

Q AND YOU: THE APPLICATION OF Q METHODOLOGY IN RECREATION RESEARCH

Whitney Ward

Department of Health Education and Recreation
Southern Illinois University
wward@siu.edu

Abstract.—Researchers have used various qualitative and quantitative methods to deal with subjectivity in studying people's recreation experiences. Q methodology has been the most effective approach for analyzing both qualitative and quantitative aspects of experience, including attitudes or perceptions. The method is composed of two main components—Q sorting and Q factor analysis—and allows for the simultaneous study of objective and subjective issues. This paper describes Q methods and terminology, past uses of Q in various fields of research, and the pros and cons of applying Q in research on recreation experiences.

1.0 INTRODUCTION

Many studies in recreation are concerned with perceptions, attitudes, points of view, or opinions regarding variables or theories of interest. Recreation researchers have used both qualitative and quantitative techniques to explore the subjectivity inherent in recreation experiences. Moore and Driver (2005) have criticized the use of traditional methods to study the subjective experiences associated with outdoor recreation. Brown (1996) discusses the problems with the qualitative/quantitative dichotomy in research and critiques traditional researchers' need to select and adhere to either qualitative or quantitative methods. One research methodology that transcends this argument is Q methodology. Because Q is neither fully qualitative nor fully quantitative, Q researchers can draw upon components and values of both. This paper introduces Q methodology, its value in recreation research, and the integral parts of Q—Q sort and Q factor analysis.

Q methodology is the systematic study of subjectivity (Brown 1980, 1993, 1997; Stephenson 1953). It is used to identify and categorize participants' attitudes, beliefs,

and viewpoints. Wilson (2005) describes Q methodology this way:

It has been referred to as a bridge between qualitative and quantitative research. It has the same level of mathematical rigor as quantitative methodology, it provides for direct measure, and has an interpretive component comparable to that of qualitative methodology. It is designed to (a) elicit operant subjectivity and (b) directly measure the response. It is not about a person. It is of a person. (p. 37)

By combining the strengths of both qualitative and quantitative research, Q methodology allows for the simultaneous study of objective and subjective issues to determine an individual's perceptions and forecast the likelihood of participation (Cross 2005).

The basis of Q methodology is the Q sort technique, followed by Q factor analysis. Q sort is the vehicle of Q methodology, the means by which the data are collected for factor analysis (Brown 1980). This process involves rank-ordering a set of statements taken from a concourse (the flow of communication on a topic; see section 4.0 below) (Brown 1980, McKeown and Thomas 1988), with responses along a continuum that usually ranges from agree to disagree (Brown 1980, 1993, 1997; Cross 2005). The Q sorts are then analyzed using correlation and factor analysis.

Q methodology takes advantage of the fact that individuals "desire to structure and ascribe meaning to all impinging stimuli and events" (Harvey as quoted in Watts and Stenner 2005, p. 76). The desire to structure stimuli, ascribe meaning, or offer a viewpoint with any set of statements provides the strength of Q methodology. It is this desire that gives a Q sample the potential to reveal useful results using both the qualitative and quantitative properties inherent in the methodology.

With all research, the research question(s) and context influence the choice of research method(s). Q is considered an exploratory technique and is not appropriate for the development and proposal of specific hypotheses as in traditional positivist methodology (McKeown and Thomas 1988, Watts and Stenner 2005, Durning and Brown 2007). While the results of a Q study cannot be interpreted to confirm or reject hypotheses in terms of a significance level, Q “can, however, bring coherence to research questions that have many, potentially complex and socially contested answers” (Watts and Stenner 2005, p. 75). Theory constructed using a Q sample can be interpreted in terms of a logical connection or consistency to respond appropriately to various research questions. Quantitative methods may ask, for example, “What proportion of users value an outdoor recreation experience?” Q methodology research questions are more exploratory, such as, “What are the perceived benefits and values of participating in an outdoor recreation experience?” The two approaches use different strategies that are useful for different research processes, purposes, contexts, and agendas (Robbins 2005).

The ranking of statements by each participant in Q methodology can appear to be similar to tests, scales, and questionnaires. However, the role of the participant, the manner in which the data are collected, and the interpretation of the data all set it apart from typical survey research (Brown 1980, 1993, 1997; Van Exel and de Graaf 2005; Watts and Stenner 2005). In Q, researchers do not suggest or impose meanings a priori, but rather let the participants determine what is meaningful, valuable, and significant from their perspectives.

2.0 Q SORT

The Q sort process is an instrument used to capture the subjectivity expressed during the sorting procedure. Q set statements or stimuli are transferred onto separate cards, randomized, and numbered (Brown 1980, 1993). Participants are then given conditions of instruction with the statements after which they usually start with a preliminary sorting into three categories of agree, disagree, and other (Brown 1980, 1993, 1997). They then sort within their three categories to correspond

with the quasi-normal distribution based upon select conditions of instruction.

It is very rare that participants perform a complete (1 to n) rank order (Watts and Stenner 2005) but typically sort according to a quasi-normal forced distribution that causes every Q sort to have a mean of 0 (Brown and Ungs 1970, Brown 1980, and McKeown and Thomas 1988, Watts and Stenner 2005). The *distribution* of statements has very little effect – it is the *order* of statements that matters (Brown 1980, 1993, 1997). Tests of validity are not a concern in the Q sorting process, since participants simply express their points of view in a formal and explicit manner and there is no outside criterion to validate or invalidate their viewpoints (Brown 1980, 1997; Durning and Brown 2007).

3.0 P SET

In contrast with other research methods, conducting a census of a population using Q is impossible. Rather than randomly selecting participants, Q sampling purposefully selects individuals to make sure that certain viewpoints are included based upon the research question (Brown and Ungs 1970). Durning and Brown (2007) state, “The categories may be somewhat imprecise, but this is of little concern in Q methodology because these categories, unlike the demographics in conventional research, are not typically used for testing purposes” (p. 544). Once the functional categories are established, the number of participants needed for the study can be determined based on the research questions. It should be noted that major relationships begin to stabilize with just a few cases, and they are influenced very little when additional observations are included in the study (Brown and Ungs 1970). The following example illustrates this point.

Q avoids the “numbers games” in a certain sense because it studies qualitative differences, on which quantity has no effect. If you wish to examine the differences in color between a tub full of green and a tub full of red paint, for instance, a thimble of each will do and buckets full from the same tubs will only provide redundant information. Similarly, in Q: If you are interested in examining the differences between the thinking of factor A vs. factor B,

three or four of each will do and buckets full will not advance understanding markedly. (Brown 1996, p. 563)

As such, Q studies generally do not need a large sample of participants (as other methodologies require for statistical power). Brown (1980, 1993) asserts that no more than 40 participants are necessary to represent the viewpoints of a population. Watts and Stenner (2005) state that most Q studies are effective with 40-60 participants, but this is merely a guideline and “highly effective Q studies can be carried out with far fewer participants” (p. 79).

4.0 CONCOURSE

A collection of attitudes, or subjective communicability, about an event or topic is what is referred to as the “concourse.” This collection can be infinite because it includes “all the manifestations and expressions of human response and dialogue, verbal and nonverbal” (Wilson 2005, p. 42). More specifically, the variety and range of opinions about a particular event or topic constitute the raw materials of Q methodology or human science in its subjective respects (Brown 1993, 2006). Concourse statements are distinguished from fact statements in that fact statements cannot be refuted while concourse statements are based on opinion (Durning and Brown 2007).

5.0 Q SAMPLE/Q SET

Researchers may find, it impractical to use an extremely large concourse. Therefore, it is usually necessary to take a representative sample of statements from the concourse (Brown 1980, 1993, 1997; Durning and Brown 2007). The Q sample, or Q set, is a set of statements that offers the fullest range of viewpoints (Karim 2001). However, unlike a population of people, the concourse population is impossible to define due to the infinity of potential statements. Yet rather than sampling statements randomly from the concourse, Q methodology uses experimental design principles in developing the Q set (Durning and Brown 2007).

Stephenson (1993/1994) argues that nature is inherently simple and that the same principles should guide the development of the concourse and the Q sample.

Accordingly, the concourse is governed by a few simple principles. The first is that a concourse is approached on a “prima facie” basis that can encompass any statement from the concourse. The second is that only statements that are based on self-reference, or are subjective, should be included. To apply these two principles, the construction of Q samples should be based on Fisher’s “balanced block” design, wherein there is a systematic basis in the Q set (Stephenson 1953, 1993/1994; Brown 1980, 1993; McKeown and Thomas 1988). Fisher’s balanced block design is used to gain a more representative sample of the concourse and to provide structural information, which is a first step in scientific experimentation.

Ideally, the goal of the Q set is to provide the fullest range of viewpoints based on the concourse (Karim 2001, Durning and Brown 2007). Furthermore, Dennis (1992-1993) and Fairweather (1981) found the test-retest reliability of Q sets to be at 0.80 and above. Therefore, the Q set does not depend on traditional issues of validity because a viewpoint expressed by one individual is just as valid as another expressed viewpoint and cannot be deemed invalid (Brown 1980, 1997; Durning and Brown 2007). Even when different subjects interpret the same statements differently, the important information is what meanings the participants derive from the statement, not the a priori meanings imposed by the researcher.

Although Q statements are not always theory-based, theory can aid in the development of the Q sample. Q samples can be developed from many sources, including academic literature, literary and popular media, interviews, and discussions, as long as the Q set is representative of the views, opinions, and attitudes in the concourse. “In the end, the exact task [of developing a Q sample] is of little consequence provided that the final Q set can justifiably claim to be broadly representative of the relevant opinion domain...” (Watts and Stenner 2005, p. 75).

Furthermore, there is no specific number of statements that should be used in the Q set. Watts and Stenner (2005) contend that studies with 40 to 80 Q statements are considered satisfactory, while Brown (1980) argues that 40 to 50 statements are adequate as long as they are

comprehensive. Cross (2005) even argues that Q studies can be carried out with as few as 10 statements because participants have the opportunity to express their point of view (Brown and Ungs 1970). However, Brown and Ungs counter that the more statements a person has to work with, within reason, the more likely it is that the person will express personal attitudes. Generally, the size of the Q sample is determined by the number of multiples of the basic design (Brown 1980). For example, five or six statements are taken from each category of the Fisher's "balanced block" design, which in turn will help ensure that statements are comprehensive.

6.0 FACTOR ANALYSIS

Q methodology is often mistakenly thought of as merely the transposition of a traditional factor analysis matrix because it involves factoring by rows the same matrix that is traditionally factored by columns (Brown 1980). Traditional factor analysis (often referred to as R form) is a statistical technique used to study the relationships between variables or traits. As such, R scores are often expressions of individual differences for the various traits of individuals. By contrast, Q factor analysis utilizes abductive reasoning from observed effects. Other differences between the Q and R factor analysis include the importance of the Eigenvalues and total variance (Brown 1980). Q methodology is more gestaltist and holistic, and Eigenvalues typically have little meaning as they are founded on an arbitrary number of individuals (Brown 1980). Likewise, traditional factor analysis often breaks up the phenomenon into separate components, but this is not the case with Q methodology where participant self-reference is maintained (Stephenson 1993/1994). Brown and Ungs (1970) further state that:

The factors that result from a Q study... in a very real sense are the results of behavior—that is, they exist as the consequence of a group of respondents having responded in the same fashion... Factors in Q technique studies arise from actual concrete operations of persons as they model their attitudes; a factor is the result of behavior. The factor-categories are genuine, as opposed to *ad hoc* categorical, and reflect true attitudinal segmentation. They are more genuinely "operational definitions" of

this-or-that attitude, since whatever they are definitions of has been made manifest by virtue of behavioral operations expressed through the medium of Q technique. (p. 519).

Q methodology operates on the assumption that observations and measurement can take place only from the external frame of reference based on internal processes that are inferential and hypothetical but defined by the prevailing variables (Christol 2002). The correlations derived from the initial correlational matrix of the individual Q sorts are simply "a way station and a condition through which data must pass on their way to revealing structure" (Brown 1993, p. 110). It is possible to determine the degree of similarity or dissimilarity between participants' Q sorts from the correlation matrix. The most important aspects of the analysis, however, are the factor arrays (Brown 1980, McKeown and Thomas 1988, Watts and Stenner 2005). Factor arrays, along with other analysis output, elucidate the viewpoint being expressed by a particular factor. Unlike other methods that use exploratory factor analysis to determine which individuals group together on what factors, Q methodology is primarily interested in the belief and preference systems that cause the factors (Durning and Brown 2007).

Brown (1993) also states that factor analysis reveals the number of factors, which is purely empirical and wholly dependent on how the Q sorts were performed. Nevertheless, the factors are qualitative categories of thought and additional participants would have virtually no impact on the factor scores. Brown (1980) points out that "quality is operationally distinct from quantity" (p. 120) and that quality can be judged by the composite factor reliability. Quality is a function of the number of defining variates; therefore, the more people that render a point of view, the greater the confidence in the scores that compose it. Furthermore, since reliability is inversely related to the standard error, the higher the reliability, the lower the standard error.

One objective that Q methodology does not accomplish well is estimating population statistics. Generalizations are not thought of in terms of induction, or the few representing the many (Christol 2002). Instead, the

aim is to sample the diversity and range of viewpoints expressed by the participants (Cross 2005). The proportion of individuals in a factor is not revealed in the factor analysis; yet, distinctive points of view in the form of statements that distinguish each factor are revealed. The composition of the particular individuals that make up the factor is rarely of direct interest because the same viewpoints could be obtained from other individuals; however, the ways in which the factors differ are of keen interest (Brown 1980). As such, generalizations in Q do not refer to demographics, but to segments of subjective communicability (Brown 1980). The concurrence of ideas is sampled representatively instead of using the more traditional means of random sampling theory related to the population of participants (Stephenson 1953). Therefore, Q methodology seeks to capture and interpret communicated points of view that may be generalized back to the phenomenon being studied rather back to the population. Q methodology utilizes by-person factor analysis, instead of the traditional by-variable analysis, to identify groups of participants who factor comparable items together (Watts and Stenner 2005). "Nothing more complicated is at issue" (Watts and Stenner 2005, p. 68).

7.0 IMPLICATIONS FOR OUTDOOR RECREATION RESEARCH

Q methodology was originally developed for use in psychology research. Since then, it has been used to study participants' attitudes, viewpoints, or perceptions in studies on healthcare, business, marketing, political science, and environmental science, to name a few (Brown 1993). Q methodology has been used successfully but very infrequently in outdoor recreation research. Lindhagen and Hornsten (2000) used Q methodology to study how forest management techniques influenced preferences and changes in recreational use over a 20-year period. Hirsh (1992) employed Q methodology to research Canadian university outdoor education programs. Christol (2002) explored differences in environmental educators' beliefs in two countries. Ward (2008) used Q methodology to explore perceptions of risks and benefits associated with mountaineering. Rilling and Jordan (2007) looked at different points of view toward leadership on extended outdoor trips. Lindley (2005) studied how participating in a wilderness experience program influenced students' attitudes towards

wilderness. Hutson and Montgomery (2006) conducted an inquiry using Q methodology to explore perceptions of outdoor recreation settings and ways of feeling close to natural environments. Finally, Wilson (2005) used Q methodology to study person-place engagements and user attachments to a recreational area in Oklahoma.

8.0 CONCLUSION

Recreation researchers have increasingly used approaches that explore and value the subjectivity of recreation experiences (Stebbins 1997). Q methodology systematically and thoroughly integrates subjectivity into the research process and provides a "bridge" between qualitative and quantitative research (Cross 2005, Wilson 2005). By combining the strength of both quantitative and qualitative research, Q methodology can be a valuable tool for those who wish to study outdoor recreation experiences.

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