Marketing Research
Chapter 11
Experimental Research
Lecturer: Michaella DeLeon Castillo, DBA - Philippines

Marketing Research – Lecture 11

LESSON 11

Experimental Research

Learning Objective 11.1 – The Nature of Experiments

Typically, the word "experiment" brings up images of a chemist surrounded by test tubes that are bubbling and Bunsen burners. Compared to marketing researchers, behavioral and physical scientists have employed experimentation for a far longer period of time. Nevertheless, experiments are used for essentially the same goal by both social and physical scientists.

Learning Objective 11.2 – An Illustration: Does Color Cause Preference?

A total of 200 female customers were enlisted to take part in the study. In contrast to responders, participants in experimental study are referred to as subjects. This is as a result of the experimenter subjecting them to a test procedure. Simply responding to the idea of a "new fashion store" was all that was required of each participant in this experiment. The shop would cater to the fashion-conscious professional woman by selling clothing and accessories for ladies.

Independent Variables

Two pertinent independent variables were used in the experiment. For the experiment, fictitious retail settings were made. There were four fictitious stores made. The prevailing store color and lighting style were the only things that varied amongst the four. Color and illumination were the two main independent factors as a result.

One of the potential levels of a variable manipulation experiment is referred to as an experimental condition.

A group from one of four condition types was given to the subjects. Each group was given a store that had one of the four exhibit-referenced color and lighting schemes. As a result, each member of a group heard

the same description. Different sets of subjects received various descriptions. The researcher can determine the influence of the two experimentally controlled independent variables by examining differences between the groups.

Independent Variable Main Effects and Interaction

It appears that color matters. However, perhaps we shouldn't reject illumination so readily. The effects of each experimental variable taken individually as well as the effects resulting from combinations of variables must both be examined by the researcher. The experimental difference in means between the various values of any one experimental variable is referred to as a main effect. Only the variations related to color are noteworthy in this situation, even if there are potential main consequences for both color and illumination. The interaction effect results from a particular arrangement of independent variables. It's likely that the use of color and lighting in this situation produces effects that aren't properly depicted by the major effects.

Learning Objective 11.3 – Basic Issues in Experimental Design

One of the main areas of inquiry is experimental design. In fact, that subject is the only focus of courses and books. An introduction to experimental design is given in this section. With this introduction, a student ought to be able to create and carry out simple experimental designs. Fortunately, the majority of marketing experiments have straightforward concepts.

At least four significant design components are used in experimental designs. These problems include of manipulating the independent variable, choosing and measuring the dependent variable, choosing and assigning experimental subjects, and controlling unrelated variables.

Manipulation of the Independent Variable

The researcher manipulates independent variables in this way to control them. The researcher changed the values of the color independent variable in our color experiment by giving it a value of either blue or

orange. It is hypothesized that experimentally independent variables have causal effects. As a result, experiments are ideal in causal designs.

The phrase "experimental treatment" refers to the manipulation of an experimental variable. For instance, the introductory vignette used an experimental treatment that assigned consumers to sample either Sea Snapper or Captain John's fish sticks, manipulating the brand. The brand variable had two layers to it. A medical researcher may change an experimental variable by giving certain participants one medication while giving another medication to the other subjects. The retail environment experiment used either blue or orange color treatments and either bright or soft lighting treatments. Treatments with more than two levels are frequently used in experimental variables. For instance, in a pricing experiment looking at how price influences sales, treatments might be priced at $1.29, $1.69, and $1.99.

These types of experimental variables can be classified as categorical variables as well as independent variables because they take on a value to indicate some categorized or qualitative quality. either orange or blue in color. Another example of a categorical or classificatory variable that could be altered in an experiment is the style of advertising content. An independent variable could actually be a continuous variable under other circumstances. In this situation, the researcher must choose suitable concentrations of that variable to use as experimental treatments. Actually, lighting can be adjusted to any level, from complete darkness to full brightness. The researcher selects the levels that would be relevant to the study before starting the experiment. The levels ought to differ significantly and be realistic.

Experimental and Control Groups

The probably simplest experiment involves manipulating an independent variable across two treatment levels to produce two groups: an experimental group and a control group. A group that receives an experimental therapy is called an experimental group. One who receives no experimental therapy is considered to be in a control group. Think of an investigation on the impact of advertising on sales, for instance. The advertising budget of the test group may be set at $200,000. In the control scenario,

advertising could either stay at zero or stay at its current level. The researcher takes precautions to eliminate any potential causes of error in the experiment by maintaining the same settings in the control group. At the conclusion of the experiment, sales (the dependent variable) in the two treatment groups are compared to see if the amount of advertising (the independent variable) had any impact. Keep in mind that this straightforward experiment can only yield a primary impact.

Several Experimental Treatment Levels

The advertising/sales trial with a single experimental group and a single control group could not provide the advertiser with all the information they are looking for. Additional experimental groups with advertising expenditures of $250,000, $500,000, and $1 million may be researched if the advertiser wanted to comprehend the functional nature of the link between sales and advertising at various treatment levels. There could still be a control variable in this experiment. In contrast to the straightforward experimental group-control group experiment mentioned above, a more accurate result may be reached by evaluating additional groups, each with a varied dose of treatment. Only the principal effect may be produced with this design.

More Than One Independent Variable

Incorporating the impact of another experimental variable might also complicate an experiment. A still very simple two-variable experiment would be typified by our extended example considering the retail environment. There are two variables, each with two levels, resulting in four experimental groups. Cell is frequently used to describe a set of treatments within an experiment.

Selection and Management of the Dependent Variable

In experimental design, selecting dependent variables is essential. The experiment won't be useful unless the dependent variables are pertinent and accurately reflect an outcome of interest. The logical

dependent variable is occasionally pretty evident. Sales volume is most likely to be a significant dependent variable if researchers launch a novel cinnamon-pink grapefruit tea blend in a test market. Determining the dependent variable, however, can be more challenging if researchers are testing various advertisement text appeals. As an illustration, suitable dependent variables include measures of advertising awareness, recall, shifts in brand choice, or sales. The main dependent variable in the context of the retail environment was retail patronage. The perceived product quality, excitement, or pricing perceptions, on the other hand, could be additional potential dependent factors.

The process of problem definition includes selecting the appropriate dependent variable. Similar to the problem defining process in general, it is occasionally not given the attention it deserves. The sort of answer provided to managers to aid in decision-making depends on the dependent variable selected by the experimenter.

Think about how challenging it can be to choose the appropriate dependent variable in a test-market. Sales are undoubtedly significant, but when should they be tracked? The dependent variable should be chosen with consideration for the period of time required for effects to become apparent. If there were any carryover effects from the trial, sales can be monitored a few months later. Considerations should be given to alterations that are more long-lasting or relatively permanent than those produced merely during the trial. Considering that some customers may try a product once but never choose it again, repeat purchase behavior may also be crucial. Customers frequently give a "loser" one try, but they do not keep purchasing it.

Selection and Assignment of Test Units

The individuals or entities used as test units are those whose reactions to the experimental treatment are measured or observed. The test units could be individual customers, staff members, organizational units, sales territories, market segments, brands, locations, or other organizations. The majority of marketing and consumer behavior tests use people as their test subjects. The test units in our unit retail atmospherics example are specific consumers.

Sample Selection and Random Sampling Errors

If the sample units in one experimental cell differ from the units in another, and this difference has an impact on the dependent variable, systematic or nonsampling error may result. Consider the scenario where some professors want to investigate the impact of offering students refreshments during exams on their performance. Snacks are the experimental variable, which can be changed on three different levels: fruit, cookies, and chocolate. Individual pupils are the test subjects in this instance. For convenience's sake, the professors choose to administer the experiment to all of the 8 a.m. courses all eat chocolate for a snack at 1 p.m. Fruit is distributed to classes, and every 7 p.m. Classes receive cookies. Although this method is frequently used, systematic error is introduced into the experiment if our palates and digestive systems respond differently to various foods at various times of the day. Furthermore, because the average age of the students in the night sessions is higher, educators may draw the incorrect conclusion that cookies improve student performance whereas, in reality, older students may just do better regardless of what they are served.

Randomization

One method for evenly dispersing the effects of uncontrollable factors across all conditions is randomization, which involves assigning subjects and treatments to groups at random. Because nuisance factors are expected to exist to the same extent in every experimental cell, they will not be completely eliminated but rather regulated. Therefore, if it weren't for the experimental treatments that were given in a specific cell, it would be anticipated that all cells would produce average scores on the dependent variables that were comparable. In other words, the experimenter wants to create a scenario in which every cell is identical aside from the experimental treatment. The researcher can infer this from the subjects' assignments, which were chosen at random.

Matching

The most popular method for preventing test units from varying from one another on critical variables involves randomly assigning participants to the various experimental groups; this method also presupposes that all of the individuals' individual attributes have been equally randomised. Another

method of preventing systematic error is to match responders according to relevant background data by assigning subjects so that they have similar traits in each group. The best way to conceptualize this is in terms of demographic traits. In a taste test, for example, the researcher may ensure that there are an equal number of men and women in each experimental cell if it is anticipated that a subject's sex may affect the dependent variable responses.

Repeated Measures

Repeated measures designs apply to experiments where a single subject is exposed to more than one level of an experimental treatment. Although this method has benefits, such as being more economical because the same subject delivers more data than would otherwise, there are a number of disadvantages that can restrict its applicability.

Control Over Extraneous Variables

The fourth choice regarding the fundamental components of an experiment is control over unrelated variables. This has to do with the different kinds of experimental error. In Chapter 8, we divided overall survey error into two categories: systematic error and error resulting from random sampling. All research designs fall into the same dichotomy, however when discussing experiments, the phrases random (sampling) error and systematic error are more usually employed.

Experimental Confounds

When there is a confound in an experiment, it signifies that any observed changes in the dependent variable have a different explanation other than the experimental factors. The validity of the experiment is seriously questioned once a potential confound is discovered. In the introductory vignette, it was mentioned that one of the experimental protocols included a taste test.

Extraneous Variables

The majority of marketing students are aware of the interaction between the factors of the marketing mix—price, product, promotion, and distribution—and uncontrollable market forces like rival

competitors' actions and consumer trends. Thus, the impact of unrelated variables can affect marketing experimentation. Extraneous factors must, if at all feasible, be identified prior to the experiment because they can lead to results that are muddled.

Learning Objective 11.4 – Demand Characteristics

What are Demand Characteristics?

An aspect of the experimental design known as a demand characteristic inadvertently gives individuals cues regarding the research hypothesis. Before an experiment, researchers cannot tell people what the research hypotheses are in order to avoid confounding the results. Take the retail atmospherics experiment as an example. The researcher would never be able to determine whether the subjects' responses to the dependent variable were actually caused by the differences in the experimental stimuli or by the fact that they were attempting to give a "correct" response if they were informed prior to participation that they would be taking part in an experiment to determine whether they preferred stores that were predominantly orange or predominantly blue.

Experimenter Bias and Demand Effects

Demand characteristics are features of an experiment that require (promote) a particular response from the subjects. They thereby contribute to systematic mistake. Participants are more likely to behave in a way that is consistent with the experimental treatment if they are aware of the experimenter's expectation or demand. Their responses may be influenced by even minute nonverbal cues.

The person in charge of carrying out experimental methods frequently exhibits prominent demand characteristics. The experiment contains experimenter bias if the experimenter's presence, actions, or comments affect the participants' behavior or sway them to skew their responses to cooperate with the experimenter. When test volunteers skew their responses to help the experimenter, they are displaying behaviors that might not be representative of how they would act in the real world. For instance, volunteers in an advertising experiment may provide an answer in the intended direction if they are aware

that the experimenter is interested in whether they altered their attitudes in response to a certain commercial. This behavior is more indicative of a demand effect than a genuine experimental treatment effect.

Hawthorne Effect

A typical demand trait is demonstrated via a well-known management experiment. At the Western Electric Hawthorne facility in Cicero, Illinois, researchers were seeking to investigate the impact of various working circumstances, like as hours of labor, rest times, lighting, and payment methods, on productivity. No matter how long or short the workday, how bright or how low the lighting was, the researchers discovered that workers' productivity rose. Surprisingly, the researchers discovered that the employees' morale was higher since they were aware that they were a member of a unique experimental group. Because researchers are aware that people would behave differently when they are aware they are experimental subjects, this completely unanticipated impact has now been given the name "Hawthorne effect."

Reducing Demand Characteristics

There are techniques that can be used to lessen demand characteristics even if it is practically hard to completely remove them from studies. Many of these procedures make it challenging for individuals to understand what the researcher is attempting to ascertain. In a certain experiment, several or all of these may be applicable.

1. Use an experimental disguise.
2. Isolate experimental subjects.
3. Use a “blind” experimental administrator.
4. Administer only one experimental treatment level to each subject.

Experimental Disguise

A placebo is a bogus treatment used in an experiment to trick participants. The comparable effect in a dependent variable that results from the psychological impact of being aware of the therapy is referred to as a placebo effect. When the experimental variable involves the actual ingestion of a product, a placebo is especially crucial. The placebo shouldn't differ in any way that the research subject can truly observe. One group should get a placebo, which is a substance that appears just like the real food additive but is inactive, if participants in an experiment are instructed that a specific food additive can reduce appetite and are instructed to sprinkle it on their dinner before eating. Both groups are probably going to consume differently from someone experiencing no affect. The distinction between the experimental group and the control group would reflect the additive's actual effects. In marketing research, placebo effects do exist.

Isolate Experimental Subjects

Researchers should minimize the extent to which subjects are able to talk about the experimental procedures with each other. Although it may be unintentional, discussion among subjects may lead them to guess the experimental hypotheses. For instance, it could be that different subjects received different treatments. The experimental integrity will be higher when each only knows enough to participate in the experiment.

Use A "Blind" Experimental Administrator

The experimental hypotheses might not always be disclosed to those doing the experiment. The benefit is that they are less likely to send off cues that lead to demand effects if they are unaware of the precise subject matter being investigated. Administrators should only know what they need to execute their jobs, just like the subjects, when there is some reason to believe that their knowledge may constitute a demand characteristic.

Administer Only One Experimental Condition Per Subject

Subjects are substantially more likely to guess the experimental hypothesis when they are aware of multiple experimental treatment conditions. Therefore, even though there are financial benefits to giving the same subject various levels of treatment, it should be avoided wherever possible. In the retail atmospherics example, for instance, if a subject initially responded to the idea of a blue retail store and then saw the exact same store with the exception that the walls were now orange, then he or she is extremely likely to be aware that the researcher is interested in color.

Learning Objective 11.5 – Establishing Control

Attempting to maintain constant conditions is an option for experimenters when irrelevant variables cannot be removed. This means that aside from the various experimental treatments, all experimental groups' subjects experience the same set of circumstances. Constancy is ensured with the aid of the already described matching principle. Four test products were used in a supermarket experiment to demonstrate the need to hold all variables constant. All variables other than shelf space had to remain constant for the duration of the trial. Throughout the test period, the shelf level that was in place in each store before to the tests' start was to be maintained.

Learning Objective 11.6 – Fundamental Questions in Experimentation

Most experiments require some level of deception, but when debriefing allows participants to return to their original state, the experiment is likely in line with high moral standards. Debriefing won't put seriously hurt or psychologically damaged individuals back to their pre-injury condition, hence the experiment shouldn't continue. As a result, some extra analysis of debriefing is provided.

It is anticipated that debriefing experimental subjects will counterbalance the negative consequences of deception, reduce stress, and give the subject an educational experience. Debriefing participants involves explaining the goals of the experiment and the researcher's hypothesis about the nature of consumer behavior.

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Learning Objective 11.7 – Ethical Issues in Experimentation

Basic versus Factorial Experimental Designs

Basic experimental designs include manipulating a single independent variable to see how it affects a single dependent variable. However, we are aware that a number of factors affect complicated marketing dependent variables including sales, product usage, and preference. Sales may be affected more by the simultaneous change in independent variables like price and advertising than by the change in each variable alone. The analysis of the interaction of two or more independent variables is possible with factorial experimental designs, which are more complex than simple experimental designs.

Laboratory Experiments

The researcher has more total control over the study environment and other variables in a laboratory experiment. For instance, subjects are chosen and brought to a research agency's office, an advertising agency's office, or possibly a mobile research unit. They are exposed to a television commercial as part of a program that also features the adverts of rival companies. Then, in a mock retail atmosphere, they are permitted to buy either the promoted product or one of several rival products. In this way, trial purchase measures are obtained. Subjects are contacted again a few weeks later to gauge their happiness and gauge whether they intend to make repeat purchases. The advertiser can quickly get data on decision-making using this lab experiment, which allows the consumer the chance to "buy" and "invest." Our in-store atmospheric experiment serves as an example for a lab experiment.

Other laboratory analyses might be more carefully thought out or made up. A tachistoscope, for example, enables a researcher to experiment with the visual impact of advertising, packaging, and other items by controlling the amount of time a subject is exposed to a visual image.

Between-Subjects Designs

How many treatments a person should receive is a fundamental issue that the researchers must address. The researcher could want to use several therapies on the same subject for financial reasons. In the retail environment experiment, for instance, each participant may rate each color and illumination

combination. So, one subject can provide four observations on the dependent variable. A within-subjects design is what is known as such a design. Because the same subject is measured for each treatment, within-subjects designs require repeated measurements. In contrast, the researcher can decide that each participant would only get one set of treatments. An analysis like this is known as a between-subjects design.

Learning Objective 11.8 – Issues of Experimental Validity

An experiment's quality is judged by two types of validity. These are known as internal and external validity.

Internal Validity

If an experimental variable is actually to blame for any variation in the dependent variable, there is internal validity. Or, to put it another way, does the experimental manipulation actually alter the relevant outcome? The researcher will have trouble drawing reliable conclusions regarding the link between the experimental treatment and the dependent variable if the observed results were impacted or confounded by unrelated factors.

Manipulation Checks

A manipulation check can frequently be used to determine the accuracy of manipulations. The researcher may really monitor blood sugar levels after providing the drug to ensure that the dosages were different enough to cause a change in blood sugar if a drug is provided in different quantities that should impact blood sugar levels. A survey question or two are frequently used in marketing to check for manipulation. In the aforementioned pricing example, subjects might be questioned on how affordable they think the cost of the car is. In a "high" and "low" price group, a legitimate manipulation would result in significantly different average answers to that question. In

experiments using the self-response format, manipulation checks should always be conducted following the dependent variables.

History

The accuracy of manipulations can frequently be assessed using a manipulation check. If a medicine is administered in different quantities that might affect blood sugar levels, the researcher may actually monitor blood sugar levels to make that the dosage differences were sufficient to result in a change in blood sugar. To check for manipulation, surveys with one or two questions are widely used in marketing. In the pricing scenario stated above, subjects may be asked how affordable they believe the purchase of the car is. A legitimate manipulation would lead to noticeably different average responses in the "high" and "low" price groups. Always do manipulation checks after the dependent variables in experiments employing the self-response format.

Maturation

Effects associated with maturation are those that develop through time and are influenced by the occurrences that naturally accompany development and experience. As individuals simply age or gain expertise, longer-term experiments may experience decreasing internal validity. Imagine doing an experiment to determine how a new compensation plan will affect sales productivity. Some of the salespeople would probably mature as a consequence of additional selling experience or perhaps obtain more expertise if this program were evaluated over the course of a year.

Testing

Because the initial measurement or test alerts or primes participants in a way that impacts their response to the experimental treatments, testing effects are also known as pretesting effects. Only in a before-and-after study do testing effects take place. Before an experimental therapy is given, a baseline measurement must be taken for a before-and-after research. Therefore, before-and-after studies are a unique application of the repeated measurements design.

Instrumentation

Instrumentation effects can compromise internal validity when they result from changes in interviewers, question phrasing, or other methods used to measure the dependent variable. Some issues could develop if the same interviewers are utilized for both the before and after measurements. With more experience, interviewers may become more skilled at conducting interviews, or they may grow bored and opt to rephrase the inquiry.

Selection

The selection effect, also known as sample selection error, is a sample bias that arises from the differential selection of respondents for the comparison groups.

Mortality

The mortality effect (sample attrition) may cause some sample bias in experiments that last a few weeks or longer. Sample attrition happens when some participants leave the study before it is finished. If patients drop out of one experimental treatment group disproportionately from other groups, mortality effects may result.

External Validity

The accuracy with which experimental results can be extrapolated from the experimental subjects is known as external validity. When the sample's respondents accurately reflect the population, they represent and when the findings apply to market sectors or other groups of people, external validity is strengthened. Researchers and managers can rely more on the assumption that any results found in an experiment will also be seen in the "real world" the higher the external validity.

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Progress Check:

Requirements:

1. Due Date : _____ before 5pm
2. Essay format, minimum of 30 words and maximum of 200 words.

Questions

1. **Create an experimental, independent variable through a valid experimental manipulation of its value**
2. **Understand and minimize the systematic experimental error.**
3. **Know ways of minimizing experimental demand characteristics.**

Answer

1. In experiments, manipulation rather than measurement is used to produce independent variables. In order to represent different values of an independent variable, the researcher develops distinctive experimental settings. In our expanded illustration, the researcher changed the color independent variable by designing an idea for a retail store that had two levels: blue and orange. The levels ought to be sufficiently dissimilar to represent the dependent variable's useful categories. If orange and burnt orange were the two hues under investigation, customers might respond too similarly to anticipate any variations in the dependent variable.

2. When the sample units (research subjects) in one experimental cell differ from those in another in a way that impacts the dependent variable, systematic experimental error occurs. The researcher wouldn't want to place all males in one color group and all females in another while testing how individuals react to color. A key strategy for reducing systematic experimental error is randomization. The distinctions in people that exist naturally throughout a population should

also exist inside each experimental cell if research subjects are randomly assigned to various treatment combinations.

3. Demand characteristics are experimental techniques that in some way inform the subject of the true goal of the study. Demand attributes may have an impact on demand. The outcomes are muddled when this occurs. These straightforward guidelines—using an experimental disguise, isolating experimental participants, employing a "blind" experimental administrator, and giving each subject only one experimental treatment combination—can help reduce demand characteristics.

Quiz 11

Enumeration

A. What are the four important experimental designs?

B. What are the four steps to eliminate demand characteristics?

C. What are two types of Validity?

Answer

A.

1. **Manipulation of the independent variable**
2. **Selection and measurement of the dependent variable**
3. **Selection and Assignment of experimental subjects**
4. **Control over extraneous variables**

B.

5. **Use an experimental disguise**
6. **Isolate experimental subjects**
7. **Use a blind experimental treatment level to each subject.**
8. **Administer only one experimental treatment level to each subject.**

C.

9. **Internal**
10. **External**