Quest-Sort: A Paper-and-Pencil Alternative to Card-Sorting Q Samples[1]

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ABSTRACT: Under conditions that might make a traditional card-sorting task infeasible, the Quest-Sort alternative presented here could be useful. A sample of 31 students demonstrates reasonable comparability of results between the formats, with the Quest-Sort about one-third faster to complete than the card-sort. A second sample of employed students demonstrates the internal validity of Quest-Sort rankings relative to both card-sorted and paired-comparisons rankings. Second-order factor analysis also suggests that the card-sort and the Quest-Sort elicit conceptually similar structures.

Introduction

In certain conditions, the traditional card-sorting approach to gathering Q data might pose problems. Card sorts typically require rather large work spaces (Thompson, 1980), take a relatively long time to complete (Kienast, MacLachlan, & McAlister, 1983), and may not be well suited for large samples of subjects (Kerlinger, 1986). If constraints such as these should make the traditional approach infeasible, an alternative approach to capturing subjective meaning could be beneficial.

This paper presents a paper-and-pencil alternative to the traditional card sort. It represents a composite of a questionnaire and a card-sort,

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and so I call it Quest-Sort. Quest-Sort reduces administration costs in terms of time and space requirements. Since it is self-contained on a single page, Quest-Sort can be efficiently embedded in a standard survey format, offering greater potential for large-sample data collection. Next, I compare a typical card-sorting approach to the Quest-Sort. Then, I present results of two experimental validation studies. Finally, I conclude with a discussion of limitations and application guidelines for the Quest-Sort.

Comparing a Card Sort to Quest-Sort

In the typical Q sort, respondents are each provided a deck of cards, each card marked with a variable or level of a variable. Respondents are then asked to stack these cards into a specified number of piles. The row of piles is usually anchored by such bipolar descriptors as "Most Uncharacteristic" to "Most Characteristic," with the middle pile neutral (Brown, 1980). Piles left of center carry negative weights, while piles right of center are positively weighted, values increasing left to right across the row of piles. Nine piles is typical with a large Q sample of items (Block, 1961). Although some researchers permit free distribution of cards among piles, the most common distribution forced in the card sort is symmetric and unimodal (Stephenson, 1953).

The Quest-Sort approach begins with a set of variables or variable levels, identical to those that might be presented on cards. However, rather than assigning each to an independent card, the items are listed in random order on a single page. They are then numbered in ascending order for identification. Also as in the card-sort, respondents are then asked to sort the items according to their relative ranks as "Most Uncharacteristic" to "Most Characteristic." However, rather than assigning each card to one of nine piles, respondents assign each item to one of nine columns of boxes, printed on top of the same page, by writing the number identifying an item in one of the boxes in a given column. Columns are weighted left to right, with the middle column neutral. All boxes within a column carry the same weight. Finally, the number of boxes presented in each column forces item assignments into a symmetric, unimodal, approximately normal distribution.

An example Quest-Sort is provided in the appendix. I successfully used this particular document in a field application, designed to

discover employee constructions of their respective organization's cultural values. I used a predecessor document in the study described next to compare results and administration costs of the Quest-Sort with those of a traditional card-sort.

Study 1

Subjects and Setting

Students in a business management course at a large, public, mid-western U.S. university participated in the study. Sixty-five percent of the students were in their senior year, thirty percent were juniors, and the rest were graduate students. Fifty-four percent were female. Most were Caucasian. Thirty-nine students participated in the first administration, and thirty-five in the second. Thirty-one students participated in both data collections, and they comprise the sample for this study.

Procedures

The first administration presented respondents with a Quest-Sort document. They were asked to sort sixty value statements into nine columns according to how "Undesirable" or "Desirable" these values would be to them in an employing organization. The number of boxes in each column dictated the number of value statements that could be assigned to that column, in this case permitting 2, 4, 7, 11, 12, 11, 7, 4, and 2 assignments across the row of columns, respectively. A large wall clock was readily visible, and respondents were instructed to record the times at which they started to rank value statements, and the times at which they finished, although it was emphasized that they could use as much time as they required. Respondents were also asked to comment in writing on the back of the document with respect to any difficulties or confusion they might have regarding the task.

Two weeks later, the same group of respondents was asked to perform a traditional card-sort. They were each provided an envelope containing a deck of sixty cards, one for each cultural value statement. Respondents were instructed to sort the cards into nine piles, from left to right, in terms of how "Undesirable" or "Desirable" the value statements were as characteristics of employing organizations. The

number of cards permitted in each pile forced the same distribution as in the Quest-Sort, and a template reflecting the target distribution was projected overhead. In addition, respondents were provided a score sheet, on which they were asked to record the number of the pile, 1 - 9, to which they assigned each value statement card. At the top of the score sheet, respondents also recorded starting and finishing times. At the bottom, they were asked to indicate whether they found the Quest-Sort or the card-sort easier to complete accurately. Finally, on the back of the score sheet, respondents reported any difficulties with the card-sort, and made general comments regarding their participation in the study.

Results

The Quest-Sort and card-sort were compared in terms of time to complete, ease, and similarity of results. On average, respondents completed the paper-and-pencil Quest-Sort in 9.81 minutes (s.d. = 2.41). The traditional card-sorting took an average of 14.51 minutes (s.d. = 3.86), a significant increase of nearly 50% ($t = 13.27$, $p < .001$, two-tailed). Sixteen students who participated in both administrations indicated preference for the Quest-Sort, while 15 preferred the card-sort. Since all students performed the card-sort second, there might be an order effect, but it is impossible to determine what it would be.

Comments from individuals preferring the Quest-Sort suggested that the format makes it easier to accurately conduct initial rankings, because all items are readily visible for scanning. On the other hand, those who preferred the card-sort said that the Quest-Sort approach makes adjustments to initial rankings more difficult than does the card-sort. Two students reported a problem with the card-sort when cards fell from their constrained work spaces to the floor.

To examine similarity of results, the column assignments for all items in the Quest-Sort were correlated with the pile assignments for all cards in the card-sort, by respondent. The median correlation between them was $r = .61$, with a maximum of $r = .79$. These coefficients are essentially similar to test-retest reliability estimates, considered reasonably stable at $r = .69$ (Cronbach, 1986). These results suggest that the two methodologies are roughly parallel, though

not identical.

Summary

Administration costs, in terms of space requirements and respondent time, were substantially lower for the Quest-Sort than for the card-sort. Quest-Sort results compared reasonably well with card-sort results, and approximately equal numbers of respondents reported preference for either approach. The next study was undertaken to examine the internal validity of Quest-Sort rankings, relative to the validity of card-sort rankings.

Study 2

Subjects and Setting

Students in two business management courses at a small, southern U.S., nontraditional university participated in this study. Students ranged in age from 20 to 50 years, with a mean age of 26.2 years. Fifty-three percent were female, 82% were employed, and most were Caucasian. Seventeen students provided complete, matching data across three separate-item sorts, as described next: (1) paired comparisons; (2) Q sorts; and (3) Quest-Sorts.

Procedures

Three data collections were administered in this study. The first was used to establish a benchmark for respondents' rankings of the importance of 15 forms of organizational rewards, drawn from the work goals literature (cf. Herzberg, Mausner, Capwell, & Snyderman, 1959; Lawler, 1971), including cash bonuses, paid time off, and promotions. Respondents were presented all possible paired comparisons of 15 alternative organizational rewards (i.e., 105 pairs), and instructed to select the more important item from each pair. Each item was presented first within pairs 7 times and second within pairs 7 times. Frequency of item selection provided importance rankings for the respective rewards. Although limited to only 105 paired comparisons in the interest of cognitive and time demands, this exercise was

intended to be rigorous enough to provide as accurate a ranking as possible, constituting a standard against which to measure other ranking methods.

The other two data collections involved Quest-Sort and Q sort methodologies, alternated to control for possible order effects. Two weeks after the paired-comparisons exercise, approximately one-half of the respondents from the first administration were asked to conduct a Q sort of 15 cards bearing the same reward labels, while the other half were asked to sort the identical items on a Quest-Sort document. In each case, the 15 items were forced into 7 categories, from "least important" to "most important," arrayed 1, 2, 3, 3, 3, 2, and 1 item(s), respectively.

Two weeks later, respondents who had previously performed a Q sort were then asked to perform a Quest-Sort of identical items, and respondents who had previously performed a Quest-Sort performed a Q sort of the same items. Each sort provided another importance ranking of organizational rewards. Respondents identified themselves by number in each administration, in order to match ranking profiles across methods, by respondents.

Results

The profiles of ranks derived from the paired comparisons, Q sorts, and Quest-Sorts were correlated, by respondent. Spearman coefficients between the Q sort and Quest-Sort profiles ranged from $r_S = .27$ to $r_S = .92$, averaging $r_S = .68$ (s.d. = .16). Correlations between the Q Sort profiles and the paired-comparisons profiles were between $r_S = .25$ and $r_S = .97$, with a mean of $r_S = .61$ (s.d. = .21). Correlations between the Quest-Sort profiles and the paired-comparisons profiles ranged from $r_S = .35$ to $r_S = .93$, with a mean of $r_S = .62$ (s.d. = .17).

The correlations across the Q sort and Quest-Sort profiles suggests ($\bar{r}_S = .68$), once again, that the two methodologies are roughly parallel. In addition, the nearly identical mean correlations between the Q sort and paired-comparisons profiles ($\bar{r}_S = .61$), and between the Quest-Sort and paired-comparisons profiles ($\bar{r}_S = .62$) suggests that the two methodologies demonstrate about the same level of internal validity.

As another test of methodology similarity, I correlated profiles and factor analyzed the correlation matrices for respective data collections. The number of resulting orthogonal factors indicates the number of different points of view in the person sample, while an individual's factor loading indicates his or her sharing of that perspective (McKeown & Thomas, 1988). Sorts for those individuals whose factor loadings are statistically significant on one and only one factor define that particular point of view (Brown, 1986).

Both the eigenvalue criterion (i.e., > 1.0) and the scree plots suggested 5-factor solutions for both analyses. After varimax rotation, the 5-factor solutions explained more than 78% and 82% of the variance in Q-sort and Quest-Sort profiles, respectively, and all respondents had statistically significant ($p < .05$) loadings on one or more of the five factors. Although the resulting factor patterns were not identical, they were strikingly similar. Indeed, there was a 75% overlap between sorts in terms of those respondents defining particular factors. For example, respondents #4, #5, #9, and #14 all had their highest and sole significant factor loadings on a distinct factor which they described in each sort, representing 100% overlap for those four respondents.

As a final test of sort comparability, I conducted second-order factor analysis of the two factor arrays. As presented in Table 1, four of five factor arrays from separate sorts loaded on the same factor in the second-order analysis, while the fifth factor from each sort defined a separate factor in the second-order analysis. This provides statistical support for the conceptual comparability of the separate 5-factor solutions (Dennis, 1992/1993).

Summary

This study demonstrates reasonable comparability across Q-sort and Quest-Sort profiles, in terms of within-person correlations, the number of attitudes toward reward rankings, and the structural representatives for those attitudes among respondents. In addition, this study suggests that both sort approaches demonstrate similar degrees of validity, when compared to paired-comparison rankings.

Consequently, the results of these studies suggest that the Quest-Sort, while providing slightly different rankings than the card-sort, nonetheless provides equally valid rankings. In addition, the Quest-Sort

apparently offers potential for economies in the areas of space utilization and time-to-complete for respondents. Nonetheless, considering the relatively small samples for these studies, and the fact that all respondents were students, further examination seems justified.

Table 1
Second-Order Factor Matrix Comparing Q Sort and Quest-Sort Factor Arrays

	Factor				
	1	2	3	4	5
Q Sort Factor 1	-90**	-19	00	-21	19
Q Sort Factor 2	27	-78**	09	-40	17
Q Sort Factor 4	-17	59*	01	17	28
Q Sort Factor 3	13	-08	84**	19	-03
Q Sort Factor 5	25	08	05	-21	-88**
Quest-Sort Factor 1	-95**	06	06	22	15
Quest-Sort Factor 2	26	-55*	19	48	-45
Quest-Sort Factor 4	25	80**	23	02	27
Quest-Sort Factor 3	-22	16	84**	-21	-04
Quest-Sort Factor 5	-04	05	-01	93**	23

* Factor Loadings > .490 are significant at $p < .05$.
** Factor Loadings > .645 are significant at $p < .01$.

Discussion

I used the Quest-Sort given in the appendix in a field survey, examining relationships among organizational cultures and employee attitudes (Howard, 1993). More than 200 workers in ten different firms provided the data. The Quest-Sort seemed appropriate because the rather paradoxical construct of culture as subjective meaning in the aggregate requires relatively large samples, because all respondents were being paid for their time, and because some of the areas provided for data collection were very crowded. Although generally successful, the Quest-Sort did present a few problems.

Some respondents apparently lost track of which of the 48 items they

had assigned to boxes, returning surveys with empty boxes and/or unassigned items. Similarly, and usually concurrently, the same item was occasionally assigned twice in the Quest-Sort. Free-distribution card sorts sometimes experience similar problems.[1] Although this had occurred only once in the student sample for study #1, it suggests that 48 items may be near the upper limit for a Quest-Sort, in terms of cognitive challenge. Since most persons seem capable of as many as 20 discriminations among items (Block, 1961), and card-sorts are generally appropriate with large Q samples of 60-90 items (Kerlinger, 1986), the Quest-Sort may therefore be most useful when the range of items in the Q set is between 20 and 60.

Instructing respondents to cross items off as they were assigned reduced tendencies for unassigned or dual-assigned items. It was also helpful to run through a simple practice sort, ranking colors of the rainbow in terms of their similarity to blue, some people sorting left-to-right, some right-to-left, and others following different strategies. In light of the difficulties in making adjustments to initial assignments, it is also advisable to use a pencil with a good eraser.

In conclusion, under certain conditions the Quest-Sort represents a viable alternative application of Q methodology. Furthermore, Quest-Sort offers potential for savings in response time and other space and administration costs. Though not strictly equivalent to traditional card-sorts, Quest-Sort appears to be about equally valid in discovering subjective structure.

Appendix

An organization's cultural values may be expressed as shared expectations about what is important, how to behave, or what attitudes are appropriate. Please read through the 48 value statements below. Then, sort them into the nine columns of boxes, by placing the item number for each value in one of the boxes. At the LEFT end, place the numbers of those values that you consider to be the Most UNCHARACTERISTIC of YOUR organization's culture, and at the ***right*** end place the numbers of those values that are the Most ***Characteristic*** of your organization.

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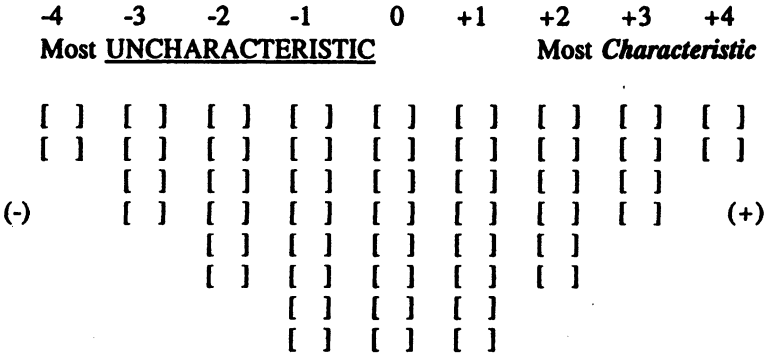
[1]Thanks to an anonymous reviewer for pointing this out.



1. Opportunities for professional growth
2. Supportiveness
3. Competitiveness
4. Control
5. Concern for nature/ environment
6. Employee development
7. Consensus/agreement
8. Innovation
9. Good company reputation
10. Public credibility/ integrity
11. Expanding markets
12. Industry rivalry/ leadership
13. Willingness to experiment
14. Written policies
15. Employee safety & health
16. Legal/ethical compliance
17. Standardized operations
18. Predictability
19. Centralized decision making
20. Achievement oriented
21. Accuracy
22. Results oriented
23. Analytical
24. Respect for the individual
25. Stability
26. High expectations
27. Security
28. Social responsibility
29. Precise
30. Aggressiveness
31. Leading-edge technologies
32. Community involvement
33. Goal oriented
34. Participative decision making
35. Collaboration
36. Productivity
37. Team orientation

38. Tolerance for mistakes
39. Group harmony
40. Rule oriented
41. Familiar routines
42. Respect for authority
43. Clear chain of command
44. Efficiency/excellence
45. Maximum output
46. Cooperation
47. Attention to detail
48. Creative problem solving

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