What is Q methodology?

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Introduction

Mixed methods research is becoming increasingly popular given the benefit of combining quantitative and qualitative data to explore phenomena.[1] Q methodology combines qualitative and quantitative techniques to study subjectivity. Despite its recent popularity, Q methodology was originally developed in the 1930s by William Stephenson, a physicist and psychologist. Stephenson worked with psychologist and statistician Charles Spearman (of Spearman correlation coefficient and factor analysis fame); Stephenson saw the need to explore the subjective opinion, combining it with the rigour of statistical factor analysis, thus Q methodology was born. Q methodology is being increasingly used to explore views on a range of topics in healthcare from mental healthcare to dentistry.[2] This paper sets out the key characteristics of Q methodology to help nurse researchers better understand the method and terminology, plus we provide practical advice about how to apply Q in nursing and health services research.

What is Q methodology?

Study design

Q methodology is used to study subjectivity, that is, to say subjective opinions, values or beliefs to answer questions about 'what' or 'how'.[3 4] Q methodology allows us to identify and describe the shared viewpoints that exist on a topic revealing areas of consensus and disagreement across these views. There are two key elements to any Q study. First, participants rank order a set of statements of opinion onto a grid. This is followed by a factor analysis to identify clusters of shared viewpoints that can then be interpreted.

Data collection

Q set development

The starting point in a Q study is a set of statements that are usually written as expressions of opinions or beliefs on the topic. The statements can be generated through various sources such as interview or focus group transcripts, newspapers or journals. In the first instance, the research team must identify all possible statements of opinion, called a 'concourse' in Q. The concourse is then reduced to a representative sample of statements, known as the Q set. The Q set is typically around 40 statements but can range from less than 20 to over 250 statements.[2] Reducing the statements to the final Q set often involves piloting, or application of theoretical frameworks to ensure distribution of statements across the framework. When data collection is conducted face to face, the Q set statements are printed onto individual cards, typically the size of credit cards.

P set

In Q methodology, the participant sample is known as the P set. P set sample selection is purposive (as per qualitative research); the aim is to identify individuals with rich and different views that might be relevant to the study rather than random sampling to achieve representativeness (as per quantitative research).[4] Sample sizes tend to be smaller than in quantitative research.[4]

Q sorting

Data collection is typically undertaken face to face, but it can also be conducted online or via post.[2] Data collection involves participants rank ordering the Q set statements onto spaces on a grid. The Q grid is a prearranged distribution or 'forced choice' distribution typically in the shape of a pyramid or quasinormal distribution shape (figure 1). For face-to-face data collection, the Q grid is printed on card or a poster board large enough to comfortably fit the Q set statement cards but not so unruly that it cannot be transported for data collection. At either end of the pyramid-shaped Q grid are the most and least important columns. These columns contain the smallest number of spaces for statement cards because it is likely that the participant will have strong views about only a few statements and feel more neutral about more statements. The grid typically ranges through columns named from +4 (most important) to −4 (least important). The size of the grid is amended to fit the number of statements and can have more or fewer columns depending on the number of statements. The Q grid can be positioned with the columns running left to right or the grid can be rotated onto its side so the columns read top to bottom.

This data collection process is known as the Q sort. The Q sort would start with participants being given some background and purpose of the study. The participant would be given the Q set of statements and the condition of instruction under which they should sort the statements, such as 'rank order the statements from most important to least important'. Often, participants start by sorting the cards into three piles: most important, neutral and least important before then sorting them onto the Q grid. Participants rank the statements relative to all others. Once participants have completed the Q sort they are asked, in a short interview, to explain their positioning of their cards.

Patient and public involvement in Q studies

Q methodology benefits from patient and public involvement, especially when developing the Q set and the Q grid.
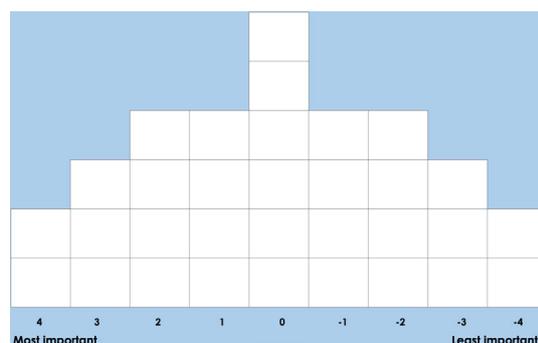

Figure 1 Example of Q grid.

By speaking to those who understand the needs of the P set, it is possible to prepare a Q sort that is easy to understand and undertake, reducing the time taken to collect data and improving the rigour of the approach.

Factor analysis and interpretation

Once the Q sort is complete, by person factor analysis is undertaken to identify clusters of participants who have completed their Q sorts in a similar way to reveal a set of shared viewpoints.[4] Q factor analysis is generally undertaken using specialist, free Q analysis software such as KenQ[5] and PQMethod.[6] Analysis is undertaken using principal component analysis or centroid factor analysis.[2] The output of the statistical analysis is a set of factors, each of which can be represented by an idealised, composite Q sort which describes how a person who perfectly correlates with the factor would have laid out their Q set statements. The degree to which an individual's Q sort corresponds to each factor is given by their 'factor loading', which is a correlation coefficient between −1 and +1; the closer to 1 the more similar an individual's Q sort is to the factor. Factor analysis typically produces several statistically possible factor solutions. Factor solutions are examined considering Eigen values and explained variance that provides information on how common each factor is to each other factor, as well as the number of participants with significant factor loadings for each factor. Consideration is also given to the qualitative comments made by participants about their statement placement as well as those statements classed as distinguishing. Distinguishing statements are those with a significantly ($p < 0.01$) different position in the composite Q sort of a factor as compared with the other factors. Factor analysis typically involves discussion of the factors with the research and patient and public involvement teams, until they are confident that they have a set of factors that represents the views of participants.

For each factor, a narrative account is produced that describes in-depth the views of those participants that load significantly onto the factor. This factor description should be supported with quotes from the post Q sort interviews.

Strengths and weaknesses of Q methodology?

A strength of Q methodology is that it combines the richness of qualitative data with the rigour of statistical analysis.[7] It allows researchers to understand collective views on a topic while offering an appreciation of the subtle, often hidden and sometimes divisive, differences across these in a structured, systematic and reproducible way. Under-standing individual's perspectives and how these differ is important for understanding their behaviours.[8] Q methodology, because of its potential for involving a wide range of perspectives, makes it an inclusive method. A limitation is that the steps involved in a Q study can be time-consuming.

Conclusion

Q methodology is a systematic way to explore the complexity of subjectivity in a systematic and in-depth way. Q methodology is highly suited to nursing and healthcare research that aims to address complexity, where there are multiple and differing views, or contentious or sensitive viewpoints on a topic.

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