusively show, there are other relevant measures which have not been included. Were we to include additional relevant measures the regression coefficients would take on still different values.

Failure to include related information, omitted equations, has a similar effect on the coefficients. Suppose that the amount of advertising was at least partially determined by the level of sales, e.g. a scheme which set the advertising budget as some base figure plus 10% of the sales level. This is, in effect, a second equation that is clearly related to our sales equation. Advertising is dependent on, not independent of, sales and therefore our sales regression will give biased estimates of our coefficients.

Incorrect form of the equation is the last misspecification type. Regression only works for "straight" lines, but the real world is rarely linear. In many cases the straight line approximation of regression is entirely satisfactory. In others, e.g. learning curves or product life cycles, a linear relationship is altogether unrealistic.

Without going into detail, suffice it to say, again, that techniques exist to mitigate the effects of these problems. The remedies are generally easy to employ, but the initial detection of the problem is less obvious.

So why would anyone not use regression analysis?

There are basically two reasons why regression analysis might not be the first choice of technique for a researcher.

Regression analysis assumes, indeed requires, the error terms to be normally distributed. The normality requirement is sometimes more than a researcher is willing to take on. Non-parametric techniques, which do not make such a restrictive assumption, are better suited to the temperament of these individuals. In general, however, the normality assumption is not outrageous if a sufficiently large sample can be obtained.

The second reason regression might be avoided is paradoxically related to regression's strong suit—quantification of relationships. In some cases one might wish to determine whether or not two measures are significantly related, yet it

doesn't make immediate sense to quantify the relationship between qualitative measures, e.g. gender and location preference. More advanced regression techniques exist (LOGIT, PROBIT, Discriminant Analysis) which can be useful in analyzing qualitative models, but discussion of their characteristics is beyond this article. Basically they convert qualitative problems into one of probability estimation, e.g. finding the probability that a male would choose to locate in area X.

A variant of this concern is that regression equations will be inappropriately interpreted and/or glorified. Given the number of potential pitfalls, any regression should be considered suspect until carefully scrutinized. There is a tendency on the part of some decision makers to give undue credence to any tool which has numbers associated with it. Should your audience consist of individuals with this affliction then you may be well advised to introduce regression analysis slowly and only in conjunction with education about regression's uses and misuses.

Where might you go from here?

There are a number of excellent texts on regression analysis and almost every major statistical package offers a regression routine or two. Economists, who have played a disproportionate role in the development of regression tools, fondly and conceitedly talk of econometrics. You might look for other texts using this term in their titles.

Here are some of my favorites:

"Using Econometrics: A Practical Guide." A.H. Studenmund and H.J. Cassidy. Little Brown and Company (Boston, 1987). One of the more accessible, mildly rigorous works, it includes several "cookbook" features which help beginners evaluate their regressions.

"The Application of Regression Analysis." D.R. Wittink. Allyn and Bacon (Boston, 1988). This is written at a fairly low level of rigor. It doesn't cover many of the remedies alluded to above, but for a complete novice it might be a good introduction. If you go this route, please follow it up with one of the other texts.

"Forecasting: Methods and Applications, 2nd ed." S. Makridakis, S.C. Wheelwright and V.E. McGee. John Wiley and Sons (New York, 1983). The book is written, obviously, with forecasting in mind. It is somewhere between the two previous works in rigor. About 1/4 of the book is devoted to regression analysis. The remainder of the book deals with other forecasting techniques, both quantitative and qualitative. It is a classic worth acquiring.

"Econometric Statistics and Econometrics, 2nd. ed." T.W. Mirer. Macmillian Publishing Co. (New York, 1988). Written at a mildly rigorous level, it is fairly accessible, has many examples and discusses remedies for the problems noted above.

For those with strong hearts and mathematical statistics backgrounds, there are several very good texts. Many are cited in the works noted above, and I would be happy to provide any reader with some suggestions.❑

St. Joseph's

continued from p. 7

direction and come up with recommendations for making changes as a result of some of the changes we've seen in our (market)," Moore says.

During the planning stages of the hospital's physical medicine and rehabilitation program, the data was used to assess its viability, based on community demand, population, and the types of patients the network's facilities could properly care for.

"It gave us the ability to calculate need, which is really very critical. It helped define the program and then once the program was in place, it helped with some of the follow-up marketing activity.

"The model also was helpful in supporting other supplemental rehab programs in that it identified the patients out in the community by diagnoses and helped us develop some programs with the school systems, programs for sports medicine, and a work wellness program. Basically all of those were generated from the evaluation of diagnoses our system provided."

St. Joseph's has also used the information to steer the growth of its psychiatry program. State approval was obtained to double the size of the program from 50 beds to 102, but the data indicated that such an expansion would require attracting more patients than the market could provide.

"Our analysis showed that, for us to be able to implement 100 psychiatric beds, we needed to expand the area that we draw from and go beyond our typical service area. There just weren't enough people within that service area to support it."

To expand at such a rate and keep the patient length of stay figures at a desirable level, the hospital would have to capture an unrealistic portion—over 90%—of the market. So an analysis was done using an increase of only 25 beds, and a 20-day length of stay, which turned out to be a more reasonable solution.

"We presented that information to various department people and had an outside consultant come in and test that hypothesis. (The analysis) certainly helped us evaluate whether or not we wanted to implement the full complement of beds or perhaps phase it in. The strategic approach we're taking is to expand up to about a 75-bed unit and see

how that goes."

Physician recruitment

The hospital also uses its database and data analysis tools in its physician recruitment efforts, providing the doctors with market demographic and case mix information.

"In a couple of cases we've been able to direct physicians to growing areas that we think will be beneficial for our exposure and beneficial for them," Moore says. "We can say to them, 'Here's an area where we don't have any physicians, we think it's dynamite, here are the types of patients we see from that area and here is the volume of business in that area.' "

Using Atlas*Graphics, a desktop mapping package made by Strategic Mapping, Inc., the analysts can make a map of the market by physician specialty, for example, to give a specialist an idea of what services the area has a shortage or surplus of, or to show a general practitioner the availability of specialists, such as cardiologists and neurosurgeons, to whom they can refer patients.

Moore says the computer maps are very valuable in these situations because they provide a graphic representation of the market, which is beneficial to doctors who are thinking of relocating there but are unfamiliar with the area.

"It's extremely helpful, particularly for physicians that are out of the area, because it's hard for them to put (the market) into perspective. For example, they'll say, 'Would you make a map showing the institution with a five- or ten-mile radius? That would really help me in terms of my office location and its proximity to the hospital,' " she says.

"The physicians that we've met with have been so pleased that this information is available to them, particularly that now we can provide specific figures on the actual number of patients in a specific area, and on patient visits by various subspecialties. That's nice because it gives them a ballpark idea of how many visits they can anticipate through their office."

Evaluate existing programs

The data also allows the hospital to evaluate existing programs. For example, the hospital's cardiology department was doing a high volume of business, but research indicated that there were problems with patients' lengths of stay. So although plenty of beds were full, patients were staying longer than the time prescribed by health insurance guidelines.

Moore says that once this information came to light, other departments within the network, such as the Quality Assurance and Utilization Review staff, did their own analyses to determine whether the length of stay problem was one of test scheduling, patient management, or patient complications.

"It was a catalyst for further investigation in key areas by the appropriate departments, for example the Finance people or Utilization Review people, who said 'Let's use our systems to look at the detail relative to a case, and do some analysis there.'

"They found that changing the management in that particular case would certainly be beneficial. Patient management becomes critical with prospective pricing and the reimbursement we now receive from Medicare and some of the other insurers, because the length of stay is determined and if you go beyond that, you have to absorb those costs."

Keeping track of variables such as length of stay is critical, Fred Towns says, because at the same time that healthcare expenditures are rising, pressure is being applied by outside forces to hold them down.

"The biggest issue facing us, is the one that's facing everybody: The squeeze is on on the part of the third party payers—the government, the HMO's—and the easy place for them to squeeze is the hospital because so much of healthcare is oriented to the hospital environment. So we're seeing a demand to hold our costs down, but at the same time we have an increasingly complex technical environment and usually with an increase in technology comes an increase in cost," he says.

Consumer researeh

To complement its extensive market data tracking and analysis, St. Joseph's also does a great deal of consumer research, including focus groups and an ongoing consumer attitudes survey.

This survey, a telephone survey of 450 respondents, provides a base of information on St. Joseph's competition as well as the network's image and community awareness of its various services.

"That's been very useful to us in determining strategic approaches to introducing new products, reinforcing existing ones or bundling existing services into a product line. We also do focus groups to show us where we need to go with our more in-depth data analyses and surveys," Towns says.

This information performs the important task of getting the St. Joseph's staff and administration to think in terms of consumer wants as well as needs, an aspect which Towns says healthcare professionals sometimes overlook.

"Healthcare providers know what people *need* in terms of health care and proper service, but it's difficult for them to realign their thinking into a consumer-oriented mode, to think more in terms of, Yes, maybe the public needs a particular service, but that may not be what they want...how can we realign our product so that it fits into the public's vision of what they actually want?"❑

Important quality and price issues for telephone samples

by Thomas D. Lacki

Editor's note: Thomas J. Lacki is the director of decision support systems with the National Research Services Group of Maritz Marketing Research. Based in Minneapolis, he received his Ph.D. in human information processing and statistics from the University of Minnesota.

The process of conducting survey research is one of collecting information on the attitudes, perceptions, behaviors, and characteristics of a group of individuals and inferring that others—those not interviewed—share the same attributes. This procedure involves sampling from a universe, and is the foundation of any good research study. It is therefore of critical importance that both the sampling procedure and the sample be of the highest quality.

Recall the 1936 presidential election poll performed by Liberty magazine, in which a landslide victory was erroneously predicted for Alf Landon over Franklin D. Roosevelt. The sample in this study was a set of listed telephone numbers drawn from directories, and the survey results were fatally flawed because the sample—those individuals with telephones—was not representative of the universe of voters, only some of whom had telephones at that time. The effect on Liberty magazine was severe: it soon went out of business. Employing a poor quality sample can have similar adverse, albeit less severe, consequences ranging from improper representation of the area being surveyed to increased interviewing costs.

In the evaluation of competing "brands" of telephone sample available from different suppliers, there are several features to consider when making a purchase decision. Many criteria are well-known and obvious, such as the expertise of a company and the completeness of the database. Beyond these, however, are concerns which are subtle yet equally important to a marketing research professional. Three of these will be briefly examined below.

Length of the random digit telephone number seed

In the generation of random digit dialing (RDD) samples, it is important to ask whether the last three or the last two digits of the telephone number are being randomly generated. The term "telephone block group" is frequently employed to denote the initial set of digits forming the base onto which the random number is appended, but its length is not always prominently discussed in the technical literature provided by sampling suppliers.

From an extensive analysis of our database, it has been estimated that a three-digit procedure will be between 29% and 13.5% less efficient than a two-digit procedure on the average for unweighted (Type A) and weighted (Type B) samples, respectively. Indeed, the drop in efficiency is expected to be 25% or greater for 1,676 counties for a Type A sample and 410 counties for a Type B sample. A model has been prepared from which it is predicted that such a drop in efficiency will increase the cost of using each telephone number by 19 cents—which can be several times the original purchase price. It is imperative that a knowledgeable buyer be aware of this difference and its impact on the total cost of a research study.

"Hidden" costs

Efficiency and its real effect on the total price of the sample is but one of the "hidden" costs associated with purchasing a telephone sample. Second, the advertised price of a sample must be adjusted by a variety of additional costs. These can greatly influence the actual purchase price of a sample, but are rarely fully appreciated. Some of the common hidden charges include:

- job set-up fees
- cell/quota set-up fees
- additional fees for listed samples
- additional fees for targeted samples
- coding of records (e.g. appending an MSA designation)
- fee for delivery of sample on magnetic tape or PC diskettes
- addition fee for failure to meet contract/job minimum quantities
- fee for same-day service

The net influence of these accessory costs can be substantial, especially when there are a number of areas within the job that are customized, such as a collection of trade areas defined by ZIP code radii. Incremental fees can, in fact, double the actual cost of each telephone number. Again, in comparing the products of various sampling system suppliers, the knowledgeable buyer will look at the actual cost per telephone number—the total of the invoice divided by the sample quantity ordered.

Suppression of businesses from residential samples

The method used to eliminate known business telephone numbers from a residential sample varies significantly from supplier to supplier. Many sampling companies simply do not attempt to perform this service and ignore the increase in non-qualified dialings it produces for the customer. Some eliminate entire exchanges that have a high likelihood of being located within business districts—unfortunately, this both removes any residential number which may be in those same exchanges and fails to capture those businesses in less commercial areas. Yet others use an algorithmic approach based on a set of "rules of thumb." For example, one such rule might classify any telephone number in which the last four digits are in consecutive ascending (e.g. 612-927-1234) or descending (e.g. 612-927-4321) order as a business.

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Program identifies repeat respondents

As mall interviewing has grown in importance as a method of data collection, questions have been raised regarding the way respondents are recruited. In particular there is concern that certain types of people haunt the mall concourses, some of whom are just waiting to be "corralled" by a research interviewer.

The scenario goes something like this: Mary goes to the mall at least once or twice a week. Like many others, she isn't there because she has something to buy, she just likes to browse in the bookstore, look in the pet shop, see what's new in her favorite department store and just "shop." When she sees the mall interviewers she always stops to say hello and usually asks what they are interviewing on today.

Mary likes to be interviewed and she is very cooperative. Sometimes she tastes products, sees some commercials before they're on TV, or maybe gets a product to take home. Occasionally she gets paid for being interviewed.

Mary is the answer to an interviewer's prayer. She knows to always say she hasn't been interviewed in the past six months (even though it was only last week). With a little leading, she can guess what the screening interviewers want her to say. And Mary can even remember what brand of dog food she said she used in a survey last month, and go through a standard validation like a stealth bomber.

There are people like Mary at every mall who truly want to be helpful. But when repeat respondents make up even a minor proportion of your quota, their "help" can seriously damage the results of a study. The difficulty is that these days the marketing research industry is increasingly troubled by declining cooperation rates. So why should it be concerned about those who enjoy participating?

Aside from the classic problems of "professional" respondents (who are far from the "naive" respondents on whom survey research depends) there is a much more insidious aspect of their use. Cutting a corner on the past participation question can soon lead to more serious violations of the qualifications.

Cooperative, repeat respondents can develop a conspiratorial familiarity with an interviewing staff. Having such cooperative respondents "fudging" the frequency of product use, the brand used (or even use of the product category altogether) and other key respondent qualifications dilutes and can even destroy the validity of the results.

There are no figures to indicate if the practice of using repeat respondents occurs often in mall research. But certainly the temptation to do so exists. In this business, as in many others, any practice that can result in faster turnaround and/or lower costs—and which might not be detected under normal conditions—should not be assumed to be rare. Even though the industry continues to emphasize quality in data collection, competitive pressures are at an all time high. Mall location managers, often miles away from their management offices, face the decision alone. They can either actively encourage the use of repeat respondents, they can ignore the practice or they can actively discourage it.

One company, Ruth Nelson Research Services, has put into action a program to safeguard their client's projects against data that results from using overly cooperative respondents. They have a custom-designed program that matches the telephone numbers of all mall respondents in each city over a three month program. Each day they input the names, telephone numbers, date of interview, interviewer, project number and other details for each person interviewed at the malls. By running the matching program regularly, repeat respondents, and their interviewers are noted; when a repeat occurs an investigation is begun.

Some matches are found to be innocent. A husband and wife interviewed on separate days or a second project with no past participation requirement are spotted. But whenever a violation is noted the company notifies the client, the interviewer, and the supervisor in charge of the project.

The main benefit of this system hasn't necessarily been in catching the occasional errors that might be made under the best of circumstances. It has been in preventing widespread use of repeat respondents. The match program insures that everyone—clients, interviewers, and supervisors—knows that this research field service not only discourages the practice but that they can also detect it immediately.❑

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Listed below are names of companies specializing in focus groups. Included are contact personnel, addresses and phone numbers. Companies are listed alphabetically and are also classified by state and specialty for your convenience. Contact publisher for listing rates: Quirk's Marketing Research Review, P. O. Box 23536, Minneapolis, MN 55423. 612/861-8051.

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Telephone

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A collection of five such rules of thumb were applied to our national database of business telephone numbers to determine the extent to which they would correctly classify business telephone numbers. The result? A poor showing at only 12.8%. In other words, a true search of a business database is nearly eight times more effective than an algorithmic approach.

An buyer who is aware will recognize that costs increase as efficiency decreases and purchasing a sample employing a superior methodology for the elimination of known business telephone numbers will impact the quality and cost of the research.

Attempting to alleviate these problems (and avoid the fate of Liberty magazine!) Maritz Marketing Research has created its own sampling system. In brief, this service uses a database of over 90% of all available working listed telephones in the United States, and is updated every six months. Obtained from a large and respected list compiler, it is an accumulation of information from more than 20 different sources. The capabilities include the production of the following types of telephone samples: random digit, listed, and targeted (e.g. high income).

Each of these types of samples can be drawn for areas defined by virtually any geography characteristic. For example, samples may be based in postal geography (ZIPs), census geography (MSAs, counties, tracts), commercial geography (ADI's, Nielsen markets) or telephone geography (area codes, exchanges). Alternatively, custom geography definitions, such as trade areas, may be used.

Summary

Three issues have been raised that need to be considered when evaluating the supplier from whom a telephone sample is to be purchased: the length of the RDD telephone block group seed, "hidden" costs, and the method for eliminating business telephone numbers.

It is true that all telephone numbers are equal—a phone number is a phone number is a phone number—but, some are clearly more equal than others because of increased quality and correspondingly reduced dialing costs. Telephone samples are not a commodity. Next time you consider purchasing samples, add the above criteria to your list for evaluating competing products. ❑

Trade News

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25% more likely to be listed. Divorced householders, particularly those with children, also tended to be unlisted."

High income households are not more likely to be unlisted. There was no evidence in the study to support the long-standing myth that unlisted households have significantly higher income than listed households. The study also found that unlisted telephone households were no more likely to refuse to participate in marketing research surveys than listed households.

"Of the 125,000+ contacts made, 40% were with unlisted households, closely approximating the unlisted rates in 80 of the largest MSAs. In some markets, unlisted households represented as much as 55% of all contacts. Most important, however, is the fact that unlisted households also represented 40% of completions and refusals, clearly dispelling the myth that unlisted households are less likely to cooperate," Piekarski wrote.

Names of Note

continued from p. 18

Bickley Townsend has joined the Roper Organization, New York, as vice president. Previously she was director of the American Demographics Institute.

Glenn Weissman has joined Schlesinger Associates, Edison, NJ as vice president-client services.

Princeton, NJ-based Total Research Corp. has named **Irving Crespi** director of public affairs research. In addition, **Todd K. Geberty** has been named junior specifications writer; and **Marite Talbergs** has been promoted to project director.

Schulman, Ronca & Bucuvalos, Inc. has added four staff members to its New York office. **Joan Robbins** has been named senior project director. Previously she was a client service manager with AHF Research. **Joan Barten Kline** has been named senior analyst in telecommunications research. Previously she was a project director at Audits and Surveys. **Scott Allen** has joined as an analyst in public policy. **Loni Lusker** has joined SRBI as an analyst in financial services research. Previously she was with Manufacturers Hanover Trust.

Linda Dawley has joined KPC Research, Charlotte, NC, as focus group coordinator.

Trade Talk

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statistics and the database, beyond just cluster and factor analysis. As I saw these research groups growing, it was clear to me they really needed somebody trained to manipulate databases. It was fairly obvious that they were really not answering some of the questions with the data that had become available to them."

Estimating that there are fewer than 100 true "marketing scientists" in the field today, Burtch says that because of the shortage, qualified people entering the job market are able to command high starting salaries.

"Someone with a B.S. in statistics from a good college can start at $30,000 a year," she says. "All of our clients are willing to train these people in the marketing area, but anybody that goes on the market with a couple of years experience on the quantitative marketing research side is very valuable."

What's the solution to the "problem?" What can be done to increase the supply of qualified people? Burtch says the respected business schools must develop stronger quantitative programs and make more statistics-related classes mandatory ("The MBA's avoid those classes like the plague," she says). And the statistical schools should realize that entering business with a degree in statistics is a viable option.

"Most of the statistical schools don't realize the demand for their people to get into marketing applications. They're so busy churning them out for the more traditional statistical applications that they forget all about business applications."

They do so, she says, primarily because few of the professors possess a business-related background, which adds a bit of a Catch-22 to the situation, because how can they teach something they have no experience in?

With no easy answer available, Burtch says companies will have to rely on their ability to snare those who are qualified and train them accordingly, because the need for people to make sense of the numbers can only increase as the data gathering technology advances.

"As competition increases, people are going to have to use this data correctly, and unless they get people who understand the ins and outs of data analysis, they could be making some major mistakes. It's very costly to use this data and I'd be a little fearful of hiring people without the appropriate skills and having them make decisions they shouldn't be making.

"But on the other hand, you have to weigh that danger with the danger of letting your competition run over you because they have a better person in there analyzing the data. It's a double-edged sword, because while the data is complex and voluminous, it can't be ignored as too complex, because the competition may be using the information, and if you ignore it, you could be left behind." ❑

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West Coast: Lane E. Weiss, 582 Market St., Suite 611, San Francisco, CA 94104. (415) 986-6341.

Index of Advertisers

Corrections

The following listing was inadvertently omitted from the 1990 Directory of Focus Group Facilities:

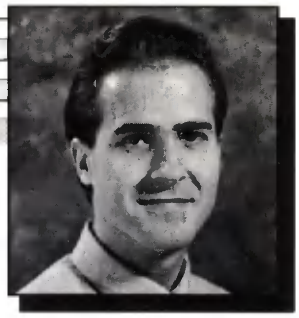
Impact Research Center
533 South 336th St., Suite C
Federal Way, WA 98003
Ph. 206-924-4622
1,3,4,6,7B

Please note the changes to the following listing from the 1990 Directory of Focus Group Facilities:

The telephone number for BSR Field Services, Coral Gables, FL, is 305-443-2000. The fax number is 305-448-6825.

TRADE TALK

by Joseph Rydholm
managing editor



Wanted: marketing scientists

Two issues back, we reported on findings from a Temple, Barker & Sloane study of the use of scanner data by consumer products firms (*QMRR*, November, 1989, p. 8). One of the study's most important findings was that many of the companies felt they weren't getting as much out of the data as they could be, for two primary reasons.

First, the sheer volume of information made it difficult to perform lengthy analyses—just when one batch of data had been examined, another came along. Second, several survey respondents said that their companies hadn't committed enough personnel to data analysis, and that the employees who *were* involved lacked the training and experience necessary to squeeze the most from the numbers.

Bottom line: there just aren't enough qualified people available to analyze the data.

Linda Burtch would agree with that assessment. She is vice president of New York-based recruitment firm Smith Hanley Associates, Inc., and she says that marketing researchers with a strong knowledge of multivariate analysis and other statistical areas—which she calls "marketing scientists"—are much in demand with the major packaged goods and other large companies and organizations she recruits for.

"Many major marketing organizations today have an unprecedented amount of data available from both existing and new sources, but they're hard put to analyze it effectively—mostly because of the pressing lack of qualified marketing scientists," Burtch says.

"Technology gives us all sorts of fresh data, on who's watching what, ads seen, brand loyalties, buying patterns, you name it. The truth is, however, that most companies are still unable to make good use of it, to find out, for instance, how effective their advertising really is or how to improve the targeting of their direct mail. The recurring problem has not been inadequate technology, but the fact that there are still not enough experienced statisticians to clean up and analyze the vast amounts of data."

She says she began to see the potential for a shortage about five years ago, when technological advances began to make huge quantities of sophisticated data available to companies. More and more, statisticians began popping up in market research departments.

"In looking at the marketing research groups within companies I found that there were always one or two people in a group who knew a little bit more about the computer, and about the

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New York ..... Aug. 8–10
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204. Qualitative Marketing Research with Children
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301. Writing Actionable Marketing Research Reports
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302. Effective Oral Presentation of Marketing Information
Cincinnati ..... Jan. 22–24
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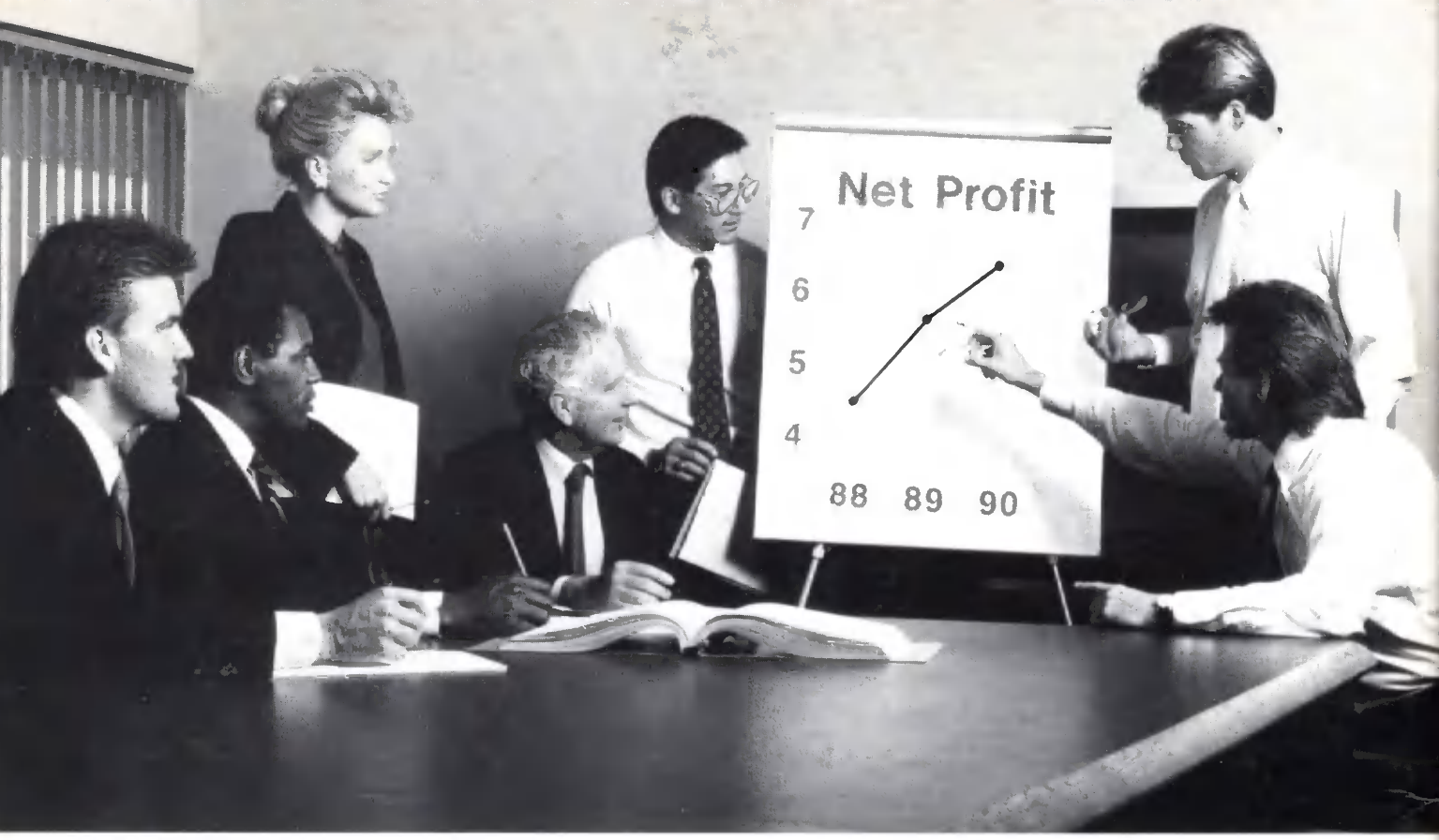

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