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Summary
Q Methodology: History, Theory and Application

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Q methodology can be described as a technique which aims to reveal similarities or differences between self-referenced viewpoints of individuals with a holistic approach (Brown, 1993). Basically, a set of statements are given to the participants and they are asked to sort the statements according to an instruction (such as agree/disagree, like/dislike). The data obtained from this process is subjected to between-person factor analysis and the clusters of subjective viewpoints are interpreted. The methodology was presented by William Stephenson as inversion of classical factor analysis and this seemingly simple novelty opened a new way of studying subjectivity. As Brown (1996, p. 561) stated, Q methodology "combines strengths of both qualitative and quantitative methods". To clarify, Q methodology can be considered as qualitative method for its endeavor to reveal subjectivity and it is considered as quantitative method for its quantitative features in measurement and analysis.

Brief History of Q methodology

Q methodology's first appearance dates back to Stephenson's (1935) letter to the *Nature* journal, in which he describes an inverted factor analysis method. Stephenson (1936) stated that R factor analysis operates by comparing population means and is not adequate to reveal subjective viewpoints of individuals. Moreover, he also stressed that conventional factor analysis techniques do not handle the individual as a whole, which he deems important to understand subjectivity (Watts & Stenner, 2012). Even if the Q methodology takes roots from such tenets, it is misunderstood by many partly because of unorthodox applications (see Watts & Stenner, 2005a for a discussion of such applications). Even if Q methodology was studied by Stephenson himself and his protégés, it was not until 1985 that it started to gain scholarly interest. In 1985, International Society for the Scientific Study of Subjectivity was established by Stephenson himself and this society started to publish *Operant Subjectivity* journal. The methodology also attracted interest of several researchers who endorsed qualitative approach and since then, its popularity and application grow in different disciplines.

Comparison of Q and R methodologies

There are a number of essential differences between Q and R methodologies. For example, the participants can actively arrange their Q-sorts in Q methodology, however, such process is not part of a typical R methodology. Moreover, while Q methodology emphasizes the subjective viewpoints of participants, R methodology primarily concerns with whether the data confirms or contradicts with the hypotheses or theory.

An important issue for Q methodology relates to the unit of measurement. R methods deal with this issue by *standardizing* their variables of interest. However, as Stephenson (1936) emphasized, this approach prevents comparison of actual responses of individuals. Instead, Stephenson endorsed a different approach and proposed that statements in a Q-set can be sorted according to *personal value* participants assign, in other words their "psychological significance" (Watts & Stenner, 2005). This approach made comparison of different statements and by extension exploration of subjectivity feasible.

Core Concepts of Q methodology: Operant Subjectivity, Holism, and Concourse

Understanding how Q methodology approaches participants, phenomena of interest and interpretation of results lies on grasping the concepts of operant subjectivity, holism and concourse. According to Watts and Stenner (2012), Stephenson's definition of "operant" is closely related to subjectivity. Because, an operant behavior is typically spontaneous and takes form by the relationship with its environment. Stephenson also emphasized the impact of participants on Q-sorts to describe subjectivity in Q methodological sense. This form of definition excludes pre-defined concepts or *a priori* assumptions in exploring subjectivity in an operant way. Stephenson

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(1980, p. 884) described result of operant subjectivity as "objective properties of communicability of which the person is quite unaware."

Even if Q methodology stresses importance of action and natural environment, the process of data collection does not resemble natural environment of individuals. Brown (1980) acknowledged this issue but stated that even if Q methodology starts with an artificial sorting process, it evolves into an entity which can be described as functional and operant. Q methodology compromises between naturalism and measurement; it makes it possible to compare between different subjective viewpoints at the expense of loss of "naturalism" to some degree.

Brown (1980) describes Q methodology as a Gestalt procedure. The information obtained from participants is evaluated as a whole and meaning is derived by examining different clusters of viewpoints in comparison to each other. The process of analysis and interpretation does not divide the data of participants in its fragments. The wholeness of data is preserved in all phases.

C*oncourse* can be defined as "a universe of statements for any situation or context" (Stephenson, 1986, p. 44). This definition relates to expression of ideas, in other words communication. For this reason, concourse is constructed by observable and communicable information. Watts and Stenner (2012) describe several qualities of concourse such as being shared knowledge, cultural heritage and leading formation of new information. These qualities denote that concourse is shaped by the communication of individuals and dynamically and continually evolves into new forms. Because of this, Wolf and her colleagues (2011) compares concourse with Moscovici's *social representations* concept and point out several similarities between the two. Even if definition of concourse captures any form of input, it may also place a restriction to the answers gathered from participants. Indeed, a typical Q-set contains 40 to 80 statements. However, participants can arrange Q-set in many different ways. Even if the amount of the statements is restricted, the number possible of configurations can go up to millions (Brown, 1980). Moreover, a typical application of Q methodology also involves open ended questions about the subject matter which may remedy the restriction related to concourse (Uluğ & Cohrs, 2017a).

Social Constructionism and Q methodology

The Q-sorting process can also be viewed as a process of construction of *meaning* (cited in Ramlo & Newman, 2011). Indeed, operant subjectivity definition also points out this process. Participants actively sort Q-statements according to their viewpoints, values or beliefs. They are provided with the opportunity of changing or arranging their configurations in any way they desire. The eventual aim of Q methodology is to reveal common viewpoints obtained from these subjectively delivered pieces. Given the fact that enormous number of configurations is probable for a Q-set and typically two to four factors emerge as a result of by-person factor analysis, the resultant factors may represent common viewpoints. Watts and Stenner (2012) state social constructionism offers an explanation to this process. As social facts become integral and important to lives of people, they also become harder to avoid and easier to encounter, which in turn is reflected in people's viewpoints or behavioral repertoire.

Application

Generation of Q statements

To conduct a research with Q methodology, a Q-set is generated based on concourse regarding a research topic. Q-set is defined as all Q statements that comprise a research topic. Q-set should represent different ideas, attitudes, beliefs and convictions about research topic (Watts & Stenner, 2005a; Watts & Stenner, 2012). It may be generated from various sources such as research reports, papers, newspaper articles, open forum discussions, internet forums, experts, as well as other research techniques (interviews, focus group discussions so on; see Uluğ, Odağ, Cohrs & Holtz, 2017). Researchers may even benefit from scale items (Watts & Stenner, 2005a). The number of statements in a Q-set may range from 40 to 80 (Stainton Rogers, 1995). The number of participants may vary between 40 and 60 however, effective studies can also be conducted with fewer participants (see Shinebourne, 2009; Uluğ & Cohrs, 2017a; Watts & Stenner, 2005a).

Application Process

In Q methodology, application process basically involves sorting the idea cards. An example application process may be expressed in the following steps: Firstly, a participant reads the idea cards carefully, and divides them into three parts: a) "I agree", b) "I disagree" and c) "I have no idea/ I am neutral". Secondly, she is asked to sort these cards on a scale (e.g., a scale ranging from -4 to + 4), which is formed in accordance with a response matrix and number of idea cards (see Dennis, 1986). Thirdly, she is given some time for making changes on the Q sort. Her comments about idea cards are noted during application. She is asked reasons for idea cards that she placed in extreme points (e.g., +4 and -4) at end of study. Finally, demographic questions are asked, and application is terminated (see Demir & Kul, 2011; Uluğ, 2016).

Analysis

Q methodology uses *by-person* correlation and Q-factor analysis. Analysis is performed by inverting

conventional factor analysis: Classical factor analysis is applied to variables while Q-factor analysis is applied to participants' Q sorts (Watts & Stenner, 2005a). In Q-factor analysis, correlation of participants instead of the items or dimensions is examined. (Van Exel & De Graaf, 2005). Statistical analysis programs such as PQMethod 2.35 (Schmolck, 2014) or PCQ (Stricklin and Almeida, 2001) may be used to analyze data. There are several options for extracting and rotating factors. For example, Principal Component Factor Analysis (PCF) or Centroid Factor Analysis (CFA) may be used for extracting factors, and Varimax rotation or manual rotation techniques may be used for rotating factors (Brown, 1980; Watts & Stenner, 2005a). Selection of factors for interpretation depends on a judgment of researchers. Some researchers (see Watts & Stenner, 2012) may follow a path determined by more quantitative criteria, while some (see Brown, 1980) may prefer using qualitative aspects of research when deciding on factor selection.

Interpretation

Factor interpretation process requires a hermeneutic approach (Shemmings, 2006; Stenner, Dancey & Watts, 2000). That is, each factor should be interpreted considering their reciprocal relations with the other factors. Participant's comments and demographic information should be considered in interpretation of each factor (Shinebourne, 2009; Watts & Stenner, 2012). Results of analysis can be examined according to distinguishing statements for each factor. "*Distinguishing* statements define the uniqueness of each factor. A *distinguishing* statement for a factor is a statement that its score on that factor is significantly different from its score on any other factor" (Akhtar-Danesh et al., 2008, p. 767). The *most agreed* and *most disagreed* statements, and *Z* values of statements may also be used for interpretation. *Z* values show relationship between statements and factors (Watts ve Stenner, 2012; Zabala, 2014). When interpreting factors, its general structure and the content of statements should be evaluated simultaneously. (Watts & Stenner, 2012).

Conclusion

Q methodology is increasingly used in different disciplines. There are several advantages to using Q methodology when compared to various methods.

a) Q methodology is a convenient method to systematically reveal human subjectivity (Brown, 1993).

b) Since Q methodology consists of a combination of qualitative and quantitative methods, it gives researchers a holistic evaluation of a research topic (Watts & Stenner, 2012).

c) Q methodology reveals agreements and disagreements between individuals or groups on a research topic (Brown, 1980).

d) Q methodology can contribute to create a common ground between different groups by exploring consensual points between them (Uluğ, 2016).

e) Q methodology is an exploratory methodology and has potential to generate a theory (Stenner et al., 2000).

f) Q methodology can be used to examine similarities and differences among individuals based on their subjective point of views (Brown, 1980; Watts & Stenner 2005a).

We hope this article will serve as an introductory resource for researchers who are not aware of Q methodology in Turkey and will contribute to its use in the Turkish literature.