



QUANTITATIVE SOCIAL SCIENCE MEASUREMENT

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MEASUREMENT (OF CONCEPTS)

Measurement is of central importance in a quantitative social research (research based on quantification of data in numerical form).

The understanding of measurement requires, study of:

- Importance of measurement;
- Review of validity and reliability &
- Measurement theory

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Measurement is part and parcel of everyday life...



- We check time in watches,
- we off and on, measure our weight,
- We measure temperature
- We measure fuel gauge in a car etc.
- We measure temperature with a thermometer.

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Measurement is a means



- To extend our sense. (Astronomer using **telescope** to study distant stars, biologist using **microscope** to study microscopic object, e.g. Cells)
- Helps in keeping us collecting **objective, precise information**.

To measure we need

- A Construct;
- A measurement instrument;
- Ability to recognise what we are looking for.

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Measurement (of concepts/variables) and research design



Conceptualisation 'is the process of taking a construct or concept and refining it by giving it a conceptual or theoretical definition'.

A **conceptual definition** is a definition in abstract, theoretical terms.

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Concept & Related Terms



- "Concepts are general expressions of a particular phenomenon, e.g. **cats, dogs, anger, achievement, alienation, speed, intelligence, socialism**" (Walliman, 2001, p. 71).

Examined more closely, it is evident that each is a word which represents an idea.

"a concept is the relationship between the word (or symbol) and an idea or conception' (Cohen and Manion, 1994, p. 17).

"A concept is an idea expressed as a symbol or in words" (Neuman, 1994).

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- Natural science concepts are often expressed in symbolic forms, such as Greek letters (e.g. Ω , β , Σ , π , α etc.) or formulas (e.g. $S=d/t$; s =Speed, d =distance, t =time). Most social science concepts are expressed as words. E.g. Social class, self-esteem, morale, personality, patriarchy etc. etc.

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- Words, after all, are symbols too; they are symbols we learn with language. Height is an example of a concept with which we are already familiar.
- e.g., I can say the word height or write it down; the spoken sounds and written words are part of the English language. The combination of letters in the sound symbolizes, or stands for, the idea of a height.
- Learning concepts and theory is like learning a language.

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Cont'd... (Neuman, 1994)



- **Height** (a Concept) is a characteristic of a physical object, the distance from top to bottom. All people, buildings, trees, mountains, books, and so forth have a height. We can measure height or compare it. A height of zero is possible, and height can increase or decrease over time. As with many words, we use the word in several ways. You may have heard such expressions as the height of the battle, the storm, the summer, auto sales, or fashion.
- The word *Height* refers to an abstract idea. We associate its sounds and its written form with that idea. There is nothing inherent in the sounds that make up the word and the idea it represents. The connection is arbitrary, but it is still useful. People can express the abstract idea to one another using the symbol alone.

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Cont'd... (Neuman, 1994)



Concept have two parts:

A *Symbol* (word or term) and a *Definition*.

We learn definitions in many ways: I learn the word height and its definition from my parents. I learned it as I learned to speak and was socialized to the culture. My parents never gave me a dictionary definition. I learned it through a diffused, nonverbal, and informal process. My parents showed me many examples; I observed and listened to others use the word; I used the word incorrectly and was corrected; and I used it correctly and was understood. Eventually I mastered the concept- this is how people learn concepts in everyday language and how they share concepts. Suppose my parents had isolated me from T.V. and other people, then taught me that word for the idea height was *zdged*. I would have had difficulty communicating with others. People must share the terms for concepts and their definitions if they are to be of value.

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Cont'd... (Neuman, 1994)



Everyday culture is filled with concepts, but many of them have vague and unclear definitions. Everyday concepts are often rooted in misconceptions or myths. Social scientists borrow some concepts from everyday culture, but they refine these concepts and add new ones. Many concepts social scientists first developed have diffused into the larger culture and become less précised. Concepts such as sexism, life-style, peer group, urban sprawl, and social class began as précised, technical concepts in social theory.

We create concepts from personal experience, creative thought, or observation. Social science concepts form a specialized language, or *Jargon*. Specialists use jargon as a shorthand way to communicate with one another. Most fields have their own jargon. They use their jargon to refer to the ideas and objects with which they worked. I read a book with the terms used by publishers and printers in order to understand their jargon – terms such as idiot, tape, fonts, cropping, kiss, impression. For people on the inside, jargon is a speedy, effective, and efficient way to communicate. Using jargon among non-specialists fails to communicate; it is like speaking English to people who know only Korean.

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Cont'd... (Neuman, 1994)



Most social science concepts are more complex and abstract. They are defined by formal, dictionary-type definitions that build on other concepts.. it may seem odd to use concepts to defined other concepts, but we do this all the time. For example, I defined height as a *distance between top and bottom*. Top, bottom, and distance are all concepts. We often combine simple, concrete concepts from ordinary experience to create more abstract concepts. Height is more abstract than *top or bottom*. The more abstract concepts refer to aspects of the world we do not directly experience. They organized our thinking and extend our understanding o reality.

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Cont'd... (Walliman, 2001, P. 71)



It is through the use of concepts that we are able to impose some sort of coherent meaning on the world: it is through them that we make sense of reality, and perceive order and coherence. We use concepts to communicate our experience of the environment around us. Our perception of our surroundings is therefore highly dependent on the scale of our knowledge and our familiarity with a wide range of concepts. The more we know and use, the more sense we can make of the data we pick up and the more certain we will be of our perception (and cognitive) grasp of whatever is 'out there'. If it is the case that we see and understand the world only through the concepts which are available to us, then it follows that people who have a different repertoire of concepts will be inclined to perceive the 'same' objective reality differently: a lawyer examining a case will utilize a very different range of concepts from, say, the simple and common knowledge notions of the lay person in that context; and a visitor to the modern urban context from a primitive rural culture would be as confused by the hustle and bustle of the modern city as would be the mythical man in the moon (or Indiana Jones for that matter).

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STATEMENTS



- Concepts are used in **Statements** (Sentences with intended meaning/argument/analysis).
- The meaning and value of concepts cannot be assessed apart from their use in statements.
- 'the scientific value of concepts can only be judged in terms of the scientific utility of the statement containing them' (Reynolds, 1971, p. 45 quoted in Walliman, 2001, p. 71).

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Symbols and Terms (Walliman, 2001, p. 72)



- “Concepts, which can perhaps be defined as a unit of understanding, are expressed and communicated through **symbols** in the form of language, spoken or written, natural or artificial (such as mathematics).
- To convey meanings accurately, it is obviously essential that the sender and receiver of the symbols should agree on their meaning.

DIFFERENCE B/W SYMBOL & TERM: “Symbols, in the form of words in spoken or written language, are normally referred to as terms, while the word ‘symbol’ is generally reserved for a mathematical sign, e.g. £, +, %.”

TWO TYPES OF TERMS

- 1) in any language, natural or artificial. Firstly, there are primitive terms. These cannot be described by using other terms, but rely on a shared agreement as to their meaning. Examples of these are: individual, interact, stone, hope. Secondly, there are derived terms. These can be described by the use of primitive terms, for example: group, business organization, curtain wall. Obviously, the meaning of primitive terms is more difficult to convey than that of derived terms, as one can explain them only by indicating examples and non-examples of the term.

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TURNING A CONSTRUCT INTO PRECISE CONCEPTUAL DEFINITION?



There is no **FORMULA** for this; a researcher has to keep certain tips in mind:

- Think Carefully!
- Observe Directly!
- Consult Others!
- Read what others have said (about the construct/variables you are trying to measure)
- Try possible definitions.

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- A good definition of a construct should have clear, explicit and specific meaning.
- Conceptual definitions are linked to ***theoretical frameworks (Positivism/structural functionalism, Critical Social Science, Interpretive Social Science, Feminism) & value position.***

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HOW?...



For example **social class** Defined from:

- **Critical social science (CSS) point of view: *the power and property a group of people in a society has or lacks.***
- **Structural Functionalism (positivist) point of view: *individuals who share a social status, life-style, or subjective identification.***

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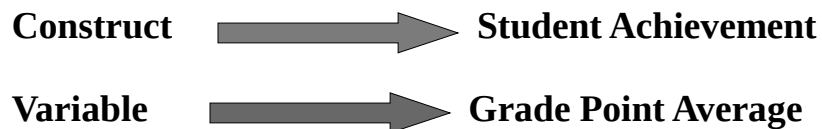
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Variables and Constructs



- A Variable is an attribute or characteristic stated in a specific or applied way
- A Construct is an attribute or characteristic expressed in an abstract, general way.



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Cont'd... (Neuman, 1996: 134)



- A researcher must know the level of complexity of a construct/concept that is being researched, because:
- Constructs/concepts vary in degree in abstractness:
e.g. Powerlessness, alienation, etc. are more abstract concepts that contain other concepts in them; Age, Religion, Ethnicity, income are more concrete in contrast.

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Cont'd... (Neuman, 1996: 134)



- E.g. Teacher's **Morale** (a concept/construct). Its conceptual definition can be developed:
- Thinking by oneself: *how people feel about things!*,
- Asking friends/colleagues
- Consulting a dictionary
- Searching academic literature in the library (& should cite the source if I borrow it from another author/researcher).

Advantage of borrowing & accumulating a number of definitions:

It gives a researcher clarity about the **conceptual boundaries** (i.e. What to consider/not-consider in a definition of **Teachers' Morale**)

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Cont'd... (Neuman, 1994: 134)



- Since morale can be low or high (as one learns from different researchers), the variation (i.e. **Low Morale VS high Morale**) turns a concept into a **variable**!

Morale, alienation, religiosity etc. are associated with *other things/people*:

- ☐ I may be more/less alienated from: friends & family, co-workers, neighbours, social activities.
- ☐ I may have high/low morale (as a teacher) with respect to: students, colleagues, school/college/university environment, pay/salary, my profession of teaching etc.

ARE THESE ASPECTS OF ALIENATION/MORALE OR ARE THESE TYPES OF ALIENATION/MORALE?

It depends on a researcher's idea (that is why **YOU** 😊 are a **RESEARCHER**!

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Cont'd... (Neuman, 1994: 135)



Additionally, a researcher is also required to decide as to which level the concept applies!

Morale or alienation can be studied at individual level, group-level, institutional level, neighbourhood level. . .

You must know the unit to which the concept applies: i.e. There must be correspondence between the construct and the unit of analysis.

Lastly, you must know the distinguishing points between the construct/concept of your interest and related/synonymous concepts:

e.g. Alienation VS estrangement, isolation etc.

Morale VS mood, optimism, pessimism etc. (*stating your own reasons for considering your construct as distinctively different*)

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IN NUTSHELL!!!



- Conceptual definition (Process of conceptualisation) should say ***what you mean to say.***

&

To do this

1. Consult a Number of Definition to clarify your ideas
2. Distinguish it from related concepts
3. Define it in relation to your Unit of analysis

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OPERATIONALISATION



- **Operationalisation** (also called *indicator* or *measure of a construct*) is:
 1. Operational definition is “a definition in terms of specific operations, measurement instruments, or procedures” (Neumann, 1996: 136)
 2. “the process of developing operational definition for the construct” (neuman, 1996: 136)
 3. “A set of procedures that describes the activities an observer should perform in order to receive sensory impressions (sounds, visual or tactile impressions etc.) that indicate the existence or degree of existence of a theoretical concept (Reynolds, 1971, p. 52 quoted in Walliman, 2001).
 4. “The process of devising ways of measuring theoretical concepts” (Jupp, 2006, p.205)

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A MEDICAL DOCTOR NEVER SEES/OBSERVES “BLOOD PRESSURE”



- He/She uses *instrument* (Blood pressure apparatus) to *indirectly* measure blood pressure.
- i.e. He/She infers [in Urdu Language = **Makhooz**] the existence of High/low Blood pressure with the *help of a measure* (tool in his/her case)

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- As tools **Theoretical concepts** organize our knowledge; We cannot directly observe and measure them.
- What researchers do is devise rules for recognizing instances or indicators of such concepts.
- For example, the theoretical concept 'social class' is typically operationalized and measured by asking subjects questions about their occupation. There are established rules for assigning occupations to social class categories. Such rules are sometimes referred to as correspondence rules because they link theoretical concepts to observable instances which correspond to them. Where a number of measures or indicators are combined in the operationalization of a concept it is common to refer to composite measurement or multiple indicators.

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- Depending on your inspiration for Questionnaire, Direct/Participant/non-participant Observation, Indirect Observation (Unobtrusive measure), Interview, in-depth interview etc. etc. measures could vary for the same type of construct.
- However, the type of construct and the way it is defined, determine or at least shape our choice of operational measure.
- **Remember!** Your measure and conceptual definitions must match

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- Social issues (masculinity, femininity, aggression, depression, sociability etc) by their nature, cannot be directly accessed in research. They can only be researched by means of first establishing some way of representing them in a measurable form. General and often abstract 'concepts' have to be converted into separate, clearly specified components that can be studied empirically.

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For instance



'refugee'; 'forced migration'; 'community'; 'social integration'; 'gypsy'; 'inner city schooling' and 'governance' are all social phenomena requiring operationalisation.

We cannot tell whether the 'thing' is present or absent, how often it occurs, in what circumstances and what importance it has, without intermediate constructions.

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For instance



- We cannot measure 'community' (the acid test is to ask 'where would you go to buy half a pound of it?', i.e. how would you know what to look for?). We could however decide that one essential feature was 'a sense of shared identity' (Community Studies), and then devise questions to discover with whom and in what ways people identified.

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- ***Shared identity*** is not in itself a full characterisation of community. It is an indicator of one part of the total concept, to be combined with other indicators such as sense of locality, or density of social networks, etc. to provide a full picture. The original idea, community, has to be operationally defined into these indicators which enable us to study it.
- Thus 'indicators' and 'operational definitions' are very similar and often interchangeable terms.

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Indicators should therefore achieve four goals (Payne & Payne, 2004, p. 116-120)



- 1) They must properly reflect the essential nature of the core concept.
- 2) They must cover the whole of the concept (it is usual to have more than one indicator for each concept).
- 3) They must not pick up some other concept.
- 4) They must produce evidence in a form appropriate to the level of study, either as a quantified form of measurement (Levels of Measurement) or contributing to a plausible narrative of meanings and interpretations (see below and Qualitative Methods).

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5 suggestions for developing a measure (Neuman, 1996, 136).



1. Remember your conceptual definition
2. Keep an open mind.
3. Borrow from others.
4. Anticipate difficulties.
5. Do not forget your units of analysis.

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AGAIN!!!



- Conceptual definition is abstract and through operationalisation, the measure developed help people concretely measure specific variables.
- To develop a measure, we use ***rules of correspondence, “logical statements of how an indicator corresponds to an abstract construct”***.

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CONT'D...



- If I want to measure (the variable of) ***alienation***, and after (conceptually) defining it, I state that “an individual’s agreement with TEN/TWENTY/THIRTY/FOURTY etc. SPECIFIC STATEMENTS would be presence of ***alienation***”. This is rule of correspondence.

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- The measurement process links the three levels: Starting from abstract world of ideas, first the conceptualisation (of a variable); 2ndly, after developing a clear conceptual definition, we **operationalise** the concept, by developing indicators for it; Lastly, we **use indicators**, by applying them in the empirical world (Neuman, 1996: 137).

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Example (Neuman, 1996, p. 138)



“Seeman and Anderson (1983) tested hypothesis that alienated people drink more alcohol. They measured alcohol drinking by a series of questions that tapped different aspects of the construct “drinking behaviour”. They defined construct as having three sub-dimensions: frequency of drinking, quantity consumed per drinking occasion, and behavioural impairment due to drinking. They operationalised each dimension as several survey questions to form an overall drinking measure. For example, the researchers measured the behavioural impairment sub-dimension by asking six questions about how often the respondent missed work because of drinking, was worried about drinking, drank on the job, drank before noon, drank alone, or had family quarrels as a result of drinking. In this way, the authors created a concrete quantitative indicator of drinking behaviour”.

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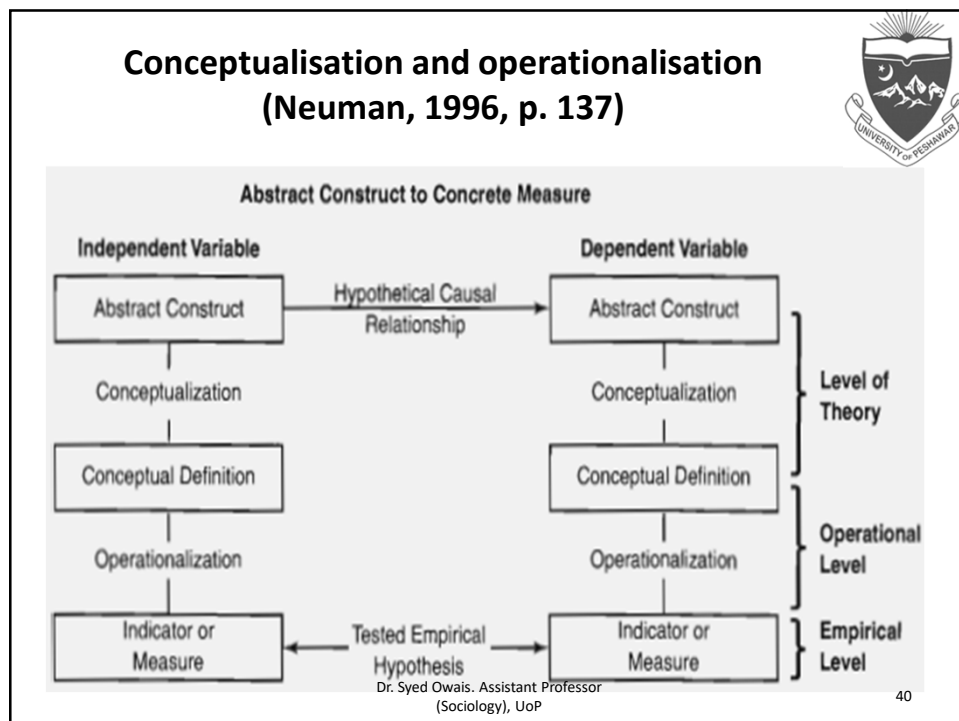
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Seeman and Anderson (1983 in Neuman, 1996, p. 138)	
hypotheses	Alienated people drink more alcohol (i.e. Drinking behaviour)
Construct	They measured alcohol drinking by a series of questions that tapped different aspects of the construct " drinking behaviour ".
Conceptualisation	three sub-dimensions: frequency of drinking, quantity consumed per drinking occasion, and behavioural impairment due to drinking.
Operationalisation	each dimension as several survey questions to form an overall drinking measure.
Example	For example, the researchers measured the behavioural impairment sub-dimension by asking six questions about how often the respondent missed work because of drinking, was worried about drinking, drank on the job, drank before noon, drank alone, or had family quarrels as a result of drinking. In this way, the authors created a concrete quantitative indicator of drinking behaviour.

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