Operationalization of Social Science Concepts by Intuition

WILLEM E. SARIS and IRMTRAUD GALLHOFER

Statistics and Methodology Department, Political, Social Cultural Science Faculty, University of Amsterdam, O.Z. Achterburgwal 237, 1012 DL Amsterdam, The Netherlands

Abstract. Much has been written about the effects of the wording of survey questions on responses, whereas, relatively little attention has been given to the content of the questions or the translation of theoretical concepts into related questions in survey research.

In this paper we concentrate on the link between a set of basic concepts for social science research and questions that can be formulated to measure these concepts. These basic concepts are: evaluations, cognitive judgments, relations, evaluative beliefs, feelings, preferences, rights, norms , policies, action tendencies, expectations, behavior, events, knowledge, demographic characteristics and information about place, time and procedures.

In order to clarify the link between the concepts and their verbal expressions (assertions) we analyze structures of sentences presenting the different concepts. Eight principally different assertion structures have been found which describe most of the survey concepts.

These findings can be used in two ways: one can use them to specify an assertion for a certain type of concept or alternatively one can also use the system to classify existing questions.

1. Introduction

Much has been written about the effects of the wording of survey questions on the responses (Sudman et al., 1982; Schuman and Presser, 1981; Andrews, 1984; Alwin and Krosnick, 1991; Molenaar, 1986; Költringer, 1993; Scherpenzeel and Saris, 1997). In contrast, very little attention has been given to the problem of translating concepts into questions (De Groot and Medendorp, 1986; Hox, 1997). Blalock (1990), following Northrop (1947), distinguishes between concepts by intuition and concepts by postulation. He says the following about these concepts (1990: 34):

> Concepts by postulation receive their meaning from the deductive theory in which they are embedded. Ideally, such concepts would be taken either as primitive or undefined or as defined by postulation strictly in terms of other concepts that were already understood. Thus, having defined mass and distance, a physicist defines density as mass divided by volume (distance cube). The second kind of concept distinguished by Northrop are concepts by intuition, or concepts that are more or less immediately perceived by our sensory
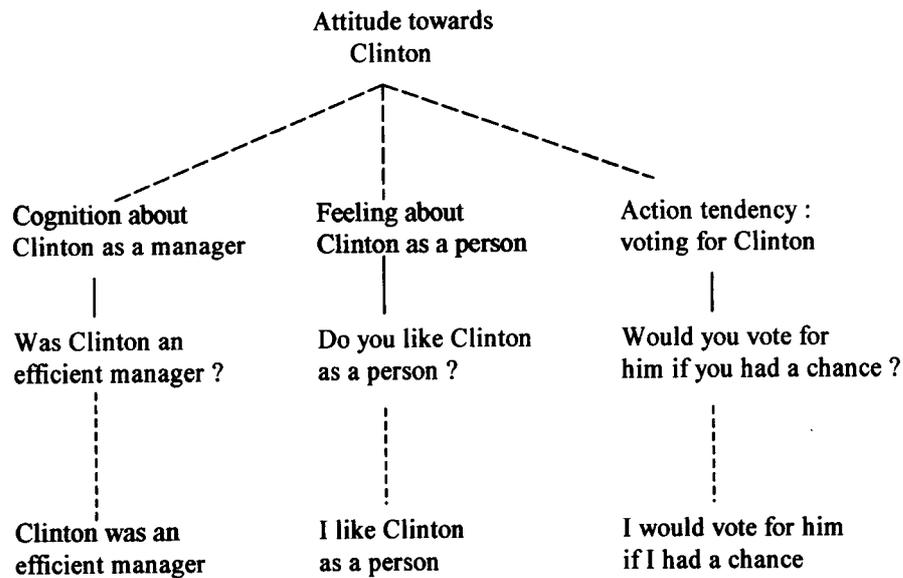
Figure 1. The operationalization of an attitude towards Clinton.

organs (or their extensions) without recourse to a deductively formulated theory. The color 'blue', as perceived by our eyes, would be an example of a concept by intuition, whereas 'blue' as a wavelength of light would be the corresponding concept by postulation.

The distinction he makes between the two is that concepts by intuition are simple concepts whose meaning is immediately obvious while concepts by postulation are less obvious concepts which require explicit definitions, for example, on the basis of a combination of more than one concept by intuition. Concepts by postulation are also called constructs. Examples of concepts by intuition include judgments, feelings, evaluations, norms and behavior. Most of the time it is very obvious that a text presents a feeling (x likes y) or a norm (people should behave in a certain way) or behavior (x does y) etc. We will return to this issue later. Examples of concepts by postulation might include "ethnocentrism", different forms of "racism" and "attitudes toward different objects". One item in a survey can not present an attitude or racism. For such concepts more items are necessary and, therefore, these concepts need to be defined. This is usually done using a set of items that represent concepts by intuition. For example attitudes were originally defined (Krech et al., 1962) by a combination of a cognitive, affective and action tendency component. In Figure 1 an operationalization of the concept by postulation "an attitude towards Clinton" is presented in terms of concepts by intuition, questions and assertions representing the possible responses.

At the bottom of Figure 1 three assertions are mentioned. There is no doubt that the assertion "Clinton was an efficient manager" represents a cognitive judgment,

that the assertion "I like Clinton as a person?" represents a feeling and that the assertion "I would vote for him if I had a chance" represents an action tendency. From this it follows that the questions asking for such assertions represent measurement instruments for cognitions, feelings and action tendencies respectively. Given that there is hardly any doubt about the link between these assertions, questions and the mentioned concepts, these concepts are called concepts by intuition. This does not mean that the reverse relationship is also obvious. That is not at all the case. There are many different cognitive judgments one could formulate about Clinton, for example, as leader of his party or as world leader etc. This means that there are many different cognitions, feelings and action tendencies one could formulate with respect to Clinton. But normally, if a specific aspect of the object is chosen, a question can be formulated which is very closely linked to that concept. That is what is meant by "concept by intuition".

In contrast to concepts by intuition, concepts by postulation are less obvious. In our example in Figure 1 the concept by postulation "attitude towards Clinton" has been defined according to the attitude concept with the three components mentioned above, but as we have indicated the choice made for the specific concepts is rather arbitrary. Therefore the definition of the attitude it self is also rather arbitrary. In fact, it is even more uncertain because, nowadays, attitudes are more commonly defined on the basis of several evaluations (Fishbein and Ajzen, 1980) and not on the above-mentioned concepts. Although these two operationalizations of attitudes differ, both define attitudes on the basis of concepts by intuition.

Blalock as early as in 1968 complained about the gap between the language of theory and research. More than two decades later, when he raised the same issues again, the gap had not been reduced (Blalock, 1990). Although he argues that there is always a gap between theory and observations, he also argued that not enough attention was given to the proper development of the concepts by postulation.

One of the major problems in operationalization is that the researchers do not, as Blalock suggested, think in terms of concepts by intuition but only in terms of questions. They form new constructs without a clear awareness of the basic concepts by intuition presented by the questions. This observation suggests that it would be useful to study the link between a set of the concepts by intuition and questions for questionnaires. If such a link could be established these basic concepts could then be used in a more systematic way to formulate higher order concepts by postulation, e.g., attitudes and other concepts, such as ethnocentrism, political interest, political efficacy, etc.

It would also be worthwhile to study the link between these higher order concepts by postulation and concepts by intuition. In this paper we have a more modest goal. For the link between concepts by intuition and concepts by postulation we refer to Blalock (1968, 1990), Guttman (1981), Hox (1997), Sartori (1984). We wish to concentrate on the link between a set of basic concepts by intuition used in social science research and questions that can be formulated in order to measure these basic concepts by intuition. The basic concepts will be presented in two

groups: subjective variables and objective variables. Under 'subjective variables' we bring together responses to questions bearing on opinions, beliefs and attitudes which cannot be verified because they are only present to the mind of the respondents. By 'objective variables' we understand responses to factual questions that refer to a physical or social reality and which could theoretically be verified by the researcher, see also Converse and Presser (1986) and Fowler Jr. (1990). Although the boundaries between objective and subjective variables are sometimes blurred we distinguish between them as follows. Subjective variables include cognitions, evaluations, evaluative beliefs, feelings, preferences, values, rights, norms and policies, action tendencies, expectations. Objective variables include behavior, past events, demographic characteristics, knowledge, information about time, place, procedures and frequency.

In order to clarify the link between basic concepts by intuition and verbal expressions in items, we shall analyze the structures of the sentences or clauses that represent the different concepts.

Often declarative statements, assertions representing specific concepts by intuition are used. The respondents are asked whether they agreed or disagreed with assertions. It is not necessary to use such statements. One could also use normal questions. This can be illustrated by an example. The assertion is:

Immigrants living here should not push themselves where they are not wanted

To transform this assertion into a question we only have to add 'Do you think that' then we get:

Do you think that immigrants living here should not push themselves where they are not wanted?

In this or similar ways, any statement can be transformed into a question.

It is also possible to transform any question into an assertion (Harris, 1978; Givon, 1990). The assertion corresponding to the above mentioned question has already been given. Another example is:

Has there been much real change in the position of black people in the past few years?

An inversion of the term "there" and the auxiliary verb "has" must be performed to obtain from this question the following assertion:

There has been much real change in the position of black people in the past few years.

Similar changes can be performed on any question in order to get an assertion.

Instead of questions or assertions, surveys sometimes use instructions or directives which are formulated grammatically as imperatives. These imperatives can also be transformed into assertions. The following example illustrates this:

Tell me if you are in favor of the right on abortion

This imperative then could be transformed into an assertion as follows:

I am in favor of the right on abortion

We have shown above that the three basic forms of survey items used to elicit answers from the respondents can be linguistically transformed into assertions or

statements. Although this is true, it should be clear that there are fundamental differences between "requests requiring an answer" and the related assertions. In fact a request for an answer, what ever the form of the request, presents the respondent with a set of possible answers, called the uncertainty space by Groenendijk and Stokhof (1997) while an assertion is a specific choice from this set. Take the last example we have given. The request was:

Tell me if you are in favor of the right on abortion

This request for an answer not only allows for the assertion:

I am in favor of the right on abortion

But equally for the assertion

I am not in favor of right on abortion

Although this inequality exists between the requests for an answer and the assertions, we prefer to discuss the link between concepts and requests for an answer on the basis of the related assertions because there is an almost unlimited number of forms for the requests of an answer.[1] The use of assertions therefore simplifies the discussion.

In order to discuss the link between the basic concepts and their related assertions the next section therefore introduces the structure of assertions.

2. The Basic Elements of Assertions

According to Hurford and Heasley (1994), an "assertion" is a declarative statement that connects objects with predicates. In our applications, assertions are also used to connect objects with objects. Assertions thus can contain three parts: objects, connectors and predicates. There are several forms of assertions, i.e., different combinations of objects, connectors and predicates. We discuss here three different forms.

The first form of an assertion is as follows. Object (x) is a grammatical subject and is linked by a connector (C) which is a verb in the sense of "be" or "have" with predicates (p) that can be nouns, (qualitative) adjectives, or various verbal forms. The form of this assertion is (xCp). Some examples might illustrate it:

"This student (x) is (C) excellent (p)".

"I(x) have (C) a sister (p)".

"Chomsky (x) is (C) recognized as a linguist". (p)

In these examples different persons (this student, I and Chomsky are the objects while the connector is in each case a form of the verb 'to be' or 'to have'.

In the first example the predicate "p" consists of a qualitative adjective "excellent", in the second "p" is a nominal object "a sister" and in the third it is a past participle plus a nominal object "recognized as a linguist".[2]

If "be" and "have" do not function as connectors, grammatical subjects (x) are connected with objects (y).

The second form of an assertion is then (xCy) where the connectors C are all kinds of verbs and the objects (y) can be nominal objects or infinitival constructions. Some examples might illustrate this second type of assertion:

"The skinheads (x) murdered (C) colored foreigners (y)".

"My parents (x) moved (C) to the countryside (y)".

"I(x) am going (C) to vote (y)".

In the first two examples the objects "y" are nouns and the connectors "C" are inflected verbs. In the third example the connector C is also an inflected verb but the object y is an infinitival construction, "to vote".

There is also a third form of assertions where the object "y" is absent (xC).

Grammatically that are declarative sentences where the verb does not take an object (Givon, 1984: 93). Frequently these verbs express a process and they are sometimes modified by an adverb. The following examples might illustrate this:

"He (x) worked (C)".

"President Kennedy (x) died unexpectedly (C)".

The examples showed that ***Objects of assertions*** can be any entity of interest such as inanimate objects (things, concepts, social policies) and animate objects (individuals, social groups, institutions). As symbols for objects we use "x, y, z . . ." indicating any unit of interest. Some frequently used objects (x) are specified explicitly as follows:

  s denotes the respondent himself
  o denotes anyone or everybody
  g stands for government or politicians
  v means value

From the above it is obvious that ***Connectors*** are always necessary in assertions. As a general symbol for a connector we use the capital C. Several specific connectors are used which frequently occur:

  I specifies that objects and predicates are connected by "is" or "has".
  F specifies feelings as links such as "like/dislike", "worry about", etc.
  J specifies a judgement connector such as "consider", "believe", "think", etc.
  R indicates relationships that function as links such as "cause/effect", "goal/mean", "influence on something", "similarity/dissimilarity", "distance/closeness", "membership of an object", "connectedness between objects".
  H specifies connectors such as "has to" or "should", "is necessary", etc.
  K indicates knowledge such as "know", "remember", "be aware about", "see", etc.
 IR specifies "has the right to" or "is allowed to", etc.
  D indicates deeds such as 'does", "is doing", "did" or "has done".
 FD indicates future deeds such as "will do", "intends", "wishes" or "wants".
  E specifies expectations such as "expects" or "anticipates" an event.
  O indicates events such as "occur", "happens", "finished", "continued".
  P indicates preferences such as "preferred to".

Predicates thus can be any characteristic which is linked to an object by a connector in the sense of "be" and "have".

We use "p" to denote these characteristics which could be, for instance, adjectives such as "large", "interesting", "sweet", "expensive" or nouns ("interest") or nominalizations of verbs like "singing" etc. or verbal participles like "expected". In principle we could denote all predicates of assertions by 'p', but it would seem appropriate to define some specific predicates that occur frequently. They are as follows:

e denotes an evaluation like "good/bad", "valuable", "advantageous/disadvantageous", etc.

f denotes a feeling or affective evaluation such as "nice/awful", "pleasant/unpleasant", "happy/unhappy", etc.

i denotes "important", "interesting"

n denotes a "number" such as "once" or a "frequency" such as "often" and so on.

The next section defines several social science concepts in the form of different assertions using these basic elements.

3. Concepts by Intuition of Survey Research

In this section we will describe the structure(s) of assertions characteristic of the concepts by intuition employed in survey research. Most researchers dealing with survey research (Oppenheim, 1966; Sudman et al., 1982, Bradburn and Sudman, 1988; Smith, 1987) make a distinction between factual or demographic questions, questions of "opinion" or "attitudes" and where they arise, questions of knowledge and behavior. The terms opinion and attitude are often used in these studies for any type of subjective variables. "Attitude" is not discussed here because we consider attitudes as concepts by postulation. Since we want to make a distinction between different kinds of opinions, the term 'opinion' itself is also not used.

In the following, for different concepts, the structure of the connected assertions are introduced. We start with so-called subjective variables.

3.1. SUBJECTIVE VARIABLES

By subjective variables, as stated, we understand variables for which the information can only be obtained from a respondent because the information exists in his/her mind alone. The following concepts by intuition are discussed: evaluations, judgments, perceived relationships between objects, evaluative beliefs, feelings, preferences, importance of values and objects, norms, policies, rights, action tendencies and expectations of future events. We begin with evaluations.

Evaluations are seen by most researchers as basic concepts by intuition of attitudes (Fishbein and Ajzen, 1975; Bradburn and Sudman, 1988; Van der Pligt and de Vries, 1995; Tesser and Martin, 1996). The structure of an assertion (a_e) which

can be seen as an expression of the not directly observable concept 'evaluation' can be described as (xIe) which means (x is good or bad). Typical for such assertions is that the predicate is evaluative. An example of an evaluative assertion is the statement:

The presidency of Clinton was very good

In this assertion the structure is very clear: the x is 'the presidency of Clinton', the evaluative predicate is "very good" and the connector C is "was". This is not always so. For example the following assertion is less clear:

Clinton was an excellent president

In this case "Clinton" is the x, the connector C is "was" and the evaluative 'predicate' is part of another object y "an excellent president". It will be clear that the meaning is the same as in the previous assertion, but the structure is different.

Evaluative assertions are defined in this study as appraisals in terms of good/bad, profitable/unprofitable. Examples of these evaluative appraisals could be as follows: positive/negative, perfect/imperfect, excellent/poor, superior/inferior, favorable/unfavorable, satisfactory/unsatisfactory, sufficient/insufficient, advantageous/disadvantageous, useful/useless, profitable/unprofitable, lucrative/unlucrative, etc.

These predicates are in our opinion most typical of evaluative assertions. As we will see later, there are also appraisals in terms of feelings and cognitions. Sometimes the boundaries between them will be difficult to draw as they can shade conceptually into one another.

There are also other structures indicating evaluations, based on other types of assertions which have a positive or negative connotation. These are discussed in one of the following sections.

Cognitions have also been discussed in the psychological literature as one of the basic components of an attitude (Kretch and Crutchfield, 1948; Bradburn and Sudman, 1988; Ajzen, 1989; Eagly and Chaiken, 1993; Van der Pligt and de Vries, 1995). Two kinds of cognitive concepts have been mentioned in the literature. The first can be called a ***judgment***.

The structure of an assertion for the concept 'judgment' (a_j) can be represented as (xIc) which denotes (x has characteristic c). We use c instead of p in order to indicate that a specific type of predicate must be used.

Predicates of judgments pertain to neutral connotations such as: active/passive, questionable/unquestionable, limited/unlimited, aware/unaware, reasonable/unreasonable, usual/unusual, regular/irregular, ordinary/extraordinary, conservative/progressive, direct/indirect, big/small, slow/quick, left/right, planned/unplanned, practical/impractical, flexible/inflexible, heavy/light, predictable/unpredictable, and so on. It will be clear that the main requirement is that the predicates do not represent "evaluation", "feelings" and "importance". An example of a judgment is:

The position of black people is changed

The predicate is the neutral term 'changed', the object x is 'the position of black people' and 'is' is the connector.

Other examples are:

The change was large

My work is heavy

Typical for these assertions presenting judgments is that the predicates are neutral otherwise another concept (e.g., an evaluation) is connected with the assertion.

The second concept in the class of cognitions is **a relationship between objects**. The structure of an assertion of a relationship (a_r) can be represented by (xRy) which means (x has a relationship with y). Such an assertion indicates that somebody perceives, for example, x as the cause of y or thinks that x has an influence on y. Further examples could be: produce, bring about, provoke, create, replace, remove, alter, affect become, accomplish achieve, attain, be the outcome of or consequence of something, etc. Note that relations are expressed by verbs and not adjectives. Causal relationships are, for example, studied in attribution theory (Kelley and Michela, 1980).

Other types of relationships frequently studied in social science refer to the similarity/dissimilarity or distance/closeness between objects (Rabinowitz et al., 1991; Stokes, 1963) or the membership of an organization or connectedness between objects (Harary, 1971; Helmers et al., 1975; Knoke and Kuklinski, 1982).

Examples include: being a member of/part of, belonging to, being affiliated with, being related with, containing, including, excluding, resembling, being similar/identical/different, being like/unlike, being close/far/distant/remote, etc.

Assertions about relationships indicate the views that respondents hold about different objects. In this respect, relational assertions provide a different type of information from judgments, though both have been classified as cognitions.

An example of a relationship is:

New laws have changed the position of black people

This is an example of a causal relationship where the 'new laws' are the cause and 'the position of black people' is the consequence. The connector indicating the causal relationship is the verb form 'have changed'.

An example of the relationship in the sense of membership is:

The Netherlands is a member of the EU

In this statement the object x 'The Netherlands' is connected to the object y 'EU' by a verb phrase 'is a member'.

Examples which relate to similarity/dissimilarity and to distance/closeness are as follows:

The Republicans differ very much from the Democrats.

The difference between the "Republicans" (object x) and the "Democrats" (object y) is expressed by the connector C "differ" which is grammatically the inflected verb.

Similarity/dissimilarity can be specified as follows:

The European Liberals have a lot in common with the American Conservatives.

Here again the connection between the objects x and y is expressed by the connector C "have a lot in common" which is grammatically an inflected verb with an object, a so-called verb phrase.

Evaluative beliefs (a_{eb}) can be represented by many different types of assertions. Typical is that they must have an evaluative (positive or negative) connotation (Oskamp, 1991). Assertions presenting relationships are often used in this context. These assertions are indicated, f.i., by $a_{eb} = xR_e y$. An example could be:

The budget reform has led to prosperity in the US

The 'budget reform' is the x, 'prosperity in the US' is the y, and 'has led to' is the connector R. The term "prosperity" is clearly a word with a positive connotation and therefore one can say that this statement expresses also an evaluation next to the fact that it expresses a relationship. This is typical for evaluative beliefs. As we see, structures which do not contain explicit evaluative terms can nevertheless indicate evaluative beliefs. In such a case, the assertion has to contain words with an evaluative connotation such as: "to prosper, prosperity, succeed, success, flourish, fail, failure, miss, loss, destroy, spoil, kill, slay" etc.

Assertions indicating the concept 'evaluative belief' thus can have the structure of several, different assertions. What makes these assertions to indicate an evaluative belief is the evaluative connotation of some words. Without these evaluative connotation these assertions can not be seen as indicating 'evaluative beliefs'. Assertions, representing evaluative beliefs, have sometimes been used purposely by researchers to avoid social desirable answers.

Feelings or affective evaluations, have in the past been considered as belonging to evaluations (Bradburn and Sudman, 1988; Van de Pligt and de Vries, 1995). But, more recently a distinction has been made between cognitive evaluations and affective evaluations or feelings (Abelson et al., 1982; Zanna and Rempel, 1988; Bagozzi, 1989; Ajzen, 1991). Three basic assertions indicative for feelings are found in survey questions. First of all, a_f can be represented as (sFx). For example:

I like my work

where "I" is x, the verb "like" is the feeling connector F and the object y is "my work".

The second structure is (xIf). An example of this structure is:

My work is nice

Which reads as x is "my work", C is the connector "is" and f is the affective adjective "nice".

The third is (xRf). An example of this structure is:

My boss often makes me angry

This structure reads: x is "my boss", R stands for a relation "makes me" and y is the evaluative feeling adverb f "angry".

Thus "f" or "F" stands for feelings of fear, disgust, anger, sadness, contempt, shame, humility, hope, desire, happiness, surprise (Cornelius 1996) which could be grammatically either verbs, adjectives or nouns such as: "being afraid/distressed, frighten, fear, scare, terrify, disgust, offend, repulse, become/make angry, en-

rage, infuriate, despise, disdain, reject, rejection, to be ashamed, regret, disappoint, disappointment, humiliate, humiliation, dishonor, to long for, crave, to be happy/lucky, fortunate, to surprise, amaze astonish", etc.

In f the predicate form of the term is used and in F the verbal form. The use of an f or an F of course makes a difference to the structure of the assertion but not in the concept presented.

Preferences are frequently asked in consumer research, election studies and in studies of policies where items from the most preferred to the least preferred item are compared (Torgerson, 1958; Von Winterfeld and Edwards, 1986). The structure of a preference assertion (a_{pr}) is (xPyz . . .) which means (x is preferred above y, z . . .). For example:

> *I prefer the socialist party above the conservative and liberal parties*

Where "I" indicates x, "prefer" P, "the socialist party" refers to object y and "the conservative party" indicates another object z "and liberal party" again another object z'. In this case several objects are compared and one is considered the best. This could be represented by an assertion (x is the best) or (x is preferred) but we have chosen the above structure to make it clear that a choice among several objects has to be made, otherwise it could not be an assertion indicative for a preference.

Another frequently occurring type of assertion indicating a preference in survey research is (sPy). An example might be as follows:

> *I am for abortion*
>
> *I favor a direct election of the president*

Here "I" indicates te x, "am for" respectively "favor" is the P and "abortion", respectively the "direct election of the president" are the y's. The dichotomous choice is indicated by the verb phrase and there is only one object y mentioned since the other object is assumed known to the addressee, being the opposite.

Importance is the next concept to discuss. The structure of an "importance" assertion (a_i) is (xIi) which means (x is important). This assertion has again the same form as the assertions indicating (cognitive) judgments and evaluations. The only difference is that the predicate is in this case 'importance'. The "x" is frequently a value (v) i.e., a basic goal or state for which individuals strive such as "honesty", "security", "justice", "happiness", etc. (Rokeach, 1973). A few examples might illustrate this:

> *Honesty is very important to me*
>
> *I am interested in politics*

The first example indicates x as the value "honesty", the connector I is "is" and "very important to me" is the predicate i. The second example is a typical importance assertion without a value, x is "I" and the connector I is "am" and the predicate i is "interested in politics".

Norms are also central to social research (Sorokin, 1928; Parsons, 1951; Homans, 1965). Coleman (1990: 242) defines them as specifications of "what actions are regarded by a set of persons as proper or correct". The structure of an assertion

representing a norm (a_n) is (oHb) which means that someone should do action b. An example of this assertion is as follows:

Immigrants should adjust to the culture in their new country

where the "immigrants" are x, "should" stands for the connector H an b is "adjust to the culture in their new country". A similar structure can be found for policies.

Policies are an important topic in political science research. They are used to determine what the public thinks about different measures of government (Sniderman et al., 1991; Holsti, 1996). A policy assertion (a_p) has the structure (gHb) which means (the government should do b). For example:

The government should not allow more immigrants.

Where "the government" is g the connector H is "should" and b is "not allow more immigrants". The only difference with the previous type of assertion is that there is another actor.

Rights, specifically civil right issues, are often asked in political science research (Sniderman et al., 1991). Assertions indicative for rights express an authorization others should have for some activities. The structure of an assertion representing a right of a person (a_{ir}) is (oIRb) which means (someone has the right or is allowed to do b). For example:

Immigrants also have the right to obtain social security

where "immigrants" stands for o, "have the right" symbolizes the connector IR and "to obtain social security" is b. Other terms indicative of rights are: just, justified, acceptable, permissible etc.

Action tendencies are often considered as the third component of an attitude (Ajzen and Fishbein, 1980; Bradburn and Sudman, 1988; Sudman et al., 1982; Eagly and Chaiken, 1993). An action tendency is what one intends to do in the future. The assertion representing an action tendency (a_t) has the structure (xFDy) which means (x will do y). For example:

I want to go to the doctor

where "I" is x, "want to go" is the connector FD and "to the doctor" is y.

Expectations of future events (Graesser et al., 1996) are anticipations of events in which oneself is not involved. The assertion for an expectation is (a_{ex}). Expectations have the structure (xEy) which means (x expects y). For example:

I expect better weather in the near future

where "I" is x, E is "expect" and y is "better weather in the near future".

The difference with the previous type of assertion is that an expectation does not relate to the respondent's own action but it refers to some kind of event which is not connected with one's own behavior.

Here ends our overview of concepts by intuition that fall under the heading of subjective variables. They are all characterized by assertions based on information that can only be obtained from respondents because they represent subjective variables and these views can not be checked in any way because they are personal views.

3.2. OBJECTIVE VARIABLES

By objective variables we mean variables for which in principle information can also be obtained from other sources than the respondent. One could think of administrations of towns, hospitals, schools etc. Normally the variables concern factual information such as behavior, events, time, place, quantities, procedures, demographic variables and knowledge.

Behavior concerns present and past actions or activities of the respondent himself (Sudman et al., 1982; Smith, 1987). The structure of a behavioral assertion (a_b) is (sDy) which means that the subject or respondent does or did y. It will be clear that the structure of this assertion is the same as the structure for an action tendency. However, its content differs fundamentally from the latter. Action tendencies deal with subjective matters (likely future behavior) while behavior is factual and in principle controllable.

Examples could be:

I am studying English

I was cleaning the house

In the first example "I" stands for s, "am studying" is the connector D and "English" is the object y. In the second example the object s is again the respondent "I", "was cleaning" is the connector D and the object y is "the house".

The facts mentioned in these assertions can in principle be checked which is not the case with the statement that a person is 'planning to go to the hospital'. This is a behavioral intention and therefore a subjective variable.

Events represent another example of an objective variable. They pertain to other people's actions that are presently ongoing or had occurred in the past. The structure of this assertion (a_{ev}) is (xDy). Examples of assertions characteristic for this concept are:

My brother is studying French

My mother had washed the clothes

The shopping center has been burgled twice

In the first example the object x is "my brother", "is studying" stands for the event connector D and "French" relates to object y. The second example has "my mother" as object x, the connector D is formulated in the past tense "had washed" and the object y are "the clothes". The third example has as object x "the shopping center" and "has been burgled twice" represents the connector D. The object y is absent.

Often information is asked in surveys about **time and place** of behavior or events. In assertions this can be presented by time and place specific elements. Examples could be:

I stayed in the hospital last month

I stayed in a hospital in Chicago

In such assertions where two or more relevant grammatical objects are present one of the optional components attracts the focus or emphasis of the message

(Givon, 1990: 712). Thus, the focus shifts in these two examples from the act to the specification of the time respectively the place.

Therefore the first assertion is a time assertion a_{ti} = (sDy, ti). It reads as follows: "I" is s, "stayed" is the behavioral connector D, "in the hospital" is y and "last month" is the time component which is indicated in the structure of the assertion by ti.

The second example is a place assertion a_{pl} = (sDy, pl) where "I" is s, D is "stayed", in a "hospital" is y and the place is "in Chicago", indicated in the structure of the assertion by pl.

The combination of the two would be:

Last month I stayed in a hospital in Chicago

This last assertion specifies time and place.

What is measured using such assertions depends on the way the question is formulated. If one asks:

Have you stayed in the hospital last month?

the emphasis is on the behavior although the time period is also relevant. However if one asks:

When have you been in the hospital?

the focus is clearly on the ***time***. The same can be done with the measurement of the ***place***.

Quantities can be specified in a similar way, The assertion that can be formulated for *quantities has the form* ($a_{qu} = s\ D\ y,\ qu$). For example:

I bought 2 packs of coffee

where "I" stands for s, "bought" is D and "2 packs of coffee" is y. The extra information "2 packs" specifies the quantitative information.

Assertions concerning ***procedures*** can also be formulated similarly (**a_{pro} =** (sDy, pro). An example:

I go to my work by public transport

where "I" is s, "go to my work" is D and "by public transport" is y, indicating the procedure.

It is important to realize that time and place and other specifications can also be added to assertions representing subjective variables which then partially acquire an objective or at least factual component. Some examples are:

The position of the black people has been changed over the last 30 years

where "the position of the black people" is x, "has been changed" is R and "over the last 30 years" is ti, indicating a time aspect.

or

The position of black people has been changed in the American South

where the time is substituted by the place "in the American South".

or

> *The position of black people has been changed in the American South over the last 30 years*

where both time and place modify the assertion from a subjective variable into a factual one.

Demographic variables are used in nearly all surveys and they are mentioned in all attempted classification (Oppenheim, 1966; Sudman et al., 1982; Converse and Schuman, 1984; Smith, 1987; Bradburn and Sudman, 1988). We represent demographic variables by the assertion (a_d). Its structure is of the same kind as the structure of judgments (xIc).The object x is frequently the respondent or another person in his/her environment but the difference from judgments lies in the fact that the predicate c is limited to certain factual topics such as the respondent's gender, age, occupation. Examples of assertions are;

> *I am 27 years old*
> *I am married*

It will be clear that the structure of these assertions is the same as the one of an evaluative assertion. The only difference is the type of predicate specified.

There are also assertions which relate to **knowledge** a_k. They require the knowledge of the respondent without asking explicitly about his/her awareness. The following examples illustrate this concept:

> *Kennedy was the thirty-fifth president of the United States*
> *The Russian leader Khrushev had sent nuclear missiles to Cuba*

The structure of these assertions requires historical or political knowledge of the respondent. These knowledge assertions can have any structure of objective variables. Our first example reads as follows: "Kennedy" is x, "was" stands for the connector I and "the thirty-fifth president of the United States" is the predicate p. This structure can be represented as $a_k = (xIp)$. The second example has the structure of an event : the object x is "the Russian leader Khrushev", the connector D is "had sent" and object y is "nuclear missiles to Cuba". The form of this example is $a_k = (xDy)$.

In this review most concepts by intuition used in the survey literature have been described. In these sections we have tried to make the structure of these assertions explicit. Table I summarizes them.

This table shows that some concepts can be presented in assertions with different structures. It would require further research to determine whether it makes a difference in the responses if the one or the other is used.

4. Complex Assertions

So far we have specified only simple assertions. The reality of survey research is far more complex. Some complications will be discussed in this and the following section. We begin with the discussion of complex assertions. A complex statement arises if an object of an assertion is substituted by an assertion itself.

An earlier mentioned example of a simple assertion was:

Table I. The basic structural differences between the different simple* assertions

Structures		Conditions	Basic concepts
Descriptions			
(xIp)			
		if p is e	evaluation (a_e)
		if p is f	feeling (a_f)
		if p is i	importance (a_i)
		if p is d	demographic variable (a_d)
		if x is v	
	and	if p is i	importance (a_i)
		if x is not v	
	and	if p is not e, i, f or d	cognitive judgment
Relations			
(xRy)		normally	cognition i.e relation (a_r)
		if R has a evaluative connotation	evaluative belief (a_{eb})
		if y is f	feeling (a_f)
Preferences			
(sPy, z.)		normally	preference (a_{pr})
(sPy)		if p is for or against	preference (a_{pr})
Duties			
(xHy)		normally	norm (a_n)
		if x is g	policy (a_p)
Rights			
(xIRy)		normally	right (a_{ri})
Action			
(xDy)		normally	behavior (a_b)
		if D is F	feeling (a_f)
		if D is FD	action tendency (a_t)
		if D has an evaluative connotation	evaluative belief (a_{eb})
		x or y indicates	
		a definite point in time	time (a_{ti})
		a place	place (a_{pl})
		a quantity	quantity (a_{qu})
		an instrument or mean	procedure (a_{pro})
Expectations			
(xEy)		normally	expectation (a_{ex})
Events			
(xDy)		normally	events (a_{pe})

*In order to formulate complex assertions one can substitute any x or y by a whole assertion (a) or add a subordinate clause to any object term.

Problems in Turkey caused immigration to Europe

This simple assertion could also be formulated as a complex assertion:

Problems in Turkey caused Turkish people to immigrate to Europe

In this case, the simple expression "caused immigration to Europe" has been substituted by the more elaborate clauses "caused Turkish people to immigrate to Europe". This example illustrates that the meaning of the two phrases is rather similar but the second formulation is much longer than the first. The object x of this assertion is "problems in Turkey". Thereafter the relational connector R follows which is "caused" and then the object y is mentioned consisting of another assertion, a behavioral one (a_b) which reads as follows: "Turkish people (x) to immigrate (connector D) to Europe (y)". This interpretation of the assertion can be verified by asking: "problems in Turkey did cause what?" This example illustrate that the y in this case is substituted by an assertion. This complex assertion can be written more formally as (x R a_b). In this case both assertions, the simple one and the complex one represent the same concept; a relationship but the second assertion is much more complex than the first one. If that makes a difference to the responses is open to further research.

Many different formulations can be generated similarly. Substitutions of the objects y or x can be employed for nearly all the elementary assertions set out above, that represent different concepts. Above we gave an example where the complex and the simple assertion represent the same concept. There are, however also cases where the concept presented by the complex assertion is different from the concept of the imbedded simple assertion. We will give here several examples.

A common example is a judgment of a relation. The relational assertion used is the one we have seen before:

Problems in Turkey caused immigration to Europe

A judgment of this relation a_r can be formulated, for example, as follows:

It is quite certain that problems in Turkey caused immigration to Europe

The structure of this assertion is not (xIc) but (arIc). This means that the assertion (a_r) "problems in Turkey caused immigration to Europe" takes the place of the object x, the connector is "is" and the predicate is in this case 'quite certain'. This means that a whole assertion is appraised and not just a particular object. This can be verified by asking: "What is quite certain?".

Krosnick and Abelson (1991) discuss the use of such complex assertion concerning the certainty about an opinion as a measure of opinion strength.

Evaluations can also be formulated with respect to assertions. For example:

It is bad that the problems in Turkey caused immigration to Europe

Now the structure is (a_rIe) and therefore this is an evaluation of an assertion.

In the same way, importance judgments can be formulated:

It is important for me that the conservative party should continue to be strong.

While "that the conservative party should continue to be strong" is an assertion on its own, in this statement an assertion concerning importance is formulated (a_eIi).

Krosnick and Abelson (1991) discuss the questions using this type of complex assertion also as measures of "opinion strength".

Feelings can be formulated in the same way. For example, we begin with the judgment (a_j)

Most immigrants are hard-working

and for this assertion we can formulate an assertion for a feeling:

I am glad that most immigrants are hard working

with the structure (sFa_e).

As a last example we show how a right is formulated on the basis of an evaluative belief in order to demonstrate the generality of this approach. The evaluative belief $a_{eb} = (xD_ey)$ is:

Immigrants exploit our social security system

The assertion of a right (aIRy) can then be formulated as follows:

It is unacceptable that immigrants exploit our social security system

These examples show how general this approach is. The reader should be aware of the complexity that can be created. This is especially true when both objects are substituted by assertions. We do not recommend such assertions for survey research, but research practice gives enough evidence of these complexities. In order to keep the presentation simple we did not introduce this complexity in Table I, but the reader should be aware that for all x and y mentioned in Table I complete assertions can be substituted. In general this goes together with a shift from one concept to another.

5. Some Frequently Occurring Complications

So far we have presented only the basic structure of the assertions. In real life, however, a lot of variation in such assertions occurs. Besides, many assertions are much longer than shown so far.

The grammar provides a variety of different ways of expressing the same proposition, what some linguists call "allosentences" which are manifested in particular syntactic constructions and certain choices between related words (Lambrecht, 1995: 5). We can select a form that is appropriate according to where we want to place the emphasis. The emphasis mostly is on the new information but it also might be on referents to parts that are assumed to be known, the so called old or background information (Givon, 1984; 251 pp.; Lambrecht, 1995: 51 pp). The next paragraphs will illustrate this kind of sentences.

5.1. ALTERNATIVE FORMULATIONS WITH EQUIVALENT MEANING

In this section we discuss some grammatical constructions that are syntactically different but semantically equivalent (Givon, 1984; Huddlestone, 1988; Lambrecht, 1995) although different parts are emphasized.

The constructions studied in this section occur frequently in survey questions and are called active/passive, existential and clefted. We begin with active/passive.

Earlier we had given the example of an assertion which was:

New laws have changed the position of black people

This assertion is formulated in the active voice which means that the grammatical subject "new laws" is the so called "agent" and the grammatical object "the position of the black people" is the "patient or undergoer" of the change. If one reads this sentence the emphasis seems to be on "new laws".

If we transform this assertion into passive voice we obtain the following:

The position of black people was changed by new laws.

In the passive voice the emphasis is on the former patient "the position of black people" which becomes the grammatical subject while the agent becomes the grammatical object "by new laws".

This emphasis becomes even more obvious if one considers another very common passive construction which suppresses the agent:

The position of black people has changed

If one transforms the passive assertion "the position of black people has changed by new laws" into an existential construction, i.e., by putting in front of the sentence the word "there", we obtain the following assertion:

There has been a change in the position of black people thanks to new laws

Grammatically the subject "the position of black people" is substituted by "there" and the word "change" is highlighted.

The last construction we discuss in this section is called 'cleft construction'. This means that a single sentence is divided (cleft) into two separate sections, each with its own verb and one of them is highlighted.

If we take, for instance, the assertion "new laws have changed the position of black people" we can obtain the following cleft constructions:

It was new laws that changed the position of black people

or

It was the position of black people that new laws changed

It will be obvious that in the first example the "new laws" are emphasized while in the second it is "the position of black people". The later formulations are semantically equivalent to the previous ones, but different parts are emphasized. However, it is not necessarily such that respondents confronted with these four different forms detect these differences and react differently to these different forms. This is an empirical issue.

5.2. EXTENDED ASSERTIONS

In research practice, formulations are often more complicated with respect to the objects (x, y . . .) used, for example through the use of subordinate clauses modifying the objects x and/or y and the use of conditional statements.

We will first discuss the *use of subordinate clauses*.

The first, and most simple form is to connect a subordinate clause with one or both of the objects in an assertion. If we take the examples relating to immigrants, more complex assertions can be formulated by adding a subordinate clause to the object "immigrants". An example could be:

Immigrants who come from Turkey are in general friendly

Here the subordinated clause "who come from Turkey" is added to the object x the "immigrants".

It is obvious that the subordinate clause specifies which kind of immigrants are meant. More formally this assertion structure can be summarized as (x (sub) I p).

Another example were both objects are modified by subordinate clauses is as follows:

Problems in Turkey, which is very poor, caused immigration to Europe, which is much richer

The subordinate clause "which is very poor" modifies the object x "Problems in Turkey" and to the object y "immigration to Europe" the subordinate clause "which is much richer" is added. This assertion can be formalized as (x (sub) R y (sub)) where "sub" indicates the subordinate clause.

Another commonly used extension of an assertion is the use of conditionals. Linguistically, conditionals express the degree of likely occurrence of something in the main clause. They thus can express real or unreal things (Yule, 1998; 123–152). In survey questions both types of conditionals are used. An example of an assertion with a real conditional might be:

Abortion is permitted if a woman is raped

This assertion clearly expresses a woman's right to abortion if she has been raped. Formally, this assertion can be summarized as (xIRy | con) where "|con" indicates the condition.

Another example is:

If immigrants work harder they will be as well off as our people

Here the main clause predicts a future evaluative state depending on the prior occurrence of the if clause: ((xIe) | con).

A more complex assertion could be formulated when unreal or hypothetical conditionals present the main clause as either unlikely or impossible. Examples could be:

If immigrants worked harder they could be as well off as our people

or

If immigrants had worked harder they could have been as well off as our people

It is obvious that the evaluative state in the first example is unlikely because the 'if' clause, describing the willingness of the immigrants to work harder is in the past tense. In the second example the evaluative state in the main clause is even impossible because the 'if' clause expressed in the past perfect implies that the condition was not fulfilled.

It is hard to understand what concept is represented by these assertions. Our best guess is that they represent two concepts: a relationship suggesting that hard

working immigrant will be as well off as our people and the cognition that immigrants did not work hard, suggesting it is their own fault that they are in a worse situation. If researchers have problems understanding what is being asserted by such assertions, it is very likely that the respondents will also have problems and this can lead to rather low reliability and validity for such questions.

6. Summary and Conclusions

This outline covers 8 principally different assertion structures which represent most concepts by intuition from the social sciences. Within each class of assertions, we can indicate whether one or an other concept applies depending on a specified characteristic of the assertion. The knowledge summarized in Table I can be used in two ways. If one wishes to specify an assertion for a certain type of concept then the conditions specified in Table I indicate how this can be done. For example, if we want to specify an evaluation about immigrants we know that the structure of the sentence should be (xIe). Therefore, we can formulate a statement such as: "immigrants are good people".

If we want a feeling (xIf) we can write: "immigrants are in general friendly".

If we want a cognitive judgment (xIc) the statement is: "immigrants are in general hard Working".

If we want to formulate a cognition concerning the reasons why immigrants come here, the structure is (xRy) and a possible assertion would be: "Problems in their own country cause immigration to Europe". In the same way assertions can be formulated for the other concepts.

One can also use this table to determine the concept indicated by an assertion. The elementary structures of the assertions refer in a simple way to the concepts mentioned. However, we have to say that the assertions can also be made rather lengthy by use of complex concepts, subordinate clauses, time and place statements and conditions. The use of such complicating possibilities can cause that the meaning of the assertions becomes much less intuitively clear than the meaning of the simple assertions. It is an interesting topic of further research to study what kinds of complications are possible without shifting the meaning of the question or assertion for the respondent.

This is relevant if one would like to evaluate questions with respect to quality. We have indicated at several places that different forms could be used for the same concept. This raises the question what form of the question would optimize reliability and validity? To discuss this kind of research would lead too far an therefore we refer to Scherpenzeel and Saris (1997) and to Saris and Gallhofer (forthcoming).

Notes

1. In the survey literature the term "stem" of a question is used (Bartelds et al., 1994; Dillman, 2000) in more or less the same way as we use the term assertion, but the meaning of the term stem is used in different definition. Therefore we prefer the term assertion.

2. The reader should be aware that the predicate of an assertion in our definition does not coincide with the entire verb phrase or grammatical predicate but only with a part of it since the verbs in the sense of "be" and "have" are coded as connectors.

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