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Q Methodology in Health Economics

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ABSTRACT

The recognition that health economists need to understand the meaning of data if they are to adequately understand research findings which challenge conventional economic theory has led to the growth of qualitative modes of enquiry in health economics. The use of qualitative methods of exploration and description alongside mainstream quantitative techniques gives rise to a number of epistemological, ontological and methodological challenges: difficulties in accounting for subjectivity in choices, the need for rigour and transparency in method, and problems of disciplinary acceptability to health economists. This paper introduces Q methodology as a means of overcoming some of these challenges. The paper argues that Q offers a means of exploring subjectivity, beliefs and values whilst retaining the transparency, rigour and mathematical underpinnings of mainstream quantitative techniques. The various stages of Q methodological enquiry are outlined alongside potential areas of application in health economics, before discussing the strengths and limitations of the approach. We conclude that Q methodology is a useful addition to the economist’s methodological armoury and one that merits further consideration and evaluation in the health field.
INTRODUCTION

The growing interest in qualitative research amongst health economists highlights the potential for conflict between the methodological traditions of mainstream economics and those associated with qualitative enquiry\(^1\). In this paper we consider Q methodology as both an alternative and a complement to qualitative modes of enquiry in health economics, which combines both the in-depth subjectivity of qualitative approaches with the mathematical techniques associated with factor analysis. We argue that Q methodology may appeal to health economists wishing to obtain a richer understanding of choice processes, motivations, values and subjectivity whilst retaining the conceptual lens of economics. We develop our argument in four sections. First, we consider the nature of the discipline of health economics and the recent growth of interest in qualitative methods, and then proceed to present a case in favour of Q methodology, identifying a range of possible applications in health economics. We then describe the stages of a Q study before addressing the strengths and weaknesses of the approach. Since Q methodology incorporates some unique terms, a glossary is provided at the end of the paper.

HEALTH ECONOMICS AND Q METHODOLOGY

Health economics draws on two core influences: the parent discipline of economics, and medicine or health sciences. Economics supplies the theoretical axioms and propositions for health economists but it is health which provides the substantive focus for the discipline; albeit a focus viewed through the conceptual lens of economic theory and methods\(^2\). Health is more than simply the area of application - the health sector (incorporating medical sciences as well as health policy) has stimulated much of the demand for health economic research. Consequently,
disciplines allied to the health sciences have been an important influence in shaping and developing health economics as a sub discipline. Witness, for example, the proliferation of health economics research connected with randomised controlled trials - the mainstay of high quality medical research.

Although health economic and medical research both share a positivist tradition, recently a need for more interpretative approaches has been identified. Empirical findings in health economics and other disciplines often lead to the questioning of assumptions underpinning economic theory, provoking questions about the meaning of data. For example, preference elicitation studies frequently yield inconsistent or irrational responses that are difficult to explain within the boundaries of mainstream approaches. Such findings have stimulated the collection and analysis of qualitative research alongside quantitative data gathering. Economists have recognised the importance of social structures and institutions, as well as the computational difficulties that limit ‘rational choices’. Consequently, the assumptions of methodological individualism and homo economicus are increasingly challenged.

These challenges to the theoretical status quo have led health economists to extend their methodological toolkit; to the inclusion of qualitative approaches. However, the simple application of qualitative ‘solutions’ to the ‘positivist’ area of health economics has the potential for generating a fissure between economic methods and economic theory. Some researchers have sought to resolve this tension by adopting a range of theoretical stances including critical or subtle realism. Nevertheless, the profound difficulties of publishing qualitative research in mainstream health economics journals are legion.

Q methodology shares some important facets with qualitative enquiry: the approach is ‘self referent’ – in that a priori constructs are not imposed on the respondent by researchers; it facilitates the elicitation of subjective opinions, beliefs and values; and
only small samples are required to explore the rich diversity of accounts on a topic. Where Q differs from qualitative methods, however, is in the means of data collection and analysis. Q uses the mathematical approach of factor analysis to identify underlying patterns in data. The use of mathematical and statistical techniques means that Q methods have greater potential for acceptability in the quantitative environment of health economics.

**POTENTIAL AREAS OF APPLICATION IN HEALTH ECONOMICS**

Q methodology has been applied in a number of health related studies concerned with a range of issues such as understanding of pain or concepts of quality in the NHS. In this section we suggest three broad areas in which Q methodology may be applied in health economics: preference elicitation; the importance of building local contextual factors into economic evaluations and case study designs; and the generation and development of behavioural models of economics.

*Preference elicitation*

There is growing recognition that standard economic approaches not only reveal individual preferences, but also shape their nature and form. Indeed, economic techniques such as time-trade off, visual analogue and standard gamble often convey a sense of precision and accuracy, even when measures used to yield statistical relationships are unreliable, invalid, or – in the extreme – meaningless. We believe that Q offers an approach to preference elicitation that minimises researcher bias; allowing participants’ voices to be heard in a relatively unique (but largely uncensored) way.

However, if elicitation methods are to be useful to economists (e.g. for setting priorities in health care) it is not sufficient to simply elicit opinions regarding the
attributes of a potential service; they should also be able to provide information on the individual’s intensity of preference. Furthermore, preferences should be elicited in the appropriate economic and policy context and recognise the opportunity cost associated with the use of resources and the marginal nature of resources allocation decisions. In Q, factor loadings (see below and glossary) reflect the intensity of the association with a given viewpoint and the conditions of instruction can be framed in such a way that they reflect choices associated with opportunity costs and marginal substitution. Interpreting Q data is a messy business but may prove more useful than pursuing the “spurious objectivity” associated with conventional approaches.

Another (less radical) use for Q in the field of preference elicitation is in the development of scenarios to support standard preference elicitation techniques (including discrete choice experiments). These inevitably involve the selection of a reduced number of important characteristics or attributes for inclusion in health state descriptions or scenarios – a process usually informed with reference to the literature, prior qualitative work, expert panels or the researcher’s own judgment. Selection of the appropriate attributes for inclusion may benefit from the structured, transparent method which Q methodology represents. Future research should seek to assess the methodological suitability of Q as a valuation technique and its role complementing and augmenting other preference elicitation techniques.

*Economic evaluation using case study methods*

Second, Q methodology is particularly suited to case-study research and small-scale economic evaluations. Conventional methods of economic evaluation are often insensitive to local cultural conditions and context specific factors which may be important to include when undertaking evaluations of organisational change management initiatives and action research projects. Q methodological studies make
use of local language system and cultural markers and are thereby better able to adapt evaluations to local conditions and the perspective of different stakeholders.

Economic behaviour

Third, the approach can be used to generate richer models of economic functioning that are sensitive to the situational constraints of human action and behaviour. For instance, Q methodology has been used to explore economic rationality and health and lifestyle choices in people with diabetes. Although Q can be used to test *a priori* assumptions and traditional economic theory, it has particular power when used inductively to generate new perspectives on human motivation and economic action. One possible application might be the exploration of the construction and ordering of the utility functions of commissioners and providers, or clinicians and managers in the NHS.

There is clear scope for the use of Q methodology in health economics, including applications which serve to complement, or overcome problems with existing methods as well as areas for future research which will require further development (for example as an alternative preference elicitation technique). The next section describes the central features of Q methodology, before detailing the stages of a typical Q study.

**WHAT IS Q METHODOLOGY?**

Q methodology comprises a set of inter-connected techniques that may be used to explore ‘subjectivity’. ‘Q’ is used to distinguish this method from ‘R’ methodology, which is used to refer to traditional statistical methods involving the use of correlation. (‘R’ is a reference to Pearson’s product moment correlation: r).
Subjectivity, in the context of Q methodology, represents the communication of an individual’s views based on personal opinions and constructs (as opposed to uncovering 'objective' facts). As such Q methodology is used to study:

“…matters of taste, values and beliefs about which a limited variety of alternative stances are taken” 17 p180

The two main features of Q methodology are the ‘Q sort’ and a ‘by-person’ factor analysis. In sorting a number of items presented to them (see Q sorting later in the paper) respondents are able to reflect on their views, beliefs and perceptions and rank the items in relation to each other. Factor analysing these sorts reveals a small number of underlying perspectives. Interpretation of the factors allows a structure to be developed, presenting different accounts of a specific topic by drawing together the commonalities and correlations between the sorts and revealing the “competing but equivalent stories”14 surrounding the topic of interest.

Q studies have four step-wise stages: selecting the ‘Q set’ of items (usually statements) to be sorted; selecting a sample of individuals or ‘P set’; the Q sorting process (the ranking of items by respondents) - commonly followed by a brief interview; and finally, factor analysis and the interpretation of factors. Figure 1 illustrates the principles of a Q study with a worked example.

**SELECTING THE Q SET**

The concourse is the starting point of every Q study. It comprises the set of views, opinions and beliefs (rather than facts) about a particular topic of concern. The Q set is a sample of items (usually statements but other items, such as pictures, can also be sorted) drawn from the concourse. Different methods can be used to access the concourse including interviews, focus group discussions, public documents or
publication in the popular press. Whatever the source of the Q set, the aim is to represent the concourse with as wide a range of viewpoints as possible.

The selection of statements to be sorted by respondents can be either unstructured or structured. In the former, items are chosen which are presumed to be of relevance to the study but where the emphasis is on representation. In the latter, sample items are chosen to represent points in a theoretical matrix. Here, the use of structured samples is akin to semi-structured schedules for interviews. The structure ensures specific dimensions of an argument or set of propositions are included. However, it is important to note that due to the immense number of possible permutations contained in a Q sort, the researcher is able to exert little influence over the factors that emerge. For example, a simple 10-item Q sort contains 1,209,600 (10 factorial) potentially unique sorts.

Regardless of whether a structured or unstructured Q set is used it should, as far as possible, represent the ‘communication concourse’ of potential value sets - in the same way that the samples used in conventional quantitative techniques should measure in relation to some defined population. The number of items in the Q set varies between studies, but usually lies between 20 and 100 statements.

**Person Sample (the P set)**

In Q individuals are purposefully selected according to their personal attributes, views they might express, or on the basis of their social position and background. The sample will therefore depend on the research topic in question rather than on the basis of statistical power.

P set sizes vary between studies. ‘Intensive’ studies focus on small numbers of individuals who each undertake several Q sorts under different conditions of
instruction. Brown\textsuperscript{19} describes an example of such an intensive study in health research: a single respondent was asked to reflect on the quality of care received from his surgeon and to sort the Q set from, “most like the care given by my surgeon” to “most unlike”. He was then asked to repeat the sort with respect to the care received from each of three nurses, the care provided by his mother during childhood illnesses and his care during another hospitalization. The Q sorts produced by this individual were then subject to factor analysis to identify the factors associated with the difference care experiences.

‘Extensive’ studies, in contrast, sample a larger P set in order to obtain Q sorts from a wide range of different people. The preferred size of the P set is ultimately related to the number of factors yielded and the way in which individual Q sorts ‘load’ on them and hence cannot be established firmly until data are collected. As a guide to the size of the P set, Brown\textsuperscript{20} suggests that 40-60 persons is more than likely adequate.

The power of purposive sampling lies in the ability to select information-rich cases and individuals likely to either strengthen or challenge emerging theory. The relationship between the individuals selected, the sampling frame used, and the type of generalisability is the same as in most qualitative techniques: i.e. the factors (accounts) that emerge represent the structure and form of shared views - rather than predicting the percentage of individuals subscribing to them in the population.

**The Q sort**

Data for factor analysis arise from individuals rank-ordering Q set items according to a ‘condition of instruction’ – a process known as Q sorting. Examples of typical conditions of instruction are:
“Sort the items according to those with which you most agree (+5) to those with which you most disagree (-5).

Sort the items according to those that are most like object/person X (+5) to those most unlike that object/person (-5)”

As a first basic sort and means of familiarisation, respondents are asked to place the cards in three roughly equal piles, for example ‘agree’, ‘disagree’, and ‘neutral’. The Q sort then follows, using a grid or scale marked, for example, from -5 to +5 and the number of cards permitted in each ‘pile’ or ‘column’ stated. An example of a sorting grid for a structured sort is shown in Figure 2 below.
Each space in the grid indicates the positioning of an item on the continuum from -5 to +5. Two items are placed in the ‘+/-5’ positions, four items in the ‘4’ and ‘3’ positions and so on. Making use of these three piles, respondents are then asked to consider the cards in their ‘agree’ pile, select two cards that are, for example, ‘most like me’ and place these in the +5 column. Next, selecting from the cards that they disagree with, respondents are asked to select the two cards that are ‘most unlike me’, placing those cards in the -5 column. This process is repeated until all cards are placed (49 in this example) finishing at the centre of the distribution.

The example above is a ‘forced’ Q sort in which respondents are obliged to sort statements into a quasi-normal distribution. ‘Forcing’ the sort in this way is merely a convention allowing respondents to sort statements in a systematic manner. Brown demonstrated that whether distributions are skewed, flattened, inverted or rectangular the impact on the factors that emerge is minimal, and certainly not statistically (or theoretically) significant. Even with forced distributions, respondents are free to place items where they wish. Although the range and number of statements are predetermined, the respondent alone decides where each statement is placed. This contrasts with traditional rating scales where items are scored serially and contextual
information excluded. Q sorters control the rank and therefore the contextual significance of each item. The distribution does not represent an index of pre-defined meaning as in a scale but rather the sorter’s attributed meaning of the scale. This process therefore taps into far richer subjective strata of data than conventional rating scales, which are designed to limit the potential range and consequent patterns of responses.

The positioning of items is then recorded by transcribing numbers associated with each statement onto a data sheet that usually incorporates a similar scale or grid ready for data entry. Often qualitative interview or open-ended questionnaire data are collected after the Q sorting procedure as a further means of elaboration. These qualitative data are used to aid interpretation of the factors.

**DATA ANALYSIS**

Once the items have been sorted by respondents, correlation and factor analysis is performed. The first step is the calculation of a correlation matrix, which represents the degree of similarity between individuals’ Q sorts. Correlations (r) are calculated using the following formula:

\[
r = 1 - \frac{\text{sum Diff}^2}{\text{sum indiv}^2}
\]

Where **Diff** represents the difference between the ‘rank score’ (e.g. -5 to +5) given to each item between two respondents in question, and **indiv** represents the rank score given by each individual. The correlation matrix is thus derived by repeating this calculation for each respondent compared to every other respondent to produce a table for \( n \) respondents of \( n \times n \). Correlations range from -1 to 1, a negative correlation indicating that Q sorters have ranked the items differently. In the unlikely event that
two Q sorts were identical the sum of the differences would be 0 and r would be equal to 1, representing a perfect correlation.

**Factor analysis**

Factor analysis is a method of reducing a dataset to a simple structure of factors based on correlations between larger numbers of variables. It has been used extensively in psychometrics, to reduce a large number of tests scores to a smaller number of factors that lend themselves more readily to interpretation (for a general text on factor analysis see\(^2\)). Whilst the convention is to factor analyse by item, (questionnaire items/ test scores as the variables of interest), Q methodology utilises by-person factor analysis, focusing on the patterns between respondents - represented by their Q sorts. In order to achieve such an analysis it is thus necessary to transpose or ‘flip’ the dataset (rows or cases become columns or variables).

Two main approaches are taken in the factor analysis of Q sort data: varimax rotation and judgemental rotation. Often analysts will consult both solutions. By selecting a technique such as varimax rotation - commonly used alongside Principle Components Analysis (PCA) in factor analysis - the statistical sophistication of the method results in higher levels of explained variance and a simple structure which maximises the similarities within factors and the differences between them (orthogonality).

Judgement is still required in the selection of how many factors to retain, although rules of thumb such as eigenvalues exceeding 1, or scree plot cut offs are often used.

Many Q experts recommend judgemental (or theoretical) rotation\(^3\). Judgemental rotation allows the analyst to view the factors from different angles before arriving at a factor solution. For example, specific individuals can be defined as reference variates and factors rotated around them. Whilst the analyst has more control over the solution using this method, factors cannot be forced into particular solutions. The
value of judgemental rotation is illustrated by Brown in his description of a Q study based in a psychiatric ward. Of the four factors retained for rotation, the fourth had an eigenvalue less than 1 and only one Q sort defining it. Examining the non-statistical information, however, it was clear this factor represented the viewpoint of the most senior decision maker in the team. To exclude this factor would have resulted in the loss of important data. The ability to rotate the factors with respect to local context or theoretical concepts (such as power relations) is a valuable one. Judgemental rotation enables exploratory hypothesising about patterns of data. Proponents of judgemental rotation highlight the potential lack of sensitivity (contextual or theoretical) of statistically driven factor solutions (such as varimax).

**Factor loadings, factor arrays and factor scores**

Factors are represented by the factor array. This is a composite Q sort derived from the weighted averages associated with individual sorts with the resultant meaning revealed by calculated factor scores. Factor scores are the calculated ‘rank score’ (e.g. -5 to +5) for each item in the factor array. In this way, each factor can be represented using the original scoring grid by placing statements on to the spaces on the grid.

Factor loadings represent the degree of concordance between an individual’s Q sort and the factor: 2 to 2.5 times standard error (SE) is used as a guide to establish whether or not such a correlation is high enough to be considered significant, where SE is calculated by $SE = \frac{1}{\sqrt{N}}$ and $N$ is the number of statements. In the grid shown in Figure 2, for example, $N = 49$ and so the correlations are considered substantial where $r > 2 \times SE$: i.e. where $r$ falls in or above the range 0.29–0.36.
**Interpretation**

The aim of the interpretive phase is to tease out the separate accounts underpinning the patterns of Q sorts, according to their similarities and differences.

The interpretation of factors in Q methodology is likely to be concurrent with decisions about the selection of factors for retention and rotation. In the same way that qualitative analysis usually overlaps with continuous data collection, the interpretation of factors in Q methodology is iterative in nature, requiring reflection on the structure of the concourse, and reference to theoretical frameworks, as well as the specific features delineating and binding the factors.

Factor arrays are central to the interpretation of each factor. Unlike conventional factor analysis it is the factor scores (rather than factor loadings) associated with each factor and Q sort items that are compared. Important sources of information in the interpretation of factors are the items placed at each end of the spectrum; neutral items; items which distinguish or represent common views between factors; any apparent discrepancies within the factor array, and apparent differences between item interpretations across factors. Laying out the factor arrays on full size grids is a useful aid to the interpretation of factors, as are the qualitative accounts collected during and after the Q sorts.

**The factors**

The resulting factors represent the different accounts around the topic of interest. Factors vary in number, although typically there will be fewer factors using judgemental rotation than using statistical rotations and eigenvalue cut-off rules (usually an eigenvalue of less than one is dropped from analysis). Descriptive labels
are usually attached to each factor and factors are usually presented together with a description and the statistical information conveyed by factor loadings and scores.

**Discussion**

**The strengths of Q methodology**

The use of qualitative methods in health economics (as in other areas with a strong quantitative tradition) raises the spectre of ‘paradigm wars’. Q methodology is presented here as an approach appropriate for addressing qualitative research questions but with the mathematical transparency that may appeal to a field traditionally associated with quantitative methods. We do not propose Q as a replacement for qualitative methods but as a complementary or alternative methodology to augment and enrich standard practice.

Q methodology has strengths that qualitative research lacks. Stainton Rogers has criticised the analysis of interview data because of ‘the mystery of the classification’ (p122). The key challenge of qualitative analysis is to interpret and classify rich and complex datasets such that they can be presented in a useful way. One of the difficulties in meeting that challenge lies in the ability to articulate precisely what the analysis ‘was’. Qualitative analysis is clearly an intellectual process as well as a technical one - using coding, themes and so forth - but this process is often difficult to express completely. Reflexivity, triangulation and other techniques are often used to present ‘trustworthy’ accounts that acknowledge the input of the researcher as well as the researched in the production of findings, but ultimately the researcher may harbour concerns that their analysis is to some extent an artefact structured by their expectations. Q allows unexpected or counterintuitive accounts to emerge. This is
possible because whilst the concourse and Q sampling depend on the researcher and
their epistemological ‘baggage’, the Q sort is ultimately self-referent. In Q,
respondents control the classification process.  

A further strength of Q methodology is its suitability for topics where respondents do
not necessarily have a readily constructed story. Qualitative researchers have
developed ways to tackle unfamiliar areas, using repeated interviews with the same
respondents, for example, or allowing subjects extended time to reflect on the topic
under investigation. Q methods do not rely on respondents’ ability to articulate
consistent or coherent rationale, rather, the shared accounts between respondents
emerge through the factors; leading Brown to comment, “Q methodology reveals
dimensions which are intrinsic, or inherent, in a concourse i.e. which emerge from it
naturally”.

At an ontological and epistemological level Q is more easily combined with
qualitative methods than other quantitative approaches (see  ). Hence Q goes some
way to bridging the much noted chasm between qualitative and quantitative
techniques. Q combines the ability to elicit a simple structure from complex data
whilst remaining mindful of subjectivity and personal interpretation. Such a reasoned
combination is alien to (or at least suppressed in) most quantitative methods. It is this
combination of the subjective with explicit and structured analytic techniques that
make it such a distinctive approach.

**THE LIMITATIONS OF Q METHODOLOGY**

While it has been used extensively in a range of research fields and although there
are a growing number of Q studies in health, the novelty of the method and its
subjectivity may not endear it to health economists.
Q is not a technique for large-scale generalizable research along logical-positivistic lines where the proportion of individuals subscribing to a point of view is deemed important. The analytic focus of Q remains squarely on the point of view causing the group to ‘cluster’. Q also breaks the assumption of independence central to the logic of statistical enquiry. When one places a Q sample statement somewhere in a continuum it does affect the placing of the next statement. However, some authors have questioned whether this violation is significant and suggest that an adequately sized Q sample and the raising of the required probability from 0.05 to 0.01 for significance in factor loadings can combat this.

**Summary**

We have sought to introduce Q methodological enquiry to a new and largely uninitiated audience and have considered the particular role it may serve in the discipline of health economics. Areas of potential research application have been described across three established topics in health economics: preference elicitation, economic evaluation, and modelling economic behaviour. That Q is a quantitative technique should not be used to mask the judgemental and interpretative nature of Q analysis – a feature it shares with qualitative approaches. We believe that Q has much to recommend it. However, only time will tell whether it becomes an established technique in the health economist’s analytical toolkit.

**Word count (excluding abstract and glossary): 4491**
**GLOSSARY OF TERMS**

The table shown below gives brief descriptions of some of the terms which have been used in this paper and which relate specifically to Q methodology.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Concourse</td>
<td>The ‘universe’ of subjective viewpoints on a subject.</td>
</tr>
<tr>
<td>Q set</td>
<td>The set of items/ statements, usually transcribed onto cards, which respondents are asked to sort according to the condition of instruction.</td>
</tr>
<tr>
<td>P set</td>
<td>Sample of persons selected (usually on theoretical grounds) to sort the cards/ statements in the Q sample.</td>
</tr>
<tr>
<td>Condition of Instruction</td>
<td>All Q sorts are conducted according to some condition of instruction i.e. direction to sort with reference to some specification such as sorting the cards representing your own point of view, from those which are “most like me” to those which are “most unlike me”.</td>
</tr>
<tr>
<td>Q sort</td>
<td>The arrangement of items or statements by respondents according to the condition of instruction. Can be forced or unforced and administered by interviewer or self completion.</td>
</tr>
<tr>
<td>Rotation</td>
<td>Rotation is a statistical technique in which the relation between Q sorts as they are represented in factor space can be examined from different angles.</td>
</tr>
<tr>
<td>Factors</td>
<td>Factors are analytic constructs calculated using correlations to reduce a large number of variables to a small number of underlying dimensions. In Q methodology each factor is seen as a distinct account relating to the topic studied, constructed from the correlations between individuals’ Q sorts.</td>
</tr>
<tr>
<td>Factor array</td>
<td>The composite Q sort representing a factor, derived from weighted averages of individual Q sorts.</td>
</tr>
<tr>
<td>Factor loadings</td>
<td>Factor loadings represent the degree of concordance between an individual Q sort and a factor.</td>
</tr>
<tr>
<td>Factor scores</td>
<td>Scores given in the composite Q sort corresponding to the original values used in the Q sort (e.g. -5 to +5).</td>
</tr>
</tbody>
</table>
Acknowledgements

We are grateful to two anonymous reviewers for their helpful comments and to Professor Roger Burrows who casually remarked once, “That Q methodology as an approach might be interesting”. RB is funded by an ESRC postdoctoral fellowship (PTA-026-27-0107).
References


**Figure 1: The principles and exemplar stages of a Q study**

**PRINCIPLES**

*Selection of statements (the Q set)*

- **Source of items**
  Items can be drawn from a range of sources including interviews, focus groups, public documents, or the popular press. Usually typed statements, items can also be pictures.

- **Structured**
  Q set items selected on the basis of theoretical propositions.

- **Unstructured**
  Q set items selected with emphasis on covering all possible contingencies.

*Selection of respondents (the P set)*

- **Respondents**
  Purposive sampling methods are used to select ‘information rich’ individuals who are likely to hold a range of different viewpoints.

*The Q sort*

- **Sorting**
  Respondents arrange items, according to a condition of instruction, along a scale (e.g. -5 to +5). The number of items permitted at each point on the scale is specified.

*Data analysis*

**A Q STUDY EXAMPLE**

*Selection of statements (the Q set)*

- **Source of items**
  46 statements about health and lifestyle choices were drawn from in-depth interviews with individuals with type 2 diabetes.

- **Structured**
  Using rational choice theory, statements were classified in terms of 3 types of rationality.

- **Examples of statements**
  *Classification*
  
  - I want to control my diabetes so that I live a bit longer (instrumental rationality)
  - I would rather leave the decisions to the experts and follow the advice they give me (procedural rationality)
  - I sometimes choose what to eat on an impulse (expressive rationality)

*Selection of respondents (the P set)*

- **Respondents**
  27 people with type 2 diabetes sampled to include the following characteristics: range of time since diagnosis, care in primary or secondary care, treatment type, ‘adherent’ and ‘non-adherent’ with lifestyle advice, gender, age.

*The Q sort*

- **Condition of Instruction**
  Respondents instructed to “sort the 46 statements onto the grid from those you most agree with (+5) to those you most disagree with (-5)”.

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