CLASSROOM ILLUSTRATION OF A CLASSICAL EXPERIMENTAL DESIGN

David L. Kruegel, San Jose State University

Abstract

Scientific experimentation can be of great value in practical decision making. Marketers do not however utilize simple, well-designed experiments as frequently as might be expected given the widespread use of scientifically based surveys and focus groups. Underutilization of simple experiments by practitioners may be due to uncertainty about how to design and conduct simple experiments. Graduating marketing students are also not as well prepared to design and conduct experiments as to design and conduct surveys. This report presents an experiential classroom technique for illustrating simple experiments. The method presented here is an adaptation of Mason Haire's famous "shopping list" study of why housewives purchase instant or regular coffee. Illustrative classroom materials and results are presented.

Scientific experimentation can be of great usefulness in marketing management. Experiments have been used to study the effects of alternatives in pricing, advertising, and promotion and can be used in other areas of marketing decision making. The importance of marketing experimentation is reflected by the number of books published (Gardner and Belk, 1980; Holloway, 1968) and by discussion of experimentation in popular marketing research textbooks (Churchill, 1987; Aaker and Day, 1986; Boyd, Westfall, and Laszlo, 1985).

In spite of long-term academic interest in scientific experimentation, marketing practitioners have not adopted experimentation as a common, day-to-day decision making tool. Experimentation is less common among practitioners than, for instance, surveys or focus groups.

Part of the reason that experiments are not used by practitioners as often as might be expected is that experiments must be well designed to be of utility. Experiments are also sometimes expensive and time consuming, although cost-benefit tradeoffs are often favorable. Another important reason why experiments may not be used as often as expected is that marketing practitioners and students are not as well-trained and as intellectually comfortable with experiments as they are with, for instance, market surveys. Upon completion of college, many marketing students have conducted and analyzed a small-scale survey, but few have been involved in or conducted an experiment. A student's lack of familiarity with experimentation may, in turn, be because the marketing curriculum often does not include laboratory sections that provide experience in conducting experiments. This problem is shared with other disciplines including sociology (Zeller, 1988).

The purpose of this paper is to present a classroom experiment that requires few special teaching materials but does illustrate the principles of experimental design and does provide an opportunity for student participation. The teaching technique is appropriate for marketing research classes and may also be used in consumer behavior and other marketing courses.

Background

Although dozens of experimental designs have been proposed and used, two or three designs are of fundamental importance. The experimental design selected for classroom illustration has one control group and involves measurement of the dependent variable only after the experimental treatment. The design is sometimes called a "one control group, post-test measurement only" design. This design is simple but powerful and is often used in marketing research and decision making (Churchill 1987, pp. 126-128).

The proposed classroom experiment is founded upon the design used in Mason Haire's (1950) famous study of reasons for not using instant coffee. The independent variable in Haire's study was reported intention to purchase an instant or a regular coffee. This variable was operationalized by preparing two shopping lists, identical except for the brand and type of coffee to be purchased. In shopping list I, the coffee to be purchased was Nescafe instant coffee; in shopping list II, the coffee to be purchased was Maxwell House drip coffee.
The dependent variable in Haire's study was consumer perception of the housewives who prepared shopping lists I and II. The experiment was conducted by consecutively presenting either shopping list I or shopping list II to a sample of 100 housewives. Fifty housewives were thus presented list I and 50 housewives were presented list II. Housewives were asked to read the shopping list presented to them and then project themselves into the situation as far as possible until they could more or less characterize the woman who prepared the shopping list. Then the respondents were to write a brief description of the housewife. The results of the Haire study showed that women who purchased Nescafe instant coffee were perceived negatively, as women who did not plan and who were lazy. Women who purchased Maxwell House regular drip ground coffee, on the other hand, were perceived positively, as women who were interested in their families and who were sensible. The Haire study is an excellent example of a one-control group, posttest-only-measurement experimental design.

The Haire study can be modified in several ways in order to efficiently illustrate experimental design in the classroom. One modification is to change the product studied from instant versus regular coffee to contemporary products likely to have differences in consumer perceptions. In recent classroom experiments, I have contrasted brands of beer, Michelob versus generic beer and Corona versus Lucky Lager beer. The hypothetical shopping situation can also be changed from reading a shopping list to observation of items in a supermarket shopping cart.

The most important modification of the Haire study is to change the method of measuring the dependent variable—consumer perception of reported shopping behavior. In the Haire research, the method of operational measurement was a single open-ended question. For classroom purposes, the dependent variable is operationally measured by several fixed-response questions. This change eliminates complex response coding and thereby reduces the time required for analysis. Illustrative shopping cart contents and four fixed-response questions are shown in Figures 1 and 2. The shopping cart contents in Figure 1 include Corona beer whereas the shopping cart contents in Figure 2 include Lucky Lager beer. The last fixed response question, "I was born in California. ___ Yes ___ No" is methodological and is explained in the discussion of classroom procedures. The foregoing are illustrative modifications. The marketing instructor can modify the Haire study in ways most appropriate for his particular students and classroom.

Classroom Procedure

The modified Haire experiment described has been used for several semesters in a consumer behavior class offered to juniors and seniors. This class emphasizes the importance of adequate methodology to derive creditable principles of consumer behavior. Early in the course issues relating to causality, experimental design, and multi-variable analysis are introduced. Then attention is turned to social, cultural, and psychological influences upon consumer behavior and consumer decision processes.

The classroom experiment is introduced to the class before consideration of product purchase norms, the discussion of which includes a review of the Haire study. The objective of the classroom illustration of experimental design is twofold. First, the classroom experiment provides an opportunity to experientially review methodological principles that had previously been considered in lecture only. Second, the partial replication of the Haire study increases student interest in the Haire research itself.

The first step in the classroom procedure is for the instructor to prepare two shopping cart content lists similar to those presented in Figures 1 and 2. One or two class sessions before consideration of the Haire study, the prepared questionnaires are distributed to the class. The questionnaires are covertly arranged and distributed in a systematic random sequence, first a Corona questionnaire, then a Lucky Lager questionnaire, then a Corona, and so forth. At this time, the students do not know that every other student is receiving a Corona or Lucky Lager questionnaire. The questionnaires are then completed by the students in about five minutes.

After the questionnaires are completed and collected from the class, a student volunteer is requested to tabulate the results. The tabulation task is explained and the volunteer is given a tabulation form similar to that shown.
in Figure 3 except that no data are present in
the body of the table. The student is asked to
tabulate the collected questionnaires and to
prepare copies of the summary tabulations for
each student for use in class discussion.

In a subsequent class period the in-
tstructor can explain both the substantial and
methodological implications derived from the
in-class experiment. Students are first given a
copy of the experimental results for their class.
In the discussion, the independent variable, repor-
ted consumer behavior, and its opera-
tionalization are explained together with the
dependent variable, perception of consumer
behavior, and its operationalization. Then the
tabular results are explained. Typical class-
room results are presented in Figure 3 which
shows a mean favorable or "Yes" response for
Corona as 2.4 as compared to a mean of 0.5
for Lucky Lager. The comparative product
purchase norms are studied by use of per-
centage differences rather than by introducing
statistical tests of differences. In several
years of classroom experience, the numerical results
have always been consistent with the hypothe-
sis that product purchase norms differ, that is,
one product is associated with more favorable
normative evaluations than the other.

After explaining the substantive results
and comparing them to those obtained by
Haire and by Webster and Pechmann in their
follow-up replication (1968), discussion is direc-
ted to methodological considerations. The
study is presented as satisfying the conditions
for a designed experiment seeking to establish
First, the independent variable, reported con-
sumer behavior, is manipulated by the inves-
tigator. Second, the experimental treatment is
randomly administered through the process of
distributing the questionnaires to the class in
a systematic random method.

The third requirement for a designed
experiment is a sufficient number of cases so
that the laws of probability operate to yield
experimental and control groups that are ap-
proximately equivalent in all characteristics
except the independent variable. This ap-
proximate equivalence of experimental and
control groups is illustrated by referring to th
Boyde, question of state of birth. If the experimental
treatment has been randomly administered,
then the percentage of students born in Califor-
nia should be approximately the same for
students receiving either the Corona or the

Lucky Lager shopping cart contents list. In
Figure 3, the respective state of birth statistics,
60 and 62 percent, are almost identical, in
spite of the comparatively small number of
students. Comparative state of birth data ob-
tained by combining two class sections are
presented in Figure 4. After several years
experience, it appears that the modified Haire
experiment serves to illustrate both principles
of experimentation and substantive marketing
principles concerning product purchase norm-
s.

Discussion

Computers and modern information process-
ing software have revolutionized the way data
are collected and analyzed. Often com-
puterized data is captured as part of normal
business operations and thus may be readily
incorporated into marketing analyses. The
potential therefore exists for greater use of
designed experiments for marketing decision
making. One impediment to more frequent
use of even simple experiments appears to be
conceptual. Marketing students do not know
exactly how experiments should be designed
and conducted and do not appreciate suffi-
ciently the quality of causal evidence that ex-
periments yield.

Student uncertainty about experimental desi-
gn and interpretation can be reduced by edu-
cational efforts. Because it seems unlikely that
most undergraduate business schools will
soon acquire special laboratory facilities, the
use of classroom demonstrations of experi-
ments appears to be a feasible approach. In
particular, modification of the well-known and
highly regard Haire study for classroom il-
ustration of experimental design seems an
appropriate teaching device. Today's market-
ing students should be as familiar and in-
formed about simple experiments as they are
familiar and informed about polls and surveys.

References

Aaker, David A. and George S. Day (1986), Marketing

Harper W., Jr., Ralph Westfall, and Stanley F.
Stasch (1985), Marketing Research: Text and
Cases. Sixth edition, Homewood, Ill.: Irwin.


**FIGURE 1**

**SHOPPING CART CONTENTS: CORONA BEER**

**ANONYMOUS QUESTIONNAIRE**

PLEASE READ THE FOLLOWING LIST OF ITEMS OBSERVED IN A SUPERMARKET SHOPPING CART. TRY TO PROJECT YOURSELF INTO THE SHOPPING SITUATION AS FAR AS POSSIBLE UNTIL YOU CAN MORE OR LESS CHARACTERIZE THE SHOPPER BUYING THE GROCERIES. THEN PLEASE ANSWER AS BEST YOU CAN THE FOUR QUESTION ABOUT THE SHOPPER.

**Shopping Cart Contents**

- fresh chicken
- Kleenex tissues
- Corona beer
- coffee
- corn flakes
- yogurt

1. I'd guess this shopper has good taste.
   
   ____ Yes   ____ No

2. I might like to meet this shopper. ____ Yes
   
   ____ No

3. I'd guess this shopper is has many friends.
   
   ____ Yes   ____ No

4. I'd guess this shopper is a college graduate.
   
   ____ Yes   ____ No
And now a final demographic question about yourself:

5. I was born in California.  ____Yes ____No

THANK YOU VERY MUCH!

FIGURE 2

SHOPPING CART CONTENTS: LUCKY LAGER BEER

ANONYMOUS QUESTIONNAIRE

PLEASE READ THE FOLLOWING LIST OF ITEMS OBSERVED IN A SUPERMARKET SHOPPING CART. TRY TO PROJECT YOURSELF INTO THE SHOPPING SITUATION AS FAR AS POSSIBLE UNTIL YOU CAN MORE OR LESS CHARACTERIZE THE SHOPPER BUYING THE GROCERIES. THEN PLEASE ANSWER AS BEST YOU CAN THE FOUR QUESTION ABOUT THE SHOPPER.

Shopping Cart Contents

- fresh chicken
- Kleenex tissues
- Lucky Lager beer
- coffee
- corn flakes
- yogurt

1. I'd guess this shopper has good taste.  ____Yes ____No

2. I might like to meet this shopper.  ____Yes ____No

3. I'd guess this shopper is has many friends.  ____Yes ____No

4. I'd guess this shopper is a college graduate.  ____Yes ____No

98
And now a final demographic question about yourself:

5. I was born in California. ___Yes ___No

THANK YOU VERY MUCH!

TABLE OF FINDINGS

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<thead>
<tr>
<th>Difference</th>
<th>Operational indicators</th>
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"Yes" Responses

for dependent and Corona Lucky Lager ([2]-[4])
other variables ______________________ or
([1]-[3])

<table>
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<tr>
<th>No.</th>
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<td>1</td>
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<td>1</td>
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<tr>
<td>8</td>
<td>62</td>
<td>1</td>
<td>9</td>
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</tbody>
</table>

\[ \text{Total "Yes"} = 31 \quad \text{NA} \quad 6 \quad \text{NA} \]

\[ (b+c+d+e) \]

\[ \text{Mean "Yes"} = 2.4 \quad \text{NA} \quad 0.5 \quad \text{NA} \]

\[ 1.9 \quad ([f]/[a]) \]

\[ \text{Born in CA?} = 8 \quad 62 \quad 6'' \quad 60 \]

* Percentage base is the number of persons who received the "Corona" shopping cart contents form or the "Lucky Lager" shopping cart contents form.

NA Not Applicable
** Lucky Lager respondent who did not answer question "h" not included.

**FIGURE 4**

**ILLUSTRATIVE CLASSROOM RESULTS: 1989**

**PROJECTIVE MEASUREMENT OF PRODUCT PURCHASE NORMS**

Replication of Haire Study

<table>
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<td>&quot;Yes&quot; Responses</td>
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<td>Operational indicators</td>
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<td>for dependent and Corona Lucky Lager ([2]-[4]) other variables</td>
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<tr>
<td>No. % *</td>
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<td>([1]-[3])</td>
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<tr>
<td>[a] No. of subjects, n.</td>
<td>30</td>
<td>100%</td>
<td>31</td>
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<tr>
<td>[b] Has good taste.....</td>
<td>22</td>
<td>73</td>
<td>11</td>
<td>35</td>
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<td>[c] Like to meet.......</td>
<td>20</td>
<td>67</td>
<td>13</td>
<td>42</td>
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<td>[d] Has many friends...</td>
<td>21</td>
<td>70</td>
<td>14</td>
<td>45</td>
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<tr>
<td>[e] College graduate...</td>
<td>24</td>
<td>80</td>
<td>10</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>[f] Total &quot;Yes&quot;.......</td>
<td>87</td>
<td>NA</td>
<td>48</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>(b+c+d+e)</td>
<td>39</td>
<td>1.4</td>
<td>NA</td>
<td>1.5</td>
<td></td>
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<tr>
<td>[g] Mean &quot;Yes&quot;.......</td>
<td>2.9</td>
<td>NA</td>
<td>1.5</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>([f]/[a])</td>
<td></td>
<td></td>
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<td></td>
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* Percentage base is the number of persons who received the "Corona" shopping cart contents form or the "Lucky Lager" shopping cart contents form.