Annotated Output for Coordinate Grid Procedure

James W. Grice, Ph.D.

Oklahoma State University

July, 26th, 2003

The coordinate grid is a novel repertory grid procedure in which the person completing the grid ranks a set of figures (usually people) in terms of their general similarity to one another. Indices of logical inconsistency and integrative complexity can then be computed from the resulting rankings. The coordinate grid was invented and developed by Bill Chambers over twenty years ago. Outside of his own research (see references below) and a paper by Grice and Hopper (2002), however, the coordinate grid has surprisingly received very little attention. One reason for this apparent lack of interest may be the absence of clear examples detailing the interpretation of coordinate grid data and its novel indices. This paper attempts to fill this void by providing a detailed interpretation of an individual's coordinate grid.

The coordinate grid in this example was completed by a 20 year-old male college student with the alias "John X":

Coordinate Grid Analyses for John X

Original Grid

	Mom	Dad	Brother	Cathy	Self	Jenny	Helen	Susan
Mom	1.0	7.0	2.0	3.0	8.0	4.0	6.0	5.0
Dad	7.0	1.0	5.0	4.0	2.0	6.0	3.0	8.0
Brother	2.0	5.0	1.0	3.0	8.0	7.0	6.0	4.0
Cathy	3.0	5.0	2.0	1.0	8.0	6.0	7.0	4.0
Self	5.0	2.0	6.0	7.0	1.0	3.0	4.0	8.0
Jenny	7.0	3.0	8.0	6.0	2.0	1.0	4.0	5.0
Helen	4.0	2.0	8.0	6.0	3.0	5.0	1.0	7.0
Susan	6.0	5.0	2.0	3.0	8.0	4.0	7.0	1.0

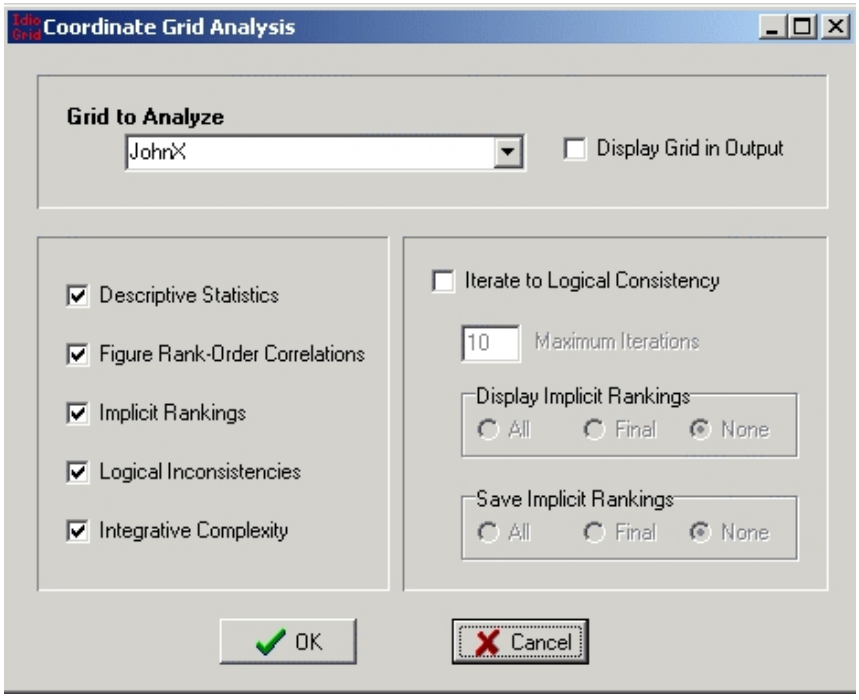
John completed the grid by ranking the figures in the columns in terms of their general similarity to the target figures in the rows.

The figures in John's grid are Mom, Dad, Brother (his only, older sibling), Cathy (his brother's wife), Self, Jenny (his current girlfriend), Helen (a friend), and Susan (a girl he met recently). At the time of completing the grid, John X had developed an infatuation for Susan and was seriously thinking of breaking off his relationship with Jenny, whom he had liked primarily as a non-romantic friend. As can be seen in the grid, the original rankings are reported with both row and column labels. The coordinate grid makes no distinction between constructs and elements, hence the same labels appear down the side and across the top of the grid.

The grid is first read in row-wise fashion. For example, consider the first row labeled "Mom." The coordinate grid procedure assumes that each figure is most like itself, and hence Mom (the first column) automatically receives the highest possible ranking of 1. John then ranked his brother as most like Mom (brother's ranking was 2) and himself as least like Mom (he ranked himself as 8th most like Mom). Now examine the row labeled "Self", which represents how similar John saw other individuals in reference to himself. He ranked Dad as second most like himself, Mom as fifth most like himself, and Susan as least like himself (it is interesting to note that he ranked his new romantic interest as overall least like himself). John's entire set of original rankings is hence reported above.

Now examine the columns of John's grid and notice a certain degree of polarization with respect to himself. Specifically, consider the column labeled "Self." John ranked himself as least like (rankings of 8) four people in the grid (Mom, Brother, Cathy, and Susan), most like two people in the grid, and 3rd most like Helen. There appears to be very little middle ground. John is overall either very similar or dissimilar to others.

This grid can be entered into Idiogrid as a coordinate grid type and analyzed as described herein. After the grid has been entered, the coordinate grid analysis options window can be activated by selecting *Analyses –> Coordinate Grid Analysis* from the **Main Menu** in Idiogrid. The following options under the coordinate grid procedure were selected for this example:



Descriptive statistics computed from the original rankings are reported first:

Descriptive Statistics for Figure Rankings

	Mean	Std	Sum of Squares	% Total SS
Mom	4.86	1.95	22.86	10.94
Dad	4.14	1.86	20.86	9.99
Brother	4.71	2.75	45.43	21.75
Cathy	4.57	1.72	17.71	8.48
Self	5.57	3.05	55.71	26.68
Jenny	5.00	1.41	12.00	5.75
Helen	5.29	1.60	15.43	7.39
Susan	5.86	1.77	18.86	9.03
Total SS:	208.86			

Note. Values are based upon columns of the Original Grid, omitting the 1s (which are given).

On average, John ranked Susan as least similar to the other people in the grid (mean = 5.86), and his dad as most like other people in the grid (mean = 4.14). The possible mean values range from 2.0 to the number of figures in the grid (8 in this example). Figures with relatively low sums of squares consistently receive the same ranking in the coordinate grid. For example, imagine if John had included a highly disliked person in his grid. That person would consistently be ranked least like everyone else and consequently yield a mean close to 8 and a low sum of squares value. John was most consistent in assigning middle rankings to Jenny (% total SS = 5.75, mean = 5.00). Consistent with the polarization noticed in his original grid, he showed the greatest degree of variability with respect to himself (% total SS = 26.68).

Rank-order correlations among the figures are computed for the rows of the original grid and reported as follows:

Figure Correlations

	Mom	Dad	Broth	Cathy	Self	Jenny	Helen	Susan
Mom	1.00	-0.67	0.81	0.79	-0.62	-0.74	-0.60	0.45
Dad	-0.67	1.00	-0.43	-0.40	0.69	0.38	0.64	-0.57
Brother	0.81	-0.43	1.00	0.90	-0.71	-0.95	-0.60	0.57
Cathy	0.79	-0.40	0.90	1.00	-0.76	-0.81	-0.69	0.69
Self	-0.62	0.69	-0.71	-0.76	1.00	0.71	0.71	-0.79
Jenny	-0.74	0.38	-0.95	-0.81	0.71	1.00	0.52	-0.43
Helen	-0.60	0.64	-0.60	-0.69	0.71	0.52	1.00	-0.86
Susan	0.45	-0.57	0.57	0.69	-0.79	-0.43	-0.86	1.00

Note. Computed from the rows of the Original Grid.

These values can be examined to evaluate the similarities in the patterns of rankings for different pairs of figures. For example, John's rankings for Cathy and Brother were highly similar (r = .90), and Jenny and Brother were highly dissimilar (r = -.95). It is also interesting to note that most all of John's correlations range from .40 to .80 in absolute value. In other words, there are very few correlations close to zero. John seems to see people as fairly similar or dissimilar (i.e., in either one "camp" or the other). It would certainly be of value to conduct a principal components analysis on the grid to see if the figures in the grid formed two distinct clusters.

The Implicit Rankings are computed from the Figure Correlations above and reported as follows:

Implicit Rankings

	Mom	Dad	Broth	Cathy	Self	Jenny	Helen	Susan
Mom	1.00	7.00	2.00	3.00	6.00	8.00	5.00	4.00
Dad	8.00	1.00	6.00	5.00	2.00	4.00	3.00	7.00
Brother	3.00	5.00	1.00	2.00	7.00	8.00	6.00	4.00
Cathy	3.00	5.00	2.00	1.00	7.00	8.00	6.00	4.00
Self	5.00	4.00	6.00	7.00	1.00	2.50	2.50	8.00
Jenny	6.00	4.00	8.00	7.00	2.00	1.00	3.00	5.00
Helen	5.50	3.00	5.50	7.00	2.00	4.00	1.00	8.00
Susan	4.00	6.00	3.00	2.00	7.00	5.00	8.00	1.00

The values are derived by ranking, from greatest to least, the individual rows of the Figure Correlations matrix. For example, consider the row labeled "Mom" in the Figure Correlations matrix above. Notice that Mom is most highly correlated with herself (r = 1.00) and least correlated with Jenny (r = -.74). Consequently, the Implicit Rankings for Mom and Jenny in the row labeled "Mom" are 1.0 and 8.0, respectively. The Implicit Rankings represent the overall degree of similarity between any particular pair of figures in the context of the entire grid. The primary purpose and use of these values is in the computation of the Logical Inconsistencies reported next.

Logical Inconsistencies

	Mom	Dad	Broth	Cathy	Self	Jenny	Helen	Susan
Mom	0.00	0.00	0.00	0.00	-2.00	4.00	-1.00	-1.00
Dad	1.00	0.00	1.00	1.00	0.00	-2.00	0.00	-1.00
Brother	1.00	0.00	0.00	-1.00	-1.00	1.00	0.00	0.00
Cathy	0.00	0.00	0.00	0.00	-1.00	2.00	-1.00	0.00
Self	0.00	2.00	0.00	0.00	0.00	-0.50	-1.50	0.00
Jenny	-1.00	1.00	0.00	1.00	0.00	0.00	-1.00	0.00
Helen	1.50	1.00	-2.50	1.00	-1.00	-1.00	0.00	1.00
Susan	-2.00	1.00	1.00	-1.00	-1.00	1.00	1.00	0.00

Note. Values departing from zero indicate logical inconsistencies.

The Logical Inconsistencies (LI) matrix is one of the two primary matrices produced by the coordinate grid procedure. It is computed by subtracting the Original Grid from the Implicit Rankings. It thus represents a

comparison of John's explicit rankings to his general, implicit rankings derived from the rank-order correlations. Chambers (1986) suggests that values departing from zero represent points of conflict in the person's construct system. When interpreting these logical inconsistencies, it is often -- although not always -- useful to begin with the largest absolute values. For John, the largest point of conflict is between Jenny and Mom (LI = 4.0). A positive number means that the degree of similarity between the two figures was overestimated (or overstated) in the original rankings. In addition, the value is interpreted from the column to the row. The 4.0 LI is therefore interpreted as John overestimating the similarity of Jenny to Mom in his original rankings. Look back at the original grid. Jenny was ranked 4th most like Mom. Yet, Jenny correlated in the most extreme, negative fashion with Mom (see the rank-order correlations) and was implicitly ranked 8th or least like Mom (see the implicit rankings). The two rankings do not match. When asked to explore this inconsistency and describe ways in which Jenny and Mom were similar, John found it difficult to enumerate very many qualities. What he did discuss, however, was that both Jenny (his current girlfriend) and Mom thought the young couple were perfect for each other; and if he broke up with Jenny, he would hurt his mother as much or more than Jenny. John overestimated Jenny's similarity to his sister in-law (Cathy; LI = 2.0) who also thought that Jenny was a wonderful match for him. In terms of their personalities, John saw Jenny as opposite of Mom and Cathy, stating that Jenny was shy and someone who secretly envied successful "socialites", whereas Mom and Cathy were successful socialites with high self-esteem. For John, self-esteem was equated with confidence in social situations. In the moment of making his original rankings, John forced Jenny to appear more similar to Mom and Cathy than she really was – resulting in the logical inconsistencies.

Negative logical inconsistencies are interpreted as underestimates. For example, John underestimated Jenny's similarity to both Dad (LI = -2.0) and Helen (LI = -1.0). In other words, when conducting the rankings, John tried to force Jenny away from both Dad and Helen in terms of their similarities. When asked to explore this inconsistency and describe how Jenny was similar and/or different from the other two people, John was able to enumerate a number of similarities but very few dissimilarities. He also discussed how his Dad and Helen were both people whom he liked, personally, but whom he did not respect because they were socially awkward. He also saw Jenny as socially awkward, but likely wanted to preserve his respect for her as his girlfriend by attempting to deny her similarity to Dad and Helen -- resulting in the logical inconsistency.

The remaining values can be explored in similar fashion. As this example points out, however, understanding the nature of the inconsistencies often involves interviewing the individual who completes the grid. Often, straight-forward questions such as "Please tell me how A and B are similar (or dissimilar) to one another?", or "Describe the relationship between yourself, A, and B" serve as sufficient probes toward understanding the inconsistencies. For positive inconsistencies between two figures (A and B) one could also ask, "The results suggest that you are overlooking or ignoring some important differences between A and B. What is it about A and B that make them so similar? Now how would you see them as

different?" For negative inconsistencies simply switch "differences" and "similarities."

The row and column sums of the logical inconsistencies (as absolute values) are then reported for each figure along with a grand total as follows:

Logical Inconsistency Totals

	Rows	***Columns***
Mom	8.00	6.50
Dad	6.00	5.00
Brother	4.00	4.50
Cathy	4.00	5.00
Self	4.00	6.00
Jenny	4.00	11.50
Helen	9.00	5.50
Susan	8.00	3.00

Grand Total: 47.00

Note. Results represent totals of absolute values.

The row sums can be used to identify those figures that incurred a large number of inconsistencies when they served as the targets during the original grid administration. A large row sum could hence signify a particular "victim" in the grid; that is, someone who was the target of numerous over- and under-estimates of similarity. John's row totals seemed to be fairly evenly spread although his parents, Helen, and Susan were the objects of his inconsistencies most often. The column totals can be used to identify possible "aggressors" in the grid, or figures associated with a large number of inconsistencies when ranked to other targets (figures) in the original grid administration. John's results show clearly that Jenny is the primary aggressor in his grid. Given that his relationship with Jenny is the current emotional focal point of his life and that Jenny is something of a blessing (she is favored by Mom and Cathy, both whom John respects very much) and a curse (John would rather be dating Susan), this finding is not surprising.

The grand total can be used as an indicator of the overall degree of conflict in the coordinate grid. A value of 0 would indicate no conflict at all. Unfortunately, no norms exist for what constitutes a particularly high total logical inconsistency score.

The Integrative Complexity matrix is the second of two primary matrices produced by the coordinate grid procedure and is reported next:

Integrative Complexity

	Mom	Dad	Broth	Cathy	Self	Jenny	Helen	Susan
Mom	0.00	0.00	0.00	0.00	3.00	-3.00	2.00	-1.00
Dad	0.00	0.00	0.00	-1.00	0.00	3.00	1.00	3.00
Brother	0.00	0.00	0.00	1.00	2.00	-1.00	-2.00	2.00
Cathy	0.00	1.00	-1.00	0.00	1.00	0.00	1.00	1.00
Self	-3.00	0.00	-2.00	-1.00	0.00	1.00	1.00	0.00
Jenny	3.00	-3.00	1.00	0.00	-1.00	0.00	-1.00	1.00
Helen	-2.00	-1.00	2.00	-1.00	-1.00	1.00	0.00	0.00
Susan	1.00	-3.00	-2.00	-1.00	0.00	-1.00	0.00	0.00

Note. A value not equal to zero indicates a lack of integrative complexity.

As the title implies, these values represent both integration and complexity. In essence, they indicate how richly each figure has been integrated into a framework consisting of all of the figures in the grid. Values of zero indicate a rich integration, whereas values departing from zero indicate a lack of integration. Unlike the logical inconsistencies, sign does not appear to weigh into the interpretation process and no distinction is made between columns and rows. Notice how John's row values, for example, are simple reflections of his column values. Perhaps because of this fact, the sums of absolute totals reported below are more interpretable than individual values in the integrative complexity matrix.

The integrative complexity row and/or column totals (as absolute values) are reported for each figure along with a grand total (see table on following page). The individual results can be used to identify figures who have been differentially treated in terms of how richly they are construed compared to the other figures in the grid. For example, if John had included a severely disliked person in the grid, that individual would likely have been ranked least like everyone else. The disliked person is treated in a simplistic, almost unidimensional fashion. He is a marginal figure and would consequently reveal an extremely high integrative complexity total score. Keep in mind that high integrative complexity scores indicate *a lack of* complex integration. In other words, the integrative complexity scores are reverse-keyed. Another example of how a relatively high score might result would be if John had viewed someone in the grid as so complex that he or she was most like every other figure in the grid, hence consistently receiving the highest ranking. In this case, the other figures in the grid would have been unfairly subsumed by the complex person.

For John's grid, there is no single figure that stands out in terms of his or her integrative complexity total score. Hence, to the extent that John is able to view these people and himself in a rich, integrated fashion, no single person is deviant.

The grand total can be used as an overall indicator of integrative complexity. A value of 0 would indicate perfect integration with maximum complexity. Like logical inconsistency, no norms exist for what constitutes a particularly high total.

Integrative Complexity Totals

	Rows/Columns
Mom	9.00
Dad	8.00
Brother	8.00
Cathy	5.00
Self	8.00
Jenny	10.00
Helen	8.00
Susan	8.00
Grand Total:	64.00

Note. Results represent totals of absolute values.

Further Analysis

Although the option was not chosen as part of the analysis above, John's grid can be iterated to a logically consistent grid. This option is shown in the Coordinate Grid options window as **Iterate to Logical Consistency.** Chambers, drawing on so-called "chaos" models, realized that the implicit rankings (see above) could be fed back into the grid as the original rankings. Repeating this process, the grid will approach perfect logical consistency. In this way, the grid analyst can use any given coordinate grid to create a model of perfect logical consistency (or near-perfect logical consistency since the process does not always converge on a total logical inconsistency score of zero). Chambers never published his findings regarding this mathematical-dynamic property of the coordinate grid; hence, no empirical studies are available. It is certainly worthy of investigation, however, and has hence been included as an option in Idiogrid. A proposed study, for instance, could involve presenting participants with their iterated, logically consistent grids. Their reactions to the grids, and the construing possibilities therein, could be assessed. Would the iterated grids open up new ways of construing the figures in the grid that would help the individuals confront the inconsistencies in their constructions?

References

Chambers, W. V. (1983). Circumspection, preemption and personal constructs. *Social Behavior and Personality, 11*, 33-35.

Chambers, W. V. (1985a). A repertory grid measure of mandalas. *Psychological Reports, 57*, 923-928.

Chambers, W. V. (1985b). A measure of the integrative complexity of personal constructs. *Journal of Social and Clinical Psychology, 3*, 213-223.

Chambers, W. V. (1985c). Logical consistency of personal constructs and choice behavior. *Psychological Reports, 57*, 190.

Chambers, W. V., Carlock, J., Olson, C., & Olson, D. (1986). Clinical and grid predictions of inconsistencies in individuals' personal constructs. *Perceptual and Motor Skills, 62*, 649-650.

Chambers, W. V., & Epting, F. R. (1985). Personality and personal construct logical consistency. *Psychological Reports, 57*, 1120.

Chambers, W. V., & Grice, J. W. (1986). Circumgrids: A repertory grid package for personal computers. *Behavior Research Methods, Instruments, and Computers, 18*, 468.

Chambers, W. V., & Parsley, L. (1987). Cognitive development, integrative complexity and logical consistency of personal constructs. *Psychology and Human Development, 2*, 7-11.

Chambers, W. V., & Sanders, J. (1984). Alcoholism and logical consistency of personal constructs. *Psychological Reports, 54*, 882.

Chambers, W. V., & Stonerock, B. (1985). Truth and logical consistency of personal constructs. *Psychological Reports, 57*, 1178.

Grice, J. W. & Chambers, W. V. (1994, July). *The logical consistency and integrative complexity of schizophrenic construct systems*. Paper presented at the Sixth Biennial meeting of the North American Personal Construct Network, Indianapolis.

Grice, J. W., & Hopper, M. (2002). The reliability of coordinate grid data. *Psychological Reports*, *91*, 1235-1243.