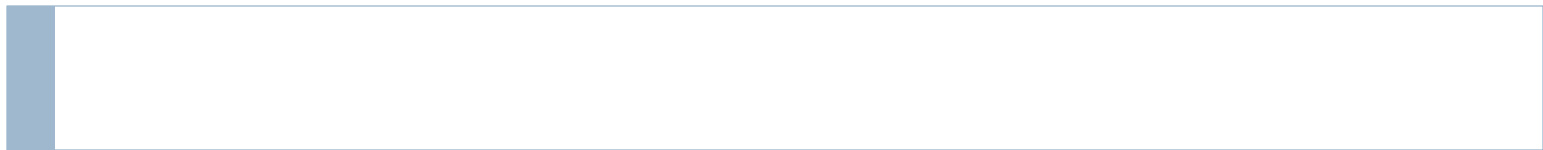


Research problems and questions
operationalization - constructs,
concepts, variables and hypotheses

Sources: Amanda Leggett: Constructs, variables and operationalization, 2011; Hair, Marketing research, ch. 3 – Thinking like a researcher

Some tips:

- ▶ http://www.youtube.com/watch?v=_BmjujIZExQ
- ▶ <http://www.youtube.com/watch?v=fbwxQBLrkfc>



When research problem is clear....

- ▶ And at least broad research questions are formulated....
the next step is to
 - ▶ **Determine the Relevant Variables to the Situation**
 - ▶ In this step, the researcher and decision maker jointly determine the specific variables pertinent to each defined problem or question that needs to be answered. The focus is on identifying the different independent and dependent variables. Determination must be made as to the types of information (i.e., facts, estimates, predictions, relationships) and specific **constructs** that are relevant to the decision problem.
 - ▶ **Construct = concepts or ideas about an object, attribute, or phenomenon that are worthy of measurement.**
-

The next step after RQ formulation can be also....

- ▶ Choice and formulation of concepts and constructs important for the problem
- ▶ Formulation of hypotheses
- ▶ Formulation of variables
- ▶formulation of constructs, hypotheses and variables is usually not sequential process, by the steps that are done more or less simultaneously



In other words....

- ▶ What **EXACTLY** wil we investigate?
- ▶ Examples:

EXHIBIT 3.6 Examples of Constructs Routinely Investigated

Constructs	Operational Description
Brand awareness	Percentage of respondents having heard of a designated brand; awareness could be either unaided or aided.
Attitudes toward a brand	The number of respondents and their intensity of feeling positive or negative toward a specific brand.
Intentions to purchase	The number of people who are planning to buy the specified object (e.g., product or service) within a designated time period.
Importance of factors	What factors and their intensity influence a person's purchase choice.
Demographic characteristics	The age, gender, occupation status, income level, and so forth of individuals providing the information.
Satisfaction of experience	How people evaluate their postpurchase consumption experience of a specified object.



If we start with variables...

▶ ***Explore the Nature of the Problem***

- ▶ Research problems range from simple to complex, depending on the number of variables and the nature of their relationship. If you understand the nature of the problem as a researcher, you will be able to better develop a solution for the problem. To help you understand all dimensions, you might want to consider focus groups of consumers, sales people, managers, or professionals to provide what is sometimes much needed insight.

▶ ***4. Define the Variable Relationships***

- ▶ • Determining which variables affect the solution to the problem.
- ▶ • Determining the degree to which each variable can be controlled.
- ▶ • Determining the functional relationships between the variables and which variables are critical to the solution of the problem.

If we start with concepts....

- ▶ To understand and communicate information about objects and events, there must be a common ground on which to do it. Concepts serve this purpose. A **concept** is a generally accepted collection of meanings or characteristics associated with certain events, objects, conditions, situations, and behaviors. Classifying and categorizing objects or events that have common characteristics beyond any single observation creates concepts. We abstract such meanings from our experiences and use words as labels to designate them. For example, we see a man passing and identify that he is running, walking, skipping, crawling, or hopping. These movements all represent concepts. We also have abstracted certain visual elements by which we identify that the moving object is an adult male, rather than an adult female or a truck or a horse.
-



What for are concepts in research?

- ▶ We design hypotheses using concepts. We devise measurement concepts by which to test these hypothetical statements. We gather data using these measurement concepts. The success of research hinges on (1) how clearly we conceptualize and (2) how well others understand the concepts we use. For example, when we survey people on the question of customer loyalty, the questions we use need to tap faithfully the attitudes of the participants. Attitudes are abstract, yet we must attempt to measure them using carefully selected concepts.
- ▶ The challenge is to develop concepts that others will clearly understand. We might, for example, ask participants for an estimate of their family's total income. This may seem to be a simple, unambiguous concept, but we will receive varying and confusing answers unless we restrict or narrow the concept by specifying:
 - ▶ • Time period, such as weekly, monthly, or annually.
 - ▶ • Before or after income taxes.
 - ▶ • For head of family only or for all family members.
 - ▶ • For salary and wages only or also for dividends, interest, and capital gains.
- ▶ • Income in kind, such as free rent, employee discounts, or food stamps.

Concepts and constructs

▶ **Constructs**

- ▶ Concepts have progressive levels of abstraction—that is, the degree to which the concept does or does not have something objective to refer to. *Table* is an objective concept. We can point to a table, and we have images of the characteristics of all tables in our mind. An abstraction like *personality* is much more difficult to visualize. Such abstract concepts are often called constructs. A **construct** is an image or abstract idea specifically invented for a given research and/or theory-building purpose.



The Role of Constructs

- ▶ **A construct** is an abstract idea inferred from specific instances that are thought to be related.
- ▶ Typical marketing constructs are brand loyalty, satisfaction, preference, awareness, knowledge.
- ▶ Research objectives typically call for the measurement of constructs.
- ▶ There are customary methods for defining and measuring constructs.



CONSTRUCTS

- Broad concepts or topics of study
 - ▣ Abstract
 - ▣ Not directly observable
 - ▣ May be complex (have multiple parts)
- Examples of constructs:
 - ▣ Aggression
 - ▣ Love
 - ▣ Intelligence
 - ▣ Life satisfaction



Researchers define constructs both “conceptually” and “operationally”

Conceptual definition: provides meaning to one construct in abstract or theoretical terms (What does it mean?)

BUT...

We have to make our abstract concepts concrete so we can study them!

Operational definition: defines a construct by specifying the procedures used to (How to measure it?) measure a construct.

“the assignment of numerals to objects, events”

Two ways to do this:

--Providing a clear definition

--Designating a particular measurement instrument to represent the concept

Research Objectives

- ▶ Precise
- ▶ Detailed
- ▶ Clear
- ▶ Operational
 - ▶ **Operational definitions** describe the operations to be carried out in order for constructs to be measured.



Examples of definition

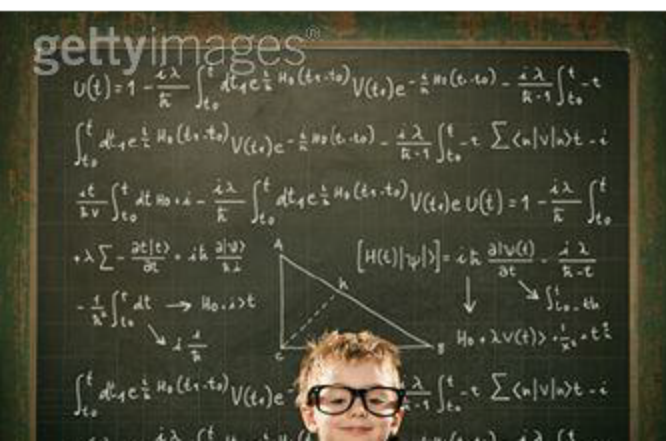
Is intelligence related to happiness?

Conceptual:

Intelligence: The capacity for abstract thought, understanding, communication, reasoning, learning, planning and problem solving.

Operational:

Intelligence: The score resulting from performing the Raven's Progressive Matrices Test.



Note...

- Operational definitions aren't always good... they may not accurately capture the intended construct (i.e., lack validity)
- An operational definition is simply how a researcher decides to measure (and thus define) a construct
- For example, intelligence is more than a score on a test...



Constructs

CONSTRUCT	OPERATIONAL DEFINITION
Brand awareness	Question: Have you heard of Brand A? ____ Yes ____ No Measure: Percentage of respondents having heard of the brand
Recall, recognition of advertising	Question: Do you recall seeing an advertisement for Brand A? Measure: Percentage who remember seeing a specific ad
Knowledge of product features	Question: Indicate which of Brand A's features you know about. Measure: Percentage who know about each feature
Brand familiarity	Question: Are you "unfamiliar," "somewhat familiar," or "very familiar" with Brand A? Measure: Percentage for each familiarity category
Comprehension of product benefits	Question: For each product benefit statement, indicate if you agree or disagree. Measure: Percentage who agree with each benefit statement

Constructs

CONSTRUCT	OPERATIONAL DEFINITION
Attitudes, feelings toward brand	Question: Rate Brand A on a 1–5 scale, where 1 = “poor” and 5 = “excellent” Measure: Average rating
Intentions to purchase	Question: What is the probability that you will buy Brand A the next time you purchase this product? Measure: Average probability
Past purchase or use	Question: Have you used Brand A in the past three months? Measure: Percentage who have used it
Brand loyalty	Question: With your last five purchases of the product, how many times did you buy Brand A? Measure: Percentage of times
Satisfaction	Question: Rate Brand A on a 1–5 scale, where 1 = “unsatisfied” and 5 = “very satisfied” Measure: Average rating

VARIABLES

- When we operationalize a concept, we are creating VARIABLES!
- Definition: Any characteristic that varies (meaning it must have at least two values)
 - ▣ Any event, situation, behavior, or individual characteristic that varies

Variables Examples

- Examples:
 - ▣ Height (participant or subject variable)
 - ▣ Age (participant or subject variable)
 - ▣ Stress (response variable)
 - ▣ Score on depression test (response variable)
 - ▣ Number of bystanders to an emergency (situational variable)



Variables

- Research questions and hypotheses consist of x and y variables
- Is **X** related to **Y**?
- Is **studying** related to school **performance**?



Independent vs. Dependent

- Independent variable (IV)– the “x” variable
 - ▣ Considered the “cause” of a behavior (the DV)
 - ▣ Variable that is manipulated in experimental design
 - The predictor variable in an observational/correlational study
- Dependent variable (DV)– the “y” variable
 - ▣ The variable that is the “effect”
 - ▣ The “outcome” or “response” variable
 - The outcome variable in an observational/correlational study



Ask yourself: Which (do you think) comes first?



IV and DV example...

- Researchers are interested in examining the effect of cooperative learning (i.e., working in groups) on math skills. They observe study hall sessions and compare students who work in dyads to those who work alone according to their performance (% correct) on a specific math test.
- Independent Variable?
 - ▣ What are the categories of this variable?
- Dependent Variable?

Example...

Is stress related to health?

X

Y

Conceptual (what does it mean?):

Stress: Emotional and physical strain that results when a person is confronted with a threat or challenge that exceeds their coping ability.

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Operational Definition (how to measure it?):

Stress: Emotional and physiological response to public speaking;
The score on the Perceived Stress Scale.

Trier Stress Test:



Some individuals in the experiment have to give an impromptu speech.

Other individuals in the experiment have to do something less stressful.

The researcher controls the level of stress in participants.

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

Name _____ Date _____

Age _____ Gender (*Circle*): M F Other _____

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

- | | | | | | |
|---|---|---|---|---|---|
| 1. In the last month, how often have you been upset because of something that happened unexpectedly?..... | 0 | 1 | 2 | 3 | 4 |
| 2. In the last month, how often have you felt that you were unable to control the important things in your life?..... | 0 | 1 | 2 | 3 | 4 |
| 3. In the last month, how often have you felt nervous and "stressed"? | 0 | 1 | 2 | 3 | 4 |
| 4. In the last month, how often have you felt confident about your ability to handle your personal problems?..... | 0 | 1 | 2 | 3 | 4 |
| 5. In the last month, how often have you felt that things were going your way?..... | 0 | 1 | 2 | 3 | 4 |
| 6. In the last month, how often have you found that you could not cope with all the things that you had to do? | 0 | 1 | 2 | 3 | 4 |
| 7. In the last month, how often have you been able to control irritations in your life?..... | 0 | 1 | 2 | 3 | 4 |
| 8. In the last month, how often have you felt that you were on top of things?..... | 0 | 1 | 2 | 3 | 4 |
| 9. In the last month, how often have you been angered because of things that were outside of your control? | 0 | 1 | 2 | 3 | 4 |

Let's say we operationalize Stress as the score on the Perceived Stress Scale.



Let's say we operationalize Health by the measurement of an individual's blood pressure after sitting quietly for 5 minutes.

What type of X variable is perceived stress?

Predictor (not under researcher control)

What type of Y variable is blood pressure?

Outcome (because X is a Predictor variable)

Let's say we operationalize Stress by whether participants had to give a public speech

Let's say we operationalize Health by the measurement of individuals' blood pressure after giving the speech.

What type of X variable is public speaking?

Independent (under researcher control)

What type of Y variable is blood pressure?

Dependent (because X is independent variable)

Hypotheses and concepts/constructs and variables

- ▶ **Propositions and Hypotheses**
- ▶ We define a **proposition** as a statement about observable phenomena (concepts) that may be judged as true or false. When a proposition is formulated for empirical testing, we call it a **hypothesis**. As a declarative statement about the relationship between two or more variables, a hypothesis is of a tentative and conjectural nature.
- ▶ Hypotheses have also been described as statements in which we assign variables to cases. A **case** is defined in this sense as the entity or thing the hypothesis talks about. The variable is the characteristic, trait, or attribute that, in the hypothesis, is imputed to the case.



Hypotheses – types (repetition from previous lecture)

- ▶ **descriptive hypotheses.** They state the existence, size, form, or distribution of some variable. Researchers often use a research question rather than a descriptive hypothesis. For example:
 - ▶ American cities (cases) are experiencing budget difficulties (variable).
 - ▶ Brand Manager Jones (case) has a higher-than-average achievement motivation (variable)



Hypotheses - types

- ▶ **Relational hypotheses.** These are statements that describe a relationship between two variables with respect to some case. For example, “Foreign (variable) cars are perceived by American consumers (case) to be of better quality (variable) than domestic cars.” In this instance, the nature of the relationship between the two variables (“country of origin” and “perceived quality”) is not specified. Is there only an implication that the variables occur in some predictable relationship, or is one variable somehow responsible for the other? The first interpretation (unspecified relationship) indicates a correlational relationship; the second (predictable relationship) indicates an explanatory, or causal, relationship.
- ▶ **Correlational hypotheses** state that the variables occur together in some specified manner without implying that one causes the other. Such weak claims are often made when we believe there are more basic causal forces that affect both variables or when we have not developed enough evidence to claim a stronger linkage. Here are three sample correlational hypotheses:
 - ▶ Young women (under 35 years of age) purchase fewer units of our product than women who are 35 years of age or older.
 - ▶ The number of suits sold varies directly with the level of the business cycle.
 - ▶ People in Atlanta give the president a more favorable rating than do people in St. Louis.
 - ▶ By labeling these as correlational hypotheses, we make no claim that one variable causes the other to change or take on different values.
- ▶ With **explanatory (causal) hypotheses**, there is an implication that the existence of or a change in one variable causes or leads to a change in the other variable. As we noted previously, the causal variable is typically called the independent variable (IV) and the other the dependent variable (DV). Cause means roughly to “help make happen.” So the IV need not be the sole reason for the existence of or change in the DV. Here are four examples of explanatory hypotheses:
 - ▶ An increase in family income (IV) leads to an increase in the percentage of income saved (DV).
 - ▶ Exposure to the company’s messages concerning industry problems (IV) leads to more favorable attitudes (DV) by employees toward the company.



Model and research...

- ▶ A **model** is a logical arrangement of constructs and relationships based on theory or experience
- ▶ Hierarchy of Effects
 - ▶ Unaware-Aware-Knowledge-Liking-Intention-Purchase-Loyalty
- ▶ Importance-Performance Model
 - ▶ Importance: Performance on attributes



-
- ▶ **Segmentation Model**
 - ▶ Divide up the market based on demographics, etc.
 - ▶ **Company Performance Model**
 - ▶ Sum of evaluations on various attributes



HIERARCHY STAGE	DESCRIPTION	RESEARCH QUESTION (University Estates Example)
Unawareness	Not aware of your brand	What percentage of prospective student residents are unaware of satellite television?
Awareness	Aware of your brand	What percentage of prospective student residents are aware of satellite television?
Knowledge	Know something about your brand	What percentage of prospective student residents who are aware of it know that satellite television (1) has 150 channels, (2) premium channels, and (3) pay-for-view?
Liking	Have a positive feeling about your brand	What percentage of prospective student residents who know something about satellite television feel negatively, positively, or neutral about having it in their apartment?
Intention	Intend to buy your brand next	What percentage of prospective student residents who are positive about having satellite television in their apartment intend to rent an apartment with it?
Purchase*	Have purchased your brand in the past	What percentage of the market purchased (tried) your brand in the past?
Repurchase/ Loyalty*	Purchase your brand regularly	What percentage of the market has purchased your brand more than other brands in the last five purchases?

TABLE**4.6****Marketing Problems for the Hobbit's Choice Restaurant**

Problem Item	Description
Will the restaurant be successful?	Will there be adequate revenue to allow the restaurant to be profitable?
How should the restaurant be designed?	How elegant should the décor be? Should there be a waterfront view?
What operating characteristics should the restaurant have?	What type of live music should be played? How should the wait staff dress? Should unusual menu items be offered?
Where should the restaurant be located?	Are customers willing to drive more or less than 30 minutes?
What are effective and efficient promotional choices?	Where should ads for the restaurant be placed for radio, TV, and newspaper? Should ads be placed in the city magazine?
What is the profile of the target market?	What are the demographic and lifestyle profiles of those who are most likely to patronize the restaurant?

TASK 1:

- ▶ H1:
 - ▶ Overall service quality has a significantly positive effect on user satisfaction.
 - ▶ 1.1:
 - ▶ “Tangibles” of services has a significant impact on user satisfaction.
 - ▶ 1.2:
 - ▶ “Responsiveness” of services has a significant impact on user satisfaction.
 - ▶ 1.3:
 - ▶ “Reliability” of services has a significant impact on user satisfaction.
 - ▶ 1.4:
 - ▶ “Assurance” of services has a significant impact on user satisfaction.
 - ▶ 1.5:
 - ▶ “Empathy” of services has a significant impact on user satisfaction.
 - ▶ H2:
 - ▶ There is a significant difference of degree of importance on every service attribute among users from different departments.

 - ▶ **1. To which research problem or research question(s) can be these hypotheses connected?**
 - ▶ **2. Which variables would you suggest to measure which constructs?**
-



Task 2:

- ▶ Managerial problem is: Low attendance of visitors and customers in shopping centre
- ▶ 1. which research questions can be formulated to this problem?
- ▶ 2. Which concepts and/or constructs are important for this problem and for the research questions?
- ▶ 3. Which hypotheses can be formulated?
- ▶ Which variables are connected to the problem and research questions?

