

qsort R package: A New Tool for Scoring Q-sort Data

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Software

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Summary

The use of Q-sets to describe subjective views on a specific research domain, in a way suitable for quantitative data analysis, has a long tradition in psychological research. Generally, Q-sets consist of a large set of items- usually sentences printed on separate cards- that describe personality and behavioral characteristics. These items are sorted into a different number of numerical categories (e.g., 9) based on their salience as descriptors of an individual (e.g., 1- most uncharacteristic to 9- most characteristic). An individual Q-sort (i.e., the scores of all items descriptive of an individual) can then be compared (correlated) with criteria Q-sorts (description of a hypothetical person at the extreme high end of a domain) to index a score for a particular domain. Also, subsets of items can be averaged to derive a scale score (J. Block 1961, J. H. Block and Block (1969), J. H. Block and Block (1980), John, Montgomery, and Tate (2014), Vaughn, Santos, and Coppola (2014)). In this paper we present an R package that computes scores from criteria Q-sorts and item scales.

The **qsort** package includes descriptions and scoring procedures for four different Q-sets: Attachment Q-set (version 3.0) (???), California Child Q-set (J. H. Block and Block 1969), Maternal Behaviour Q-set (version 3.1) (Pederson, Moran, and Bento 1999), and Preschool Q-set (Baumrind 1968) revised by Wanda Bronson).

The package contains four objects:

- **ex_qsort** - example Q-sort datasets for the four different Q-sets: aqs, ccq, mbqs, pq.
- **qsets** - a list containing the four different datasets mentioned above.
- **qsort_score** - a function which uses the criteria scores and/or scales from the **qsets** datasets to compute scores for Q-sort data.
- **print_cards** - a function which creates a .pdf file where items' descriptions are printed in separate cards.

Each Q-set dataset in **qsets** includes: (1) a column with item numbers, (2) a column with Q-set initials, (3) a column with item description, (4) plus a variable number of columns according to available criteria sorts and scales. The **aqs** dataset includes: (1) security criterion scores, (2) dependency criterion scores, (3) (Pederson and Moran 1995) scales; compliance, secure base, fussy/difficult, enjoys physical contact, affective sharing, (4) and (Posada et al. 1995) scales; smooth interactions with mother, physical contact with mother, interactions with other adults, proximity to mother. The **ccq** dataset includes scores of five criteria Q-sorts: (1) social competence criterion scores (2) self-esteem criterion scores (3) ego-resiliency criterion scores, (4) ego-control criterion scores, (5) social desirability criterion scores, and (6) emotion regulation scale scores retrieved from [shields1997emotion]. Ego-resiliency and ego-control criteria scores data for this dataset

was retrieved from (Waters et al. 1985) and from Brian Vaughn (personal communication). The **mbqs** dataset includes scores of one criterion Q-sort: (1) sensibility criterion scores. The data for this dataset was retrieved from (Pederson, Moran, and Bento 1999). Finally the **pq** dataset includes scores of three criteria Q-sorts: (1) social competence, (2) self-esteem, and (3) social desirability. The data for this dataset was retrieved from (Waters et al. 1985).

(Waters et al. 1985) analysis of the discriminant validity of related constructs in the California Child Q-set (J. H. Block and Block 1969) and the Preschool Q-set (Baumrind 1968) revised by Wanda Bronson) indicate that social desirability scores should be used to control for response bias when computing participants' scores (correlations) from criterion scores. Response bias in Q-sorts can occur when observers, confronted with two equally descriptive items of a participant, place one of the items higher (or lower) in the sort because it is more (or less) socially acceptable. Thus, the authors state that participant's scores are best indexed by a partial correlation between her/his Q-sort description and the criterion Q-sort, controlling for social desirability. The `qsets$ccq` and `qsets$pq` datasets include social desirability criterion scores. For these two Q-sets (**ccq** and **pq**) the `qsort_score` function will compute partial correlations between individual Q-sorts and criteria Q-sorts' scores, controlling for social desirability.

The following installs and loads `qsort` package:

```
# install qsort from CRAN
install.packages("qsort")
```

```
# load qsort
library(qsort)
```

Examples

The `qsort_score` function uses the criteria scores and/or scales from the `qsets` datasets to compute scores for Q-sort data. The following applies the `qsort_score` function to `ex_qsort$ccq` and stores the output data frame in `data_ccq`.

```
R> data_ccq <- qsort_score(x = ex_qsort$ccq, qset = "ccq", item1 = "ccq1",
+                          subj_id = "participant", group_id = "classroom")
R> data_ccq
```

	qset	participant	classroom	scomp_c	sest_c	egores_c	egocont_c
1	ccq	1	1	-0.074	-0.093	-0.145	-0.012
2	ccq	2	1	-0.023	0.008	0.090	0.157
3	ccq	3	1	0.092	0.086	0.112	-0.021
4	ccq	4	1	-0.105	-0.113	-0.182	-0.128
5	ccq	5	1	-0.010	-0.039	-0.092	-0.092
6	ccq	6	2	-0.104	-0.079	-0.042	0.156
7	ccq	7	2	0.051	0.079	0.168	0.169
8	ccq	8	2	0.049	0.066	0.153	0.185
9	ccq	9	2	-0.024	-0.007	0.009	-0.026
10	ccq	10	2	-0.039	-0.046	-0.033	0.098
	sdes_c	partial_scomp_c	partial_sest_c	partial_egores_c			
1	-0.137	0.113	0.047	-0.054			
2	0.053	-0.160	-0.073	0.086			
3	0.132	-0.061	-0.053	-0.002			
4	-0.160	0.088	0.047	-0.089			

5	-0.053	0.085	0.012	-0.090
6	-0.089	-0.054	-0.004	0.068
7	0.124	-0.139	-0.053	0.121
8	0.118	-0.130	-0.068	0.101
9	0.007	-0.069	-0.026	0.004
10	-0.042	-0.003	-0.019	0.005
partial_egocont_c shields_s_emreg				
1	-0.007		4.3	
2	0.155		5.9	
3	-0.026		5.1	
4	-0.123		3.7	
5	-0.090		4.4	
6	0.160		5.7	
7	0.166		5.9	
8	0.182		5.9	
9	-0.026		5.0	
10	0.100		5.2	

For details about the `qsort_score` function usage type `?qsort_score`. The first three columns of `data_ccq` correspond to **qset**, **participant** and **classroom** identification variables; the remaining columns refer to correlation values computed from correlating individual Q-sorts with the criteria Q-sorts' scores (present in `qsets$ccq`). The names of these columns follow the column names in **qsets** datasets (e.g., social competence-**scomp_c**, self-esteem-**sest_c**, etc.). Variable names are detailed in the help file of **qsets**. See `?qsets` for details. Scores obtained from partial correlations controlled by social desirability correspond to columns in the output data frame with names starting with **partial_**.

To create a .pdf file where items' descriptions are printed in separate cards, the `print_cards` function can be used as in the following example:

```
R> print_cards(qset = "aqs", desc_col = "description", dir.print = getwd())
```

This creates a .pdf file, in in the working directory, with Attachment Q-set item cards.

For further details on how to use the functions provided and the Q-set datasets contained in the **qsort** package type `help(qsort)`. At the moment, **qsort** package only analyses data for four different Q-sets, but it can be easily updated to extend its capabilities to other Q-sets. We believe this tool to be of great interest and utility for Q-sort researchers from different areas of social sciences and we invite them to contribute with new or updated versions of existing Q-sets, criterion scores and derived scales.

Baumrind, D. 1968. *Manual for the Preschool Behaviour Q-Set. Parental Research Project*. Berkeley, CA: Institute of Human Development, University of California.

Block, J. 1961. *The Q-Sort Method in Personality Assessment and Psychiatric Research*. Springfield, IL: Charles C. Thomas.

Block, J. H., and J. Block. 1969. *The California Child Q-Set*. Berkeley, CA: Institute of Human Development.

———. 1980. "The Role of Ego-Control and Ego-Resiliency in the Organization of Behaviour." Hillsdale, NJ: Erlbaum.

John, A., D. Montgomery, and A. L. H. Tate. 2014. "Using Q Methodology in Conducting Research with Young Children." In *O. N. Saracho (Ed.), Handbook of Research Methods in Early Childhood Education: Review of Research Methodologies*, 147–73. Charlotte, NC: Information Age Publishing.

Pederson, D. R., and G. Moran. 1995. "A Categorical Description of Infant-Mother Relationships in the Home and Its Relation to Q-Sort Measures of Infant-Mother Interaction." *Monographs of the Society for Research in Child Development* 60 (2/3):111–32. <https://doi.org/doi:10.1111/j.1540-5834.1995.tb00207.x>.

Pederson, D. R., G. Moran, and S. Bento. 1999. *Maternal Behaviour Q-Sort (Version 3.1)*. London, ON: Psychology Department, Western University.

Posada, G., E. Waters, J. A. Crowell, and K. Lay. 1995. "Is It Easier to Use a Secure Mother as a Secure Base? Attachment Q-Sort Correlates of the Adult Attachment Interview." *Monographs of the Society for Research in Child Development* 60 (2/3):133–45. <https://doi.org/doi:10.1111/j.1540-5834.1995.tb00208.x>.

Vaughn, B. E., A. J. Santos, and G. Coppola. 2014. "Q-Methodology and Q-Sorting as Tools for Addressing Research Questions in Educational Settings: Historical Overview and Illustrations Using Three Standardized Q-Sets." In *O. N. Saracho (Ed.), Handbook of Research Methods in Early Childhood Education: Review of Research Methodologies*, 175–202. Charlotte, NC: Information Age Publishing.

Waters, E., D. M. Noyes, B. E. Vaughn, and M. Ricks. 1985. "Q-Sort Definitions of Social Competence and Self-Esteem: Discriminant Validity of Related Constructs in Theory and Data." *Developmental Psychology* 60 (2/3):508–22. <https://doi.org/doi:10.1037/0012-1649.21.3.508>.