

Numbers into Pictures: Visualization in Social Analysis¹

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INTRODUCTION

Howard Wainer in *Picturing the Uncertain World* uses Figure 26.1, ‘Confidence in Institutions’, to illustrate a fine point of graph design. The chart, which appeared in the *New York Times*, nicely resolves the problem of the ‘distracting legend’:

In 1973 Jacques Bertin, the maître de graphique moderne, explained that when one produces a graph it is best to label each of the elements in the graph directly. He proposed this as the preferred alternative to appending some sort of legend that defines each element. His point was that when the two are connected you can comprehend the graph in a single moment of perception as opposed to having first to look at the lines, then read the legend, and then match the legend to the lines (Wainer, 2009: 96).

The designer Ben Schott achieves this goal, as Bertin advises, by labeling each of the lines in the chart. Even better – because this is a trend line with lots of data points where

the lines cross – the author labels the lines twice, on each side of the chart. Wainer does not tell us where the data in the chart comes from, nor does he comment on the pattern it suggests: a general decline in confidence in four of the five institutions and an upward, albeit volatile, trend in only one, the military. There is no need, however, to fault him for giving the data short shrift. After all, his focus is on how to chart information, not the information itself.

Nevertheless, American sociologists will readily recognize that the data comes from the General Social Survey (GSS),² and might then be drawn to the stories that could be told with the graph, which is why it appeared in the *New York Times* in the first place. The responses to the questions about confidence charted in Figure 26.1 refer to only five of the 13 major institutions that the GSS includes in its, now, every other year survey.³ When combined with additional information derived from the GSS and other sources, these

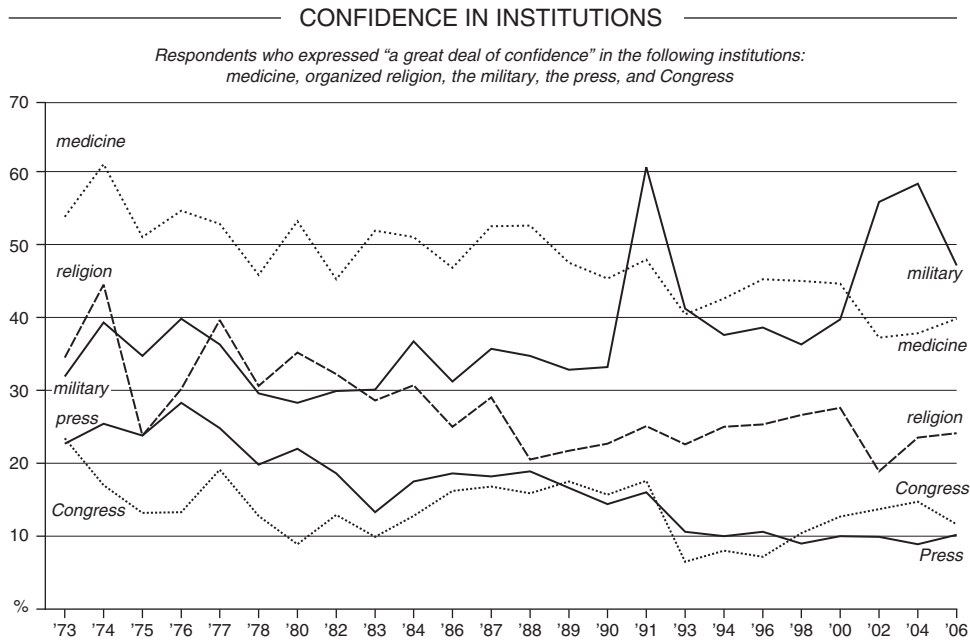


Figure 26.1 A graph taken from the 'News of the Week in Review' section of the 25 February 2007 issue of the *New York Times*. Designed by Ben Schott

Data source: General Social Survey (GSS), USA. Reproduced with permission.

responses suggest a steady and startling erosion of American public life over the last 35 years. This conclusion is not new and echoes both pundits of the left and right but, unlike their opinions, the data from the GSS is more reliable and less susceptible to transitory shifts in political enthusiasm. *To tell this story adequately, however, we must understand the data; and understanding data requires that we first see it, visualizing it in ways that reveal its patterns.*

In this chapter I demonstrate that making good and imaginative choices in visualizing evidence enables us to see what these questions, concerning confidence in 13 of America's most important institutions, the responses to them, and the array of numbers they generate, portend about the directions that the lives of Americans may be taking. While surveys like the GSS do provide evidence that social bonds might be fraying, a closer look at this data by sociologists yields a more modulated view. These GSS researchers, however, have not identified any

specific factors that are consistently associated with an overall decline in institutional confidence, with the possible exception of generational change. Nor have they pinpointed a social process that could explain why confidence should vary from one generation to the next. This chapter will conclude by identifying just such a mechanism and thereby demonstrate that the craft of visualizing data is essential for social analysis. Enlisting the cognitive competency of the eye in this manner leads us to make a surprising discovery that is obscured by more conventional statistical analysis.

In any event, the major goal of this chapter is to show how ubiquitous graphic design software – to wit the 'chart wizard' function in Microsoft Excel® – can be used to construct many, if not most, of the graphs needed to analyze and display simple descriptive statistics like those in Figure 26.1. The charts that I have created for this chapter will show what different types of charts are good for, when they should be used, and how

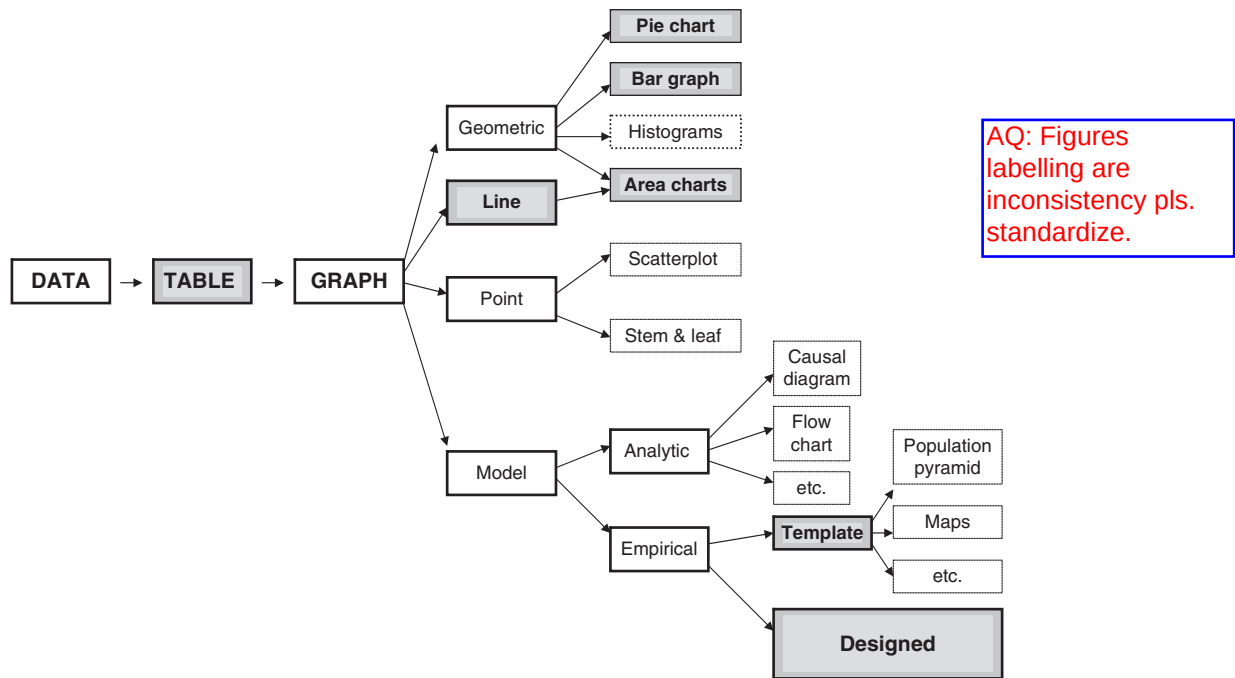


Figure 26.2 Typology of non-animated ('still') visual displays of information

they should be constructed. Figure 26.2 is a typology of some of the graphs that social scientists are able to deploy for analysis and communication. This chapter will focus specifically on those types that are shaded, beginning with elementary forms and progressing to the construction of idiosyncratic designs, which are often especially useful for making sense of complex analytic puzzles. Nevertheless, variants of the more elementary forms will reappear throughout as the story unfolds. The chapter's takeaway story is that sociologists should pay as much attention to the analytic and visual manipulation of descriptive statistics as they do to developing increasingly powerful algorithms.

This chapter will exemplify how to use good visualization techniques as analytic tools to resolve a specific sociological puzzle: Why has Americans' confidence in their institutions changed? Therefore, it will introduce the reader to visualization in sociology by modeling how to use visual display as an

analytic tool. This form of exposition is less common in the social sciences, which tend to prefer presenting general principles that are then selectively illustrated. Unfortunately, articulating the relationship between abstract concepts and concrete applications in this fashion is usually so formal and idealized that it rarely addresses the challenges faced in most empirical research, which are best served by exemplifying the kind of thinking – and pragmatic moves – useful for social analysis. Howard Becker refers to this process as deploying a 'trick of the trade', which he defines as:

A specific operation that shows a way around some common difficulty; and suggests a procedure that solves relatively easily what would otherwise seem an intractable and persistent problem (Becker, 1998: 4).

In other words, this chapter will explore the ways that visual methods can be of help in 'how to think about your research while

you're doing it' as Becker puts it in the subtitle on the cover of his book, *Tricks of the Trade*. Reading this chapter will be most rewarding if readers actively imagine how 'tricks' like those discussed below – as well as many others designed by visualization specialists like Stephen Few, Edward Tufte and Howard Wainer who are referenced throughout – could be applied, modified, or even invented to deal with the challenges they encounter in their own research.

PRODUCING YOUR OWN CHARTS

One of the most important lessons of Edward Tufte's⁴ path-breaking work on thinking visually with graphs and charts is to avoid the allure of the egregiously distorted and eye-popping designs that so littered the pages of even the very best newspapers when he first prepared and published *The Visual Display of Quantitative Information* in 1983.⁵ Tufte's critique of 'chartjunk' – where visual attraction is inversely related to information value – has influenced newspapers like the *New York Times*, which now produce and disseminate visual displays that are as thoughtfully informative as they are excellent graphically. As more social scientists appreciate the breathtaking intelligence and imagination of these new graphics, they will be prompted to improve their own charts. Currently, however, the software required to design complex visualizations and animations has a steep learning curve that few working social scientists have time to master. While trends in digital technology suggest that the future will undoubtedly deliver more user-friendly products for various kinds of data analysis and graph design, that future is not imminent. Fortunately, most of our workaday challenges are relatively simple, and Excel's chart functions are fairly easy to use and provide an array of chart types diverse enough for displaying most descriptive statistics. There are also manuals like John Walkenbach's *Excel 2007 Charts*

(2007), which are invaluable for making the most of Excel.

Successfully visualizing information requires being attentive to three matters: first, identifying the purpose of the display; secondly, addressing the conceptual issues it raises; and, thirdly, making choices between various display formats. Generally speaking, data is visualized for one of three purposes: laying out information for simple inspection in order to identify patterns; displaying data in order to analyze both variation as well as pattern; and, finally, as a way of formally presenting data either to summarize, or provide evidence for, an argument. Similarly, visualizing information invariably entails addressing several concerns. These include: issues of substance, which are posed both by the topic and provenance of the data (What is the data about?); formal issues that are posed by the numerical properties of the data (What form does the data take?); and logical and aesthetic questions posed by the story-telling possibilities of the display. Finally, the display choices for most descriptive statistics fall into one of the following categories: single-variable displays, correlations, and comparisons of two or more variables. These matters will be addressed as each of the major chart types is discussed.

Pie charts

A pie chart consists of a circle divided into wedge-shaped segments. The area of each segment... is the same percent of the total circle as the data elements it represents is of the sum of all the data elements in its data set (Harris, 1999: 281).

Figure 26.3, for example, represents the number of Americans in 2008 that believe in other people's 'fairness'. A pie chart like this one is one of the most ubiquitous graphs for showing proportions, or 'the relative sizes of components to one another and to the whole' (Harris, 1999: 281). There are two major reasons for its popularity as a graphic choice; it is invariably dramatic and, as it is loaded on any software program (like Excel)

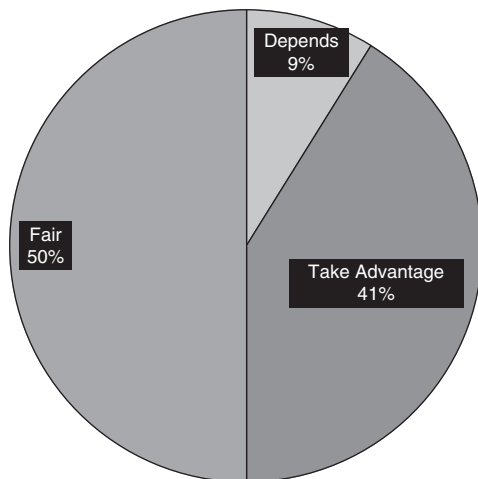


Figure 26.3 'Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair?' Text of question asked since 1972 for variable FAIR by the General Social Survey (GSS), USA

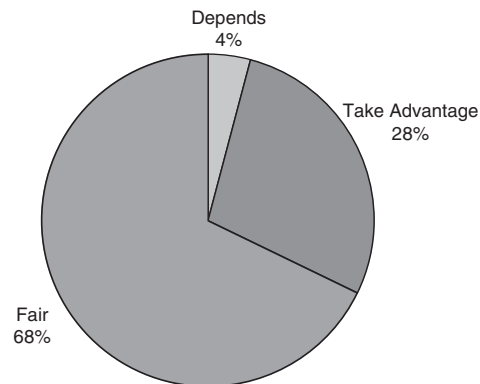


Figure 26.4 'Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair?' Text of question asked by the American National Election Survey (ANES) between 1964 and 2004

AQ: Figures labelling are inconsistency pls. standardize. (llc or Ulc)

that has a charting function, it is easy to render.

Figure 26.3 was drawn with Excel and follows the guidelines of the cognitive neuroscientist Stephen Kosslyn (1994) for constructing this type of chart.⁶ It does not use an exploding wedge; the wedges are arranged in a simple clockwise progression, beginning with the smallest at the top; readily visible labels obviate the need for a legend and are placed within each wedge. Finally, the text in the chart is made legible by using either a serif or sans serif font⁷ (Kosslyn, 106–109).

But how useful is this display, either to lay out data for simple visual inspection or for analysis, and does it have any communicative value to warrant its creation? Might this chart actually distract the analyst from searching for language to convey what these proportions mean? One-half of Americans expect others to be fair, while just over two out of five report that others would take advantage. Do we need a graph to make that point? And does the chart encourage us to interrogate the data? Does the fact that only one out of two

Americans expects others to be fair guarantee stability in a society where a great many, if not most, encounters are with strangers? Absent a theory that identifies acceptable thresholds for wariness, it is always a useful move to compare trends over time and see if anything has changed.

Figure 26.4 represents the answer to essentially the same question when asked in 1964 by a survey with greater time depth than the GSS. Placing the two pie charts side by side, we see that over the course of 44 years, Americans are 18 percentage points less likely to attribute a proclivity for fairness to others, dropping from over two-thirds of the population to just one-half. We follow the same display rules for the pie chart, which were suggested by Kosslyn, except that now we place the labels outside the pie and immediately adjacent to their respective wedges because we can't fit one of the labels within a very narrow wedge.⁸ It is pretty evident that the decline of confidence in selected institutions, which was suggested by Figure 26.1, is complemented by one measure of a decline

in confidence in people generally, which suggests that the social glue holding Americans together might be quite frayed indeed. Nevertheless, the question remains whether the charts add much to the story. Why wouldn't a simple table suffice?

Tables

The table, or art of tabling, is so neglected in the literature on visualization that it is often considered little more than drudgery, a first – albeit necessary – step to real visualization. This is a mistake, as even a humble table like Table 26.1 has some properties that make it an indispensable tool for displaying data. Robert Harris advises:

Sometimes referred to as a matrix. Tables are charts with information arranged in rows and columns in some meaningful way. The following list summarizes some of the major reasons for using tables.

- They are one of the best ways to convey exact numerical values.
- They present data more compactly than in sentence form.
- They assist the viewer in making comparisons, determining how things are organized, noting relationships between various sets of data, etc.
- They are one of the most convenient ways of storing data for rapid reference.
- They are an excellent vehicle for recording and communicating repetitive information (forms).
- They organize information for which graphing would be inappropriate (Harris, 1999: 387).

Table 26.1 Believing in fairness: Change between 1964 and 2008

Year	<i>Percent of US population reporting if others will be fair or take advantage</i>		
	Be fair	Take advantage	It depends
1964 (ANES)	67	28	4
2008 (GSS)	50	41	9

Data source: American National Election Survey (ANES 1964) and General Social Survey, USA (GSS 2008).

Tables are so commonplace that we overlook how often we turn to them as a way of organizing information. These applications include schedules, checklists and calendars and constitute the graphic template for constructing trellis displays, or small multiples, which are invaluable in making comparisons (Tufte, 1990: 67–80; 1997: 105–119; Harris, 1999: 388, 397; Few, 2009: 98–104). Harris (1999) and Stephen Few (2004: 47–54, 127–161) provide very useful introductions to the art of tabling. For our purposes I will focus on three aspects of table design that make them particularly valuable for social scientists. First, the table is capable of containing more information – or data points – in a display than most other charts. Secondly, it can be used simultaneously for reference as well as analysis. Thirdly, a table's simplicity does not prevent it from being designed to highlight information in an elegant manner. I will discuss these three aspects of tabling and then explore how to most effectively extract the stories that a table may contain.

Figure 26.1 shows a steady decline of Americans' confidence in a number of their institutions. The military is an exception and exhibits a more volatile, yet generally, upward, trend. Table 26.2 recodes the data for three of these measures into decades. The value of the table for reference is that it invites the reader to evaluate the adequacy of how well the data in the table supports

Table 26.2 Comparison of confidence levels between 1972 and 2008

	<i>Percent of US population reporting a great deal of confidence in those who run selected institutions</i>			
	1970s	1980s	1990s	2000s
Medicine (CONMEDIC)	54	50	45	41
Military (CONARMY)	37	33	41	49
Press (CONPRESS)	25	18	11	10

Data source: General Social Survey, USA.

the argument. Such an assessment should include not only the explicit claims in the argument – let’s say, the decline in confidence for two of the institutions – but also a consideration of evidence that might modify the argument, which the author may not have chosen to discuss. For example, whereas the average percentage point decline for the three institutions between the 1970s and 1990s is **6.3** in Table 26.2, it actually increases by **0.6** from the 1990s to the 2000s, suggesting that the drop in confidence may be leveling off, and our awareness of it is a common – although perhaps misplaced – expression of anxiety that occurs once the worst part of a bad time is over.

Using a table in this way, therefore, probably would be even more valuable if it included the same information for the remaining 10 institutions. Thus, even if a table doesn’t dramatize a pattern, it may contain a large number of cells (and numbers), which are easily referenced by a reader, and might encourage a deeper engagement with the argument. Finally, resizing, **bolding**, *italicizing* or coloring⁹ the numerical information that the author wishes to underscore – for whatever reasons – means that the reader’s attention is readily drawn to that portion of the evidence that supports the argument, while preserving access to other figures they may want to consult.

One of the most important skills for a social scientist to learn is how to extract a story from a table. This involves many of the same practices that those in visual studies deploy when they inspect an image. In a nutshell, the visual analysis of an image entails identifying each element in the composition of a picture, ascertaining how it relates to other elements and defining what each contributes to the effect of the composition as a whole.¹⁰ In a table, the story elements are found in each cell’s values and its composition is encoded in the proportional relationships between these different values. The dynamics of the stories that can be drawn from a table, therefore, are primarily expressed by differing rates and ratios

between the numbers in the cells, as well as evaluative judgments about the significance of certain numbers. Story development of this sort is a three-stage process.

First, the analyst should carefully look at each row and describe its pattern. In row 1 of Table 26.2 we witness a steady *decline* in confidence in medicine that goes from slightly above one-half of the population (**54** percent) to just over two out of five (**41** percent) for a drop of 13 percentage points, or **24** percent (13 divided by 54) between the 1970s and 2000s. Row 2, or confidence in the military, however, is almost the mirror image of this trend, showing an *increase* in confidence from under two out of five Americans (**37** percent) to almost one-half (**49** percent) for a jump of 12 percentage points or **32** percent (12 divided by 37). The analyst would certainly note that this increase was not steady but happened after an initial decline in the 1980s of four percentage points. Finally, an inspection of row 3 in Table 26.2 reveals that confidence in the press during this period has dramatically declined from one-quarter of the population (**25** percent) to just one out of 10 (**10** percent), a drop of 15 percentage points or **60** percent (15 divided by 25).

The preceding paragraph is not something an analyst would want to publish; it is more of a scratch sheet, summarizing patterns. I have put it in a narrative form for the sake of exposition, but on my desktop it would appear as an enumeration of bullet points. Nevertheless, because we haven’t completed deconstructing the table, there is still space to exemplify bulleting.

The second step in reading a table, therefore, would be to look at each column and summarize the patterns that can be discerned in them:

- In the 1970s the range of variation between the three variables was 29 percentage points.
- In the 1970s the institution with the most confidence was more than twice that of the lowest.
- In the 2000s the range of variation between the three variables had widened to 39 percentage points.

- In the 2000s the institution inspiring the most confidence was still only supported by around one-half the population, whereas that with the least by only one-fifth of this value.
- And so on.

After similarly inspecting Figure 26.1 and Table 26.1, we might summarize our findings in a way that is certainly consistent with the image of a ‘frayed’ America:

Americans have generally lost confidence in most of their institutions, except the military. They show a steady deterioration in confidence of anywhere from 10 to 15 percentage points. Nevertheless, among those institutions with declining confidence levels, there seems to be three patterns: characterized by small, moderate or large decreases in a ‘great deal of confidence’. Additionally, the higher the initial vote of confidence, the slower its rate of decline over time. Medicine has shown the smallest decrease, from the sixth to the fifth decile. Religion is next, from the fourth to the third decile. Finally, Congress and the press bring up the rear, dropping from the third to the cusp of the first and second deciles. Data for the military may represent a very different pattern or just be an anomaly. Finally, a

measure of confidence in personal relationships in general – fairness – also shows a marked decline over much of the same time period. Losing confidence in other people’s fairness occurs at roughly the same rate (25 percent) as those institutions with only small decreases.

Line charts

After preparing a table, perhaps the most useful visualization technique for analyzing descriptive statistics is to compose a *trend line*, which is a simple line chart that includes the entire range of relevant values in a variable. The point is to deploy the spatial competence of the eye to ascertain the direction and shape of a trend. Caitlin Amos (2009) has used the chart wizard in Excel to create a *time series* – a trend line that covers a period of time – for a question from the GSS that measures confidence in banks and financial institutions (CONFINAN). The chart (Figure 26.5) is exemplary in many ways. It maximizes the size of the frame within which the data is displayed, although

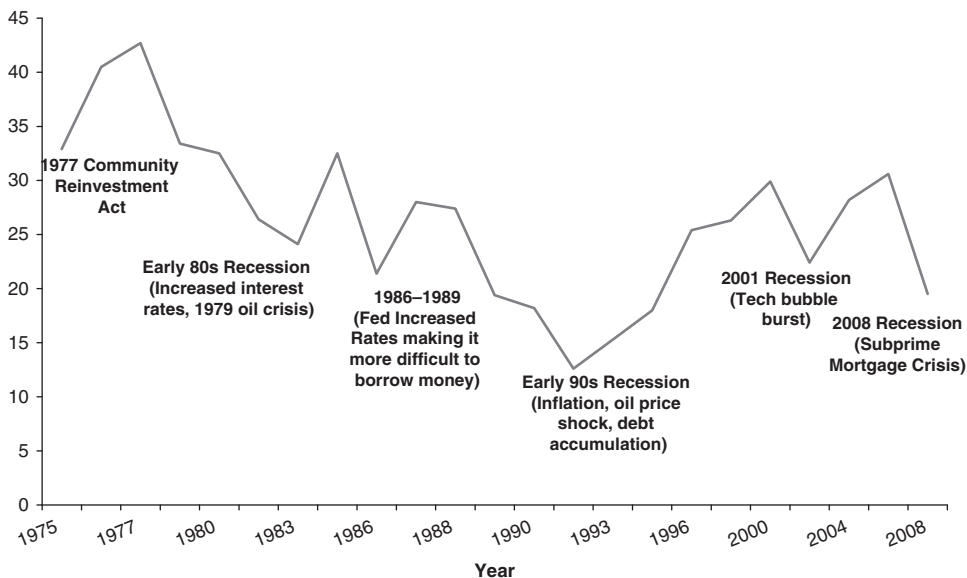


Figure 26.5 Trend line for Americans expressing confidence in banks and financial institutions

Data source: General Social Survey (GSS), USA. Chart prepared by Caitlin Amos (2009). Reproduced with permission.

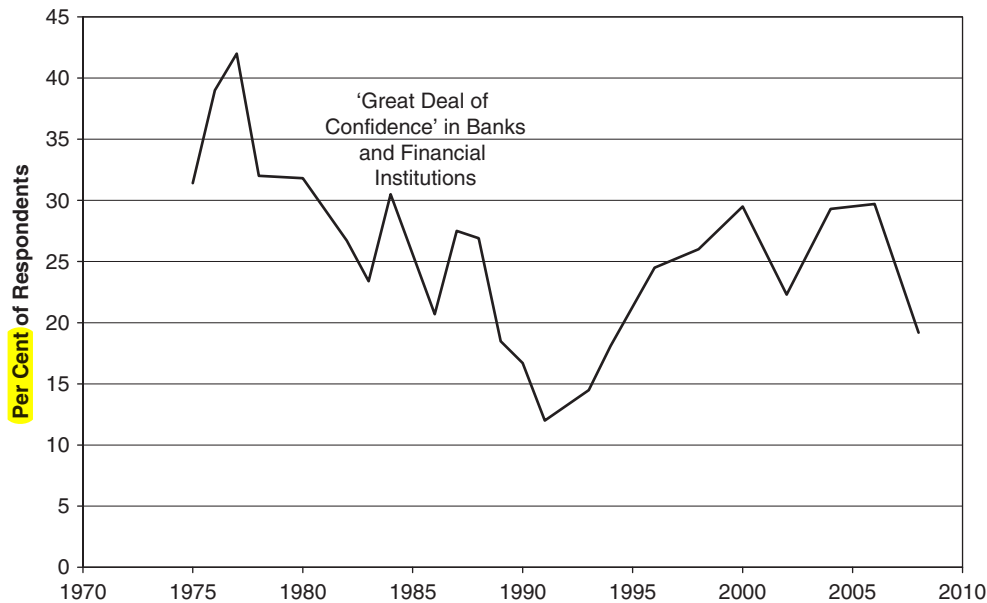


Figure 26.6 Revised version of Figure 26.5, charted as an XY (or scatter) plot

the unnecessary labeling of the x -axis does eat up space. Wisely, the chart does not include a legend. The line for the time series is clearly visible and the lines delineating the vertical axes are rendered with a muted gray-scale, which, while legible, doesn't draw attention away from the trend line, which carries the burden of the argument.

There is one flaw in Amos' chart that is found throughout the literature using GSS data, including Figure 26.1. Ideally, in a time series, the spaces between years should be equivalent. Thus, the spacing between 2-year intervals should be twice the length of those that separate succeeding years. In Figure 26.5, however, the spaces between adjacent values in some cases represent 1 year, while in others, 2 years. The result is that, even though the mid-point of the survey is just before its lowest point in 1993, the values for subsequent years are compressed, perhaps exaggerating their rate of change.¹¹ The most effective way of eliminating this distortion is to chart the data as an XY (or scatter) plot using the option provided by

Excel under 'chart types' (see Figure 26.6). All subsequent line charts in this chapter, which display GSS data over time, will be constructed with the scatter plot option.

The reader will note that the graph for confidence in banks and financial institutions charted in Figures 26.5 and 26.6 exhibits a different pattern from those we have discussed previously. Confidence in banks and financial institutions declines over time, like most of the institutions we have already examined, but it also exhibits the volatility found with confidence in the military. Volatility of this sort often reflects a *period effect*, which suggests that the survey is responding to the influence of historical events rather than more fundamental changes rooted in a population's demography and social organization.

To exemplify her argument, Amos labels each of the temporary declines in the trend line with a brief summary of the economic or financial events that correlate with responses to the survey. Attitudes about financial institutions appear to be strongly

influenced by recessions and other downturns in the economy. Revisiting Figure 26.1, we notice that the two dramatic upturns in confidence in the military coincide with the Persian Gulf and the Iraq/Afghanistan wars. Using a chart to identify period effects in this fashion is usually only effective with one variable. Nevertheless, it is possible to do so for several variables if they trend in a similar direction.

Recently, Pamela Paxton (2005) has reasoned that a close look at some of these trends suggests a more optimistic reading of the state of trust in American society. She focuses on three trends in particular: the question of fairness in Table 26.1, confidence in banks and financial institutions (CONFINAN) in Figure 26.5, and confidence in the military (CONARMY), which is charted in Figure 26.1, and concludes that although there is a steady decline in people's willingness to attribute 'fairness' – and,

by extension, 'trustworthiness' – to others, the very volatility of CONFINAN and CONARMY suggests a resilience in institutional life 'that is our best hope of restoring trust in individuals' (Paxton, 2005: 45). In this view, while we may despair of our fellow human beings in general, we can still quickly regain faith in them as part of a team that – when working together – is effective in accomplishing objectives. Over the long run, a positive institutional experience not only may compensate for our 'misanthropy',¹² but also may nurture a sunnier view of others. This is a plausible thesis, but how does it fare when we examine not only two other questions about human nature – whether people are helpful and can be trusted – but also include all 13 institutions considered by the GSS in our investigation?

Figure 26.7 is a line chart, which – as we have already established – is useful for comparing trends over time. This chart follows

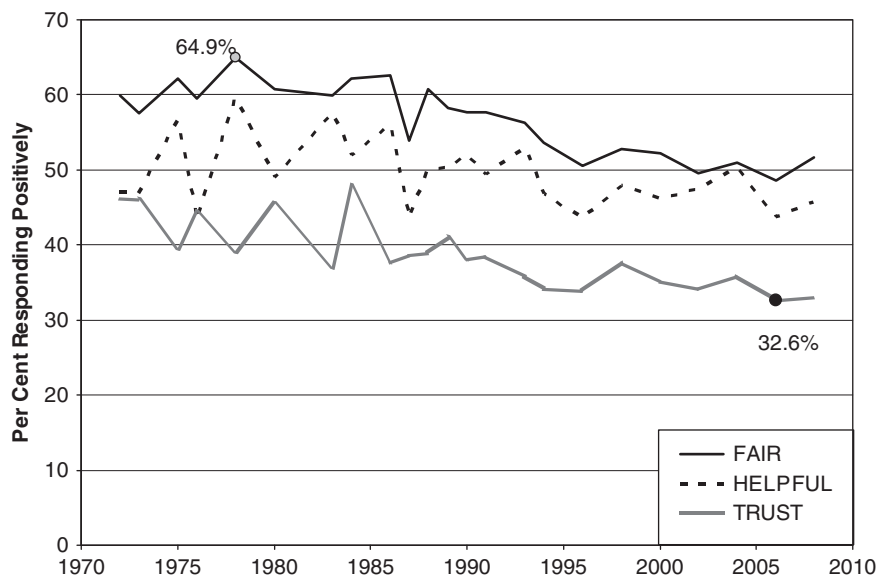


Figure 26.7 Are people 'fair', 'helpful' and can they be 'trusted'? For text of question for FAIR see Figure 26.3. TRUST: Generally speaking, would you say that most people can be trusted or that you can't be too careful in life? HELPFUL: Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves?

Data source: General Social Survey (GSS), USA.

Stephen Kosslyn's guidelines for constructing such charts. The chart ensures that the three series, or lines, are distinguishable and the direction of the trend legible. This is often easier to accomplish if we color the lines appropriately. Unfortunately, we are often limited to grayscale and don't have that option. Figure 26.7 adapts to this limitation and uses three different black lines of the same size. They vary in being bold, dotted or hatched. Only two data points, with labels showing their values, are displayed – the very highest and lowest value within the frame – because adding more points and numbers is unnecessary and would clutter the frame with extraneous information. If the exact values of each, or most, of the data points are important to an argument, they should then, as a matter of course, be put into a table rather than crammed into a chart. The data point markers in Figure 26.7 are configured to be at least twice the size of the line. In addition, the chart has a legend because the trend lines are too close together to follow Bertin's recommendation to position labels next to the line. The legend, however, is placed on the right of the chart's body as close as possible to the lines it identifies (Kosslyn, 1994: 140–151).

A quick glance at Figure 26.7 makes it clear that there has been a parallel decline in positive responses to all three variables and that judging others to be 'fair' tends to be espoused more often than designating them as 'trustworthy' by 15–20 percentage points since 1972. Respondents to the GSS invariably also identify others as 'helpful' less often than 'fair' and more often than 'trustworthy.' It should be stressed, however, that these variables are not merely three versions of the same question.

Trustworthiness implies that another person can be relied upon to protect your interests. Someone is helpful, however, when they go out of their way to facilitate another person achieving a goal. Finally, to be fair usually refers to a person modifying their behavior to abide by a situationally sensitive interpretation of a moral code. Trustworthiness

is important in relationships with intimates and friends, but may not be advisable with those that you don't know well. Helpfulness is valuable with neighbors and those who are encountered in a person's daily round and is usually taken for granted with intimates. Finally, fairness is an expectation that should apply to those we don't know as well as those we do. Therefore, it shouldn't surprise us that the responses to these three questions not only diverge from each other in the way they do but also vary consistently over time.

Paxton is certainly correct to choose 'fairness' as most closely connected to the demands of institutional life. Nevertheless, a drop of 13 percentage points in Americans' evaluation of their fellow citizens 'trustworthiness' – to just under one out of three (33 percent) – is troubling and must be accounted for in any assessment of the role of institutions in organized life. At the very least – as Robert Putnam's *Bowling Alone* (2000) suggests – the decline in TRUST indicates a turning inward from others that may seriously inhibit a population's willingness to engage in civic affairs.

Tom Smith (2008), who has extensively analyzed confidence trends in the entire gamut of institutions surveyed by the GSS, is less sanguine than Paxton, and detects a far more nuanced story in the data. Figure 26.8 charts the proportion of the population with a 'great deal of confidence' in all 13 institutions between 1972 and 2008. Trying to include 13 variables on a single line chart almost invariably results in a confused jumble of lines, so it is advisable to begin by creating separate charts for each variable. Generally speaking, the charts should share a common template and be closely juxtaposed to invite an unhurried visual inspection of the assemblage as a whole.¹³ An analyst should then print each chart and inspect them for story in much the same fashion as was done above for tables. The order for viewing the assemblage might be organized by various typologies. In this case, an obvious one would include the following five institutional spheres: Governmental

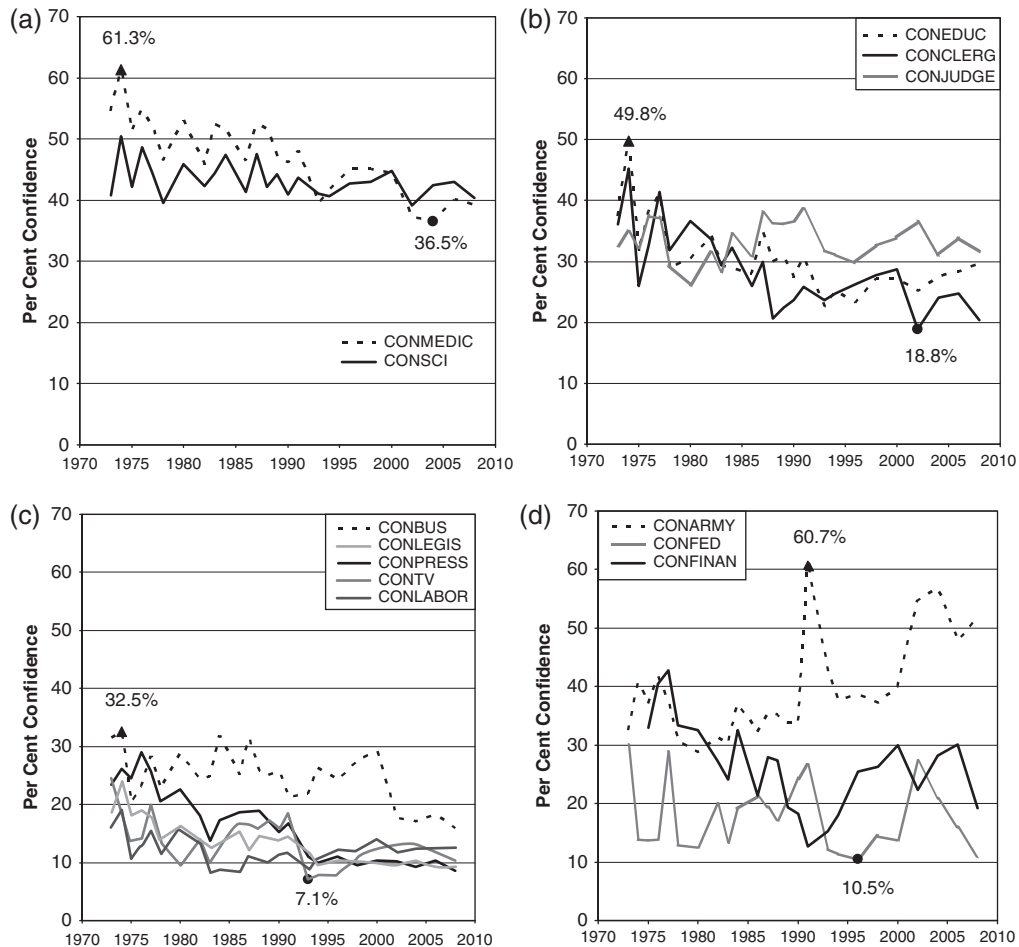


Figure 26.8 Percent of Americans with a 'great deal of confidence' in the leadership of 13 institutions – Medicine (CONMEDIC), Science (CONSCI), Education (CONEDUC), Religion (COMCLERG), Supreme Court (CONJUDGE), Congress (CONLEGIS), Press (CONPRESS), Television (CONTV), Unions (CONLABOR), Corporations (CONBUS), Military (CONARMY), Executive Branch of Federal Government (CONFED), Banks and Financial Institutions (CONFINAN) – from 1972 to 2008, organized into four charts, showing those institutions with the most confidence (a), those with moderate confidence (b), those with least (c), and those with the most volatile levels of support (d)

Data source: General Social Survey (GSS), USA.

(CONFED, CONLEGIS, CONJUDGE, and CONARMY); Economic (CONBUS, CONFINAN, and CONLABOR); Knowledge/Ideology (CONEDUC and CONSCI); Media (CONTV and CONPRESS), and Professional Services (CONMEDIC and CONCLERG). Other arrangements are possible and would depend on the theoretical goals of the

researcher. In any event, one alternative that visual displays not only make possible, and which should *always* be considered, is to arrange the 13 charts by their visual similarity, and examine this ordering as a basis for identifying macro patterns, a way of letting your eyes help you do the thinking (Bertin, 1977: 7).

Figure 26.8 is the product of just such an ordering and arranges the variables into four small multiples: Most, Moderate, Least and Volatile Confidence. Those in the Most Confidence group (CONMEDIC and CONSCI) trend consistently from the sixth to the fifth decile over the course of 35 years. The Moderate Confidence group (CONEDUC, CONCLERG, and CONJUDGE) moves from the fourth to the third decile, while the Least Confidence group (CONBUS, CONLEGIS, CONPRESS, CONTV, and CONLABOR) descends from third to the second decile. Finally, the most Volatile Confidence group (CONARMY, CONFED, and CONFINAN) has, as one might expect, the widest range of variation in their approval rates during these years (over 50 percentage points).

Area and bar charts

Those who are surveyed by the GSS are prompted to answer the ‘confidence in institutions’ questions with one of three responses: Does the respondent have ‘a great deal of confidence’, ‘only some’ or ‘hardly any?’ Most commentators focus on the value expressing the most confidence, because it appears to be extremely sensitive to changes in opinion. ‘Hardly any’ tends to inversely mirror ‘a great deal’, and ‘only some’ is an intermediate category that might express indifference as much as it does moderation. Even so, it is important not to neglect the other values and what they reveal about the weight of opinion. One way of doing this is to use area charts and bar graphs and to construct indices to recode the information that the GSS makes available.

Figure 26.9 is an important chart variant – a shaded area chart – which enables the viewer to assess the direction of a trend over time – the strength of the line chart – as well as what each value’s proportion of the whole may be, which is often measured, as we shall soon see, in bar graphs. The great advantage of Figure 26.9 is that it permits us to assess the confidence that Americans have

in each of these institutions in several ways. First, we can ascertain the weight of the three different responses that were available to those surveyed. Secondly, we can combine them for viewing in any manner we find suitable. Thus, a ‘great deal’ and ‘only some’ can be combined as a measure of, say, ‘general confidence’. Finally, we can get a rough sense of the difference between any two of the values. In this case – and for other questions like it – it is often useful to compare the extreme values: here, a ‘great deal of confidence’ and ‘hardly any.’ In this last instance we note that there are anywhere from two to ten times more people who express a ‘great deal of confidence’ than those who have ‘hardly any confidence.’ Conversely, the number of those who have ‘hardly any confidence’ in Congress goes from less than parity to almost seven times more than the number of those who express a ‘great deal of confidence.’¹⁴

Constructing a shaded area chart in Excel permits the designer to choose the order in which the values are displayed. One option is to display them according to their semantic weight, which in this case would suggest beginning at the bottom with either ‘hardly any’ or ‘a great deal’, and putting ‘only some’ in the middle, or vice-versa. Another common recommendation is to insert the value that varies the least at the bottom because ‘you can make it easier for the reader to compare the degree of change in specific segments’ (Kosslyn, 1994: 152). In this case we have put ‘only some’ at the bottom for three reasons. First, it tends to be the one that changes the least and is also the largest, which makes it easier to visualize how the other two, more extreme, responses vary. Secondly, we are able to put ‘a great deal’ above it, which makes it possible to imagine the combined value of these two as a measure of ‘general confidence’. Moreover, designing the chart so that ‘hardly any’ is just above ‘a great deal’ creates a semantic tension that encourages the viewer to assess the respective weights of these extreme values. This is particularly apparent when – as in

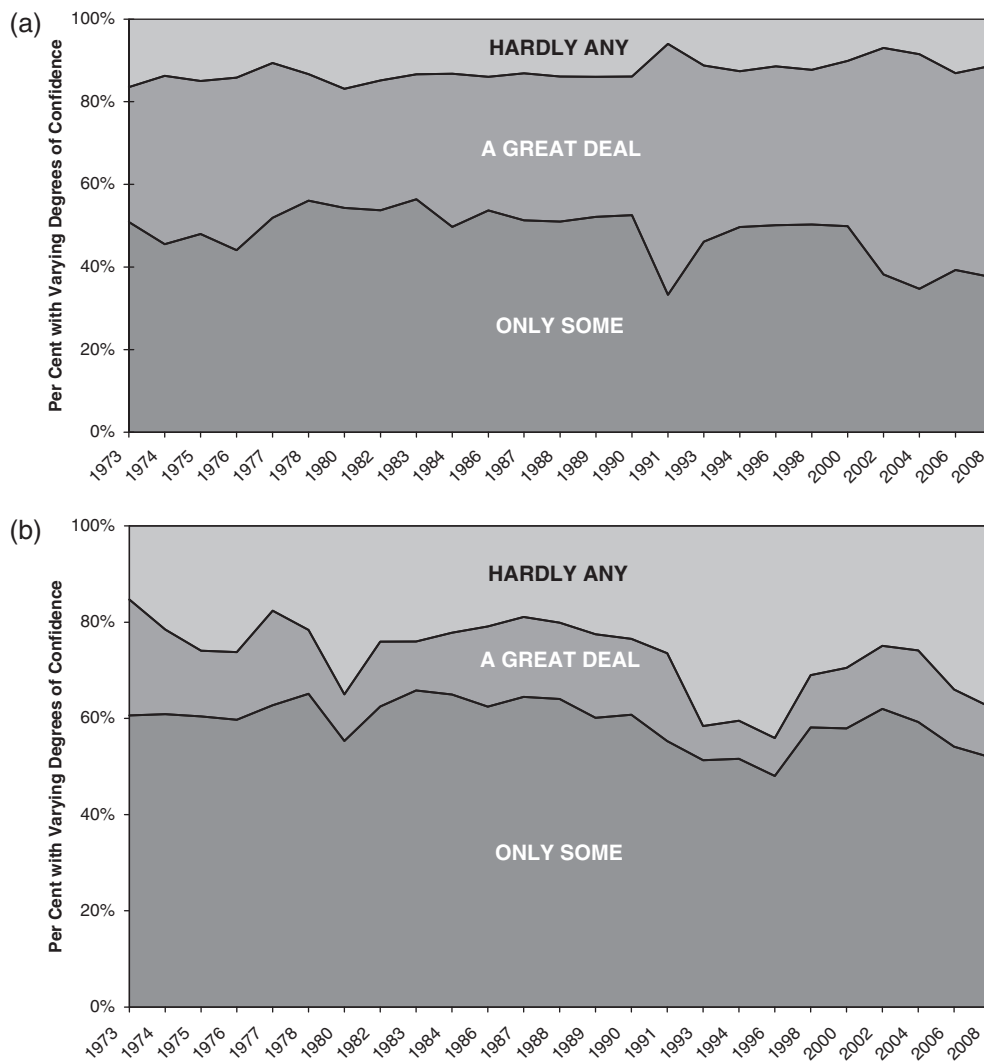


Figure 26.9 Shaded area chart measuring confidence in the Military (a) and Congress (b)

Data source: General Social Survey (GSS), USA.

Figure 26.9 – graphs with contrasting levels of confidence, like CONARMY and CONLEGIS, are juxtaposed.

It is often advisable when constructing graphs and charts to devise ways to aggregate the data as a tool for determining whether a more general pattern can be discovered in the evidence. In this case one such move might be to chart how all the institutions compare with each other when we contrast the cumulative averages of the three possible

responses to the confidence query for each institution. The decision to aggregate data should be made cautiously because overall averages tend to obscure variation within the values even as they facilitate comparison between them. Nevertheless, so long as the analyst has been attentive to designing other charts that reveal as much variation as possible, and remembers to account for this variation, then this pitfall can often be avoided.

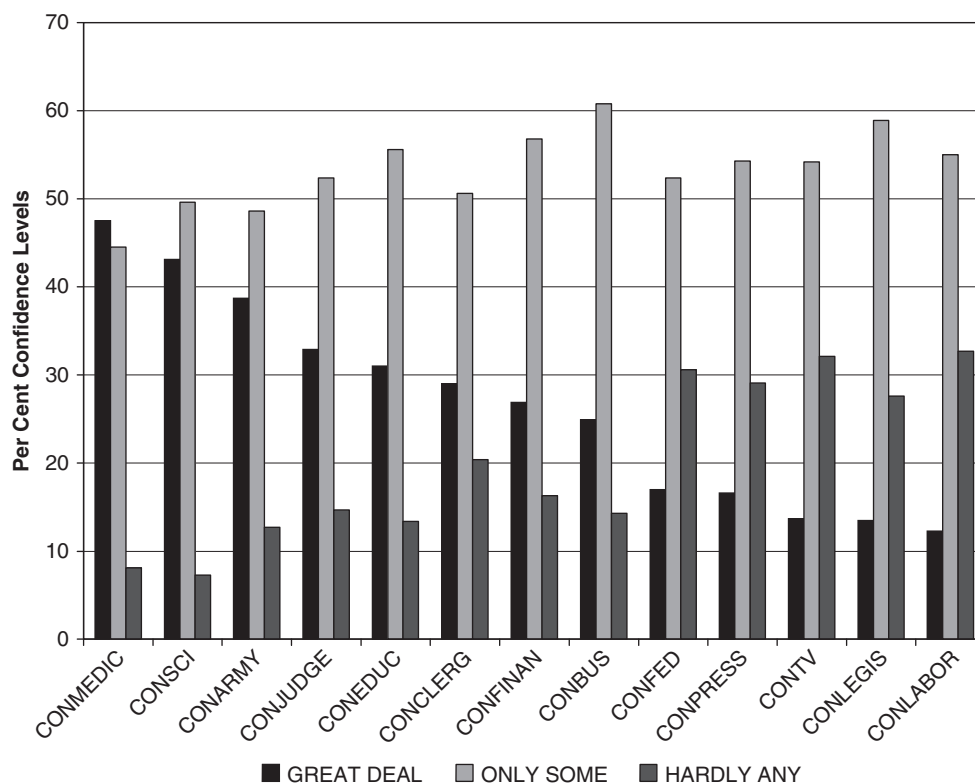


Figure 26.10 Vertical bar (or column) graph comparing the average responses for 'confidence' during the period 1973–2008

Data source: General Social Survey (GSS), USA.

Figure 26.10 is a vertical bar, or column, graph based on the cumulative average of the responses to the GSS on these 13 questions since 1973. It reveals four interesting findings:

- 1 It confirms the pattern in Figure 26.9 that 'a great deal of confidence' and 'hardly any' covary inversely or, in other words, that those institutions, which Americans report as meriting a 'great deal of confidence' over time, tend to have lower 'hardly any' responses.
- 2 As we might expect, there is a marked tendency for the cumulative averages to mirror the patterns found in the line charts in Figure 26.8. Those institutions with the highest initial level of a 'great deal of confidence' tend to be those with the highest cumulative average over the course of the survey period. The exceptions to the

second observation are the institutions labeled 'Most Volatile' in Figure 26.8.

- 3 We see from Figure 26.10, that the level of confidence averaged over time generally reflects the categories we chose for Figure 26.8, but that the institutions labeled 'Volatile' in Figure 26.8 are spread across quite a large range in Figure 26.10. Using the ranking in Figure 26.10, we will reallocate the institutions into three categories – those with Most Confidence, Moderate Confidence, and Least Confidence, typified as follows in Table 26.3. Figure 26.10 provides the new insight that institutions in the 'Least' category in Table 26.3 have two to three times more respondents answering 'hardly any' confidence compared to those answering 'a great deal'.
- 4 It is important to note that those Americans who have 'only some' confidence in their institutions constitute a plurality in all but one of the institutions (CONMEDIC) and less than a

Table 26.3 Confidence levels of 13 institutions by strength of ratio between those expressing 'a great deal' and 'hardly any confidence', based on cumulative average 1973–2008

<i>Confidence level</i>	<i>Institution</i>	<i>Ratio: 'great deal' to 'hardly any'</i>
Most Confidence	CONMEDIC	5.9
	CONSCI	5.9
Moderate Confidence	CONARMY	3.0
	CONEDUC	2.3
	CONJUDGE	2.2
	CONFINAN	1.7
	CONBUS	1.7
Least Confidence	CONCLERG	1.4
	CONPRESS	0.6
	CONFED	0.6
	CONLEGIS	0.5
	CONTV	0.4
	CONLABOR	0.4

Data source: General Social Survey, USA.

majority in only three (CONMEDIC, CONSCI, and CONARMY). Needless to say, these three institutions have the highest number of respondents answering that they have 'a great deal of confidence' since 1973. When we add 'only some' and 'a great deal of confidence' together and recode the sum as a new measure entitled 'general confidence,' we note that no institution has less than two out of three responses (**67.3 percent**) in this new category (Figure 26.11). Nevertheless, there does appear to be a marked ratcheting down of confidence when we arrive at those in the 'least confidence' category. This should not surprise, as these are the only five institutions where more people respond with 'hardly any' confidence than report a 'great deal.'

Figure 26.11 is a horizontal bar graph that displays the recoded variable, 'general confidence'. As Kosslyn tells us, bars graphs are particularly appropriate for comparing

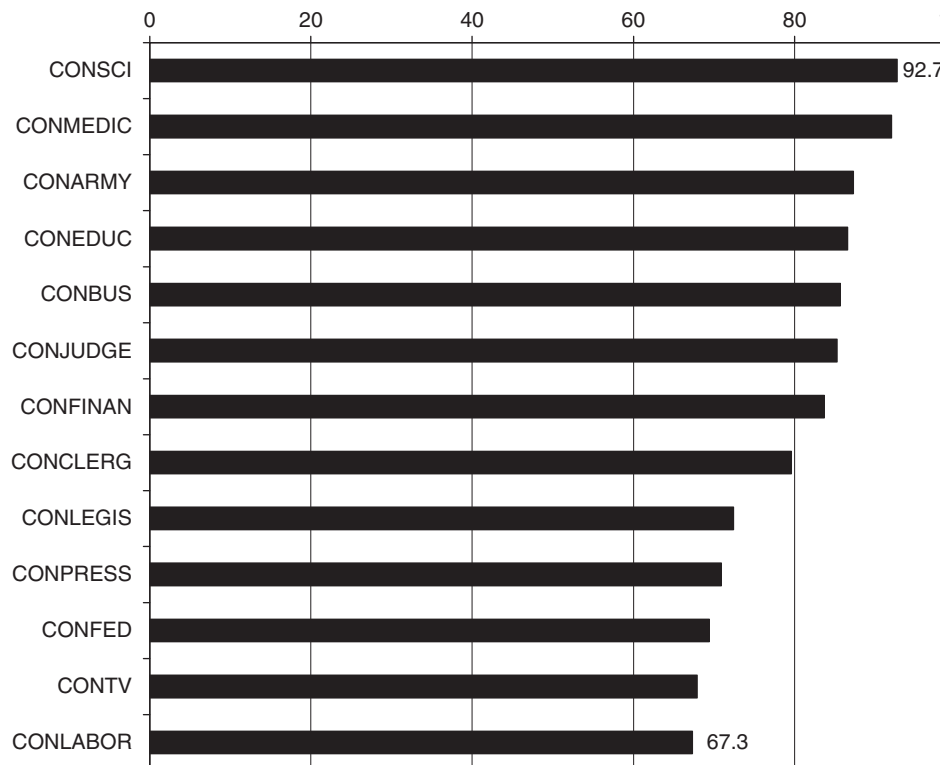


Figure 26.11 Horizontal bar graph of the cumulative average of 'general confidence' in 13 American institutions, 1973–2008

Data source: General Social Survey (GSS), USA.

precise measurements and nominal values such as discrete entities rather than ordinal values such as sequential numbers or years (Kosslyn, 1994: 37–38). It is generally advisable to use vertical bar graphs, but in a case like Figure 26.11 it makes more sense to display the data horizontally. For one, there are too many labels in the chart and they would be harder to read if they were displayed at a diagonal as in Figure 26.10. Figure 26.10 charts three values for each variable and while it could have been displayed horizontally, the overall pattern would not have been as visible as it is when displayed vertically. No such disadvantage accompanies Figure 26.11. Also, putting the numbers that label the *x*-axis along the top border of the chart makes it easier to follow the trend in the data points from one

institution to the other as we descend from higher rankings at the top.

Custom-designed charts

Figure 26.12 is a revised and summary version of Figure 26.8. It aggregates the averages for each of the institutions into the three new categories defined by Table 26.3, and provides us with an overview of institutional trends, which – when viewed with the other charts and tables above – can be provisionally summarized as follows:

A closer look at Figure 26.12 and the data describing Americans' attitudes about their institutions suggests that their confidence has not been eroded as much as some commentators have suggested.



Figure 26.12 Cumulative yearly averages for institutions in 'Most', 'Moderate' and 'Least' confidence levels. See Table 26.3

Data source: General Social Survey (GSS), USA.

Figure 26.11 shows that, over the last 35 years, each of these 13 institutions earned a 'general confidence' response from at least two-thirds of Americans. Some institutions held the general confidence of over 90 percent of the population. As might be expected, they correspond to the three categories in Table 26.3: those with Most Confidence ('general confidence' scores of 90 percent or above); those with Moderate Confidence ('general confidence' scores of just about 80 percent to somewhat under 90 percent), and those with Least Confidence ('general confidence' scores of from 67 percent to just over 70 percent). The Least Confidence category differs from the others because more people responded that they have 'hardly any' rather than 'a great deal' of confidence in these institutions (see Figure 26.10). Whether or not we conclude that the level of Americans' confidence in these institutions indicates a weakening of social ties, it is important to note the steady decline in confidence in all institutions between 1973 and 2008 (Figure 26.12). Scores for the institutions in the Most and Moderate Confidence categories have dropped by one-sixth, whereas for the Least Confidence category, the drop has been precipitous; scores for these institutions dropped by more than one-half (57 percent).

While this pattern seems to be clear enough, determining what factors might be shaping it is not so evident. Demographic and social factors – like gender, race, class, and education – as well as political ideology show no consistent correlation, if any, with responses to these questions as Smith (2008) has established and as just a few minutes running cross-tabs on the GSS confirm. The only strong association for 10 out of the 13 institutions that surface with multiple regressions¹⁵ is with cohort, or birth year, and age (Figure 26.13). This association, however, is quite puzzling as it lumps together people from earlier cohorts – who tend to be older in the GSS sample – and younger respondents. This pattern of weak, or no, associations has led many commentators, like Paxton and Smith, to search for ad hoc explanations that emphasize independent period effects – particular historical events – for each institution. Idiosyncratic accounts like these invariably appear plausible in most

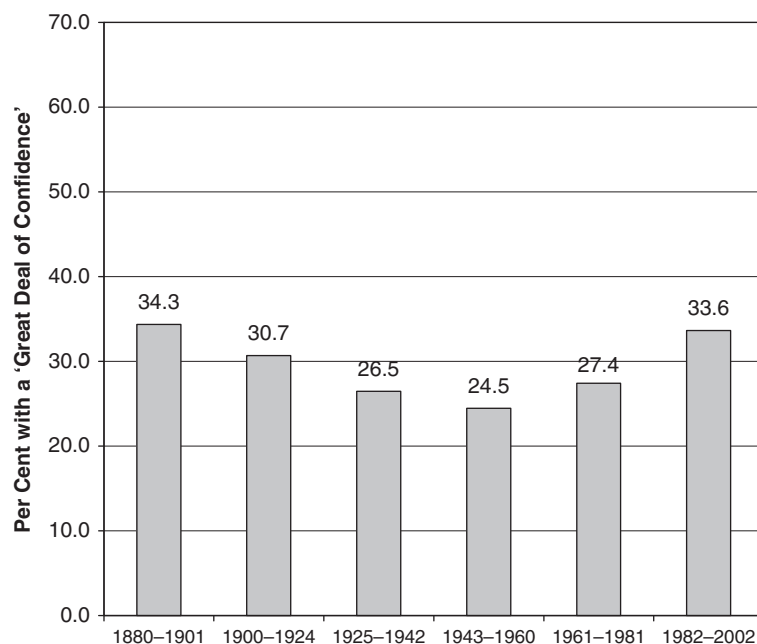


Figure 26.13 Confidence for average of all institutions by year of birth (COHORT), 1973–2008

Source: General Social Survey, USA.

cases, as is Caitlin Amos' thoughtful identification of the role of economic downturns in the changing fortunes of financial institutions in Figure 26.5. Very often, however, these accounts seem a bit like 'just-so' stories made to fit the facts. Tom Smith, for example, in his account of confidence in science (CONSCI) asserts that:

There is some evidence that ratings are responsive to events such as the Challenger disaster. The Challenger spacecraft exploded on launch on January 28, 1986 and the proportion with a great deal of confidence dropped from **44.5** per cent in 1984 to the post disaster **39.5** per cent in 1986. It then rebounded to **45.1** per cent in 1987. The Columbia spacecraft was destroyed on re-entry on February 1, 2003. But with no post-disaster reading until over a year after the event, there was no evidence of a drop with **37.2** per cent having a great deal of confidence in 2002 and **41.8** per cent in 2004 (Smith, 2008: 6; my **bold** emphasis).

Smith's comments are judicious. If there had been a GSS survey in 2003, it is quite possible that it might have shown the same decline and rebound effect after the Columbia tragedy, which has been attributed to the Challenger disaster. But, then again, it might not.¹⁶ Generally, the clearest, and most compelling, evidence for the effects of specific historical events are those that entail dramatic and prolonged impacts on the functioning of an institution; but these events occur less often than we imagine. The most notable exception that we have encountered so far in this chapter is the increased confidence in the military (CONARMY) since the terrorist attack on the World Trade Center in New York. Usually, period effects – if they can even be pinpointed properly – are episodic and transitory.¹⁷

If, for the sake of argument, however, it is conceded that no general causal factors are discernable in declining institutional confidence, and if each institution appears to have its own unique history, we are still left with the problem of accounting for the patterns that we *do see* in Figures 26.11 and 26.12, and Table 26.3. Smith suggests that devising

more sophisticated algorithms might solve the answer: 'Once the role of specific events on specific institutions are modeled, the impact of more general societal trends may be identified and a fuller understanding of confidence trends achieved' (2008: 17). There are, nevertheless, some visual techniques that can be devised to display simpler statistical operations, which we might want to turn to first, and which often provide more enlightenment than more complex measures do.

One of the most useful aspects of Excel – and spreadsheets in general – is that it's matrix design can be modified to display data in unconventional, and illuminating, ways. Cells can be resized, outlined and filled with various colors and/or grayscale shades to reveal patterns that otherwise might not be apparent. Manipulating 'graphical matrices' to organize, analyze and display data was developed by Jacques Bertin in the 1960s to enlist the eye's design for pattern recognition as a tool for quantitative analysis.¹⁸ The central purpose of Bertin's method is to *simplify* data:

The aim of simplification is to make the relationships appear, that is, to *display* sought after information. In problems involving more than three components, simplification is achieved by the transformation of the image. Visual permutations are based on the eye's ability to perceive spatial entities. The eye perceives sets and can thus compare and bring together two similar rows by disregarding meaningless distances. Modern equipment, often very simple, makes these permutations possible for nearly everyone (Bertin, 1977: 20).

Table 26.4 is composed of two charts. Table 26.4(a) is for reference purposes only. When originally constructed, the rows in this table were arranged quite differently, more or less randomly. The current order emerged as Table 26.4(b) was designed. In its final form, Table 26.4(b) explicitly follows Bertin's recommendations. Therefore, instead of looking at each institution separately, they are all gathered into a single graphic matrix. Put simply, an average of all the values in a variable – in this case confidence in an institution spanning 1973–2008 – is calculated and

Table 26.4 (a) Percent with 'a great deal of confidence' in institution

	1973	1974	1975	1976	1977	1978	1980	1982	1983	1984	1986	1987	1988	1989	1990	1991	1993	1994	1996	1998	2000	2002	2004	2006	2008
coneduc	37.5	49.8	31.5	38.2	41	28.9	30.5	34.2	29.2	28.8	28	34.8	30	30.8	27.4	30.6	22.6	25.2	23.2	27.2	27.1	25.1	27.5	28.3	29.5
conpress	23.4	26.2	24.5	29	25.7	20.5	22.6	18.1	13.7	17.3	18.6	18.8	18.9	17.1	15.2	16.7	11	9.9	11	9.5	10.4	10.2	9.2	10.3	8.6
conmedic	54.6	61.3	51.3	54.8	52.1	46.4	53.1	45.7	52.3	51.5	46.5	52.4	51.7	47	46.1	48.1	39.6	41.8	45.1	45	44.4	37.2	36.5	40.1	39.2
conlegis	24.1	17.6	13.7	14.1	19.7	13.3	9.7	13.5	10.2	12.9	16.7	16.7	15.9	17.4	15.8	18.3	7.1	7.9	7.9	10.9	12.6	13.1	13.3	11.9	10.5
contv	18.8	23.7	18.3	19.1	17.7	14	16.3	14.2	12.7	13.4	15.2	12	14.4	14.3	13.9	14.5	11.7	9.6	10.4	10.4	10	9.6	10.3	9.1	9.3
conclerg	36.1	45.2	26	32.7	41.4	31.9	36.7	33.7	29.4	32.2	26	30	20.6	22.4	23.7	25.9	23.6	24.8	26.3	27.8	28.7	18.8	24.1	24.7	20.4
conbus	31.4	32.5	20.4	23.2	28.3	22.7	28.8	24.5	24.8	31.8	25	31.5	25.8	25.1	25.8	21.2	21.8	26.3	24.2	27.5	29.1	17.7	17	18.3	16
consci	40.8	50.4	42.2	48.6	44.5	39.5	45.9	42.3	44.4	47.4	41.3	47.5	42.1	44.2	40.9	43.7	41.1	40.6	42.7	43	44.8	39.2	42.5	43	40.4
confed	29.9	13.9	13.7	13.9	28.8	12.9	12.5	19.9	13.3	19	21.2	19.3	17.1	20.5	24.2	26.6	12.2	11.5	10.5	14.4	13.8	27.3	20.8	16	10.9
conjudge	32.6	34.8	32.2	37.5	37.2	29.4	26.1	31.4	28.3	34.5	30.9	38	36.3	36.2	36.6	38.6	31.9	31.2	29.8	32.7	33.9	36.5	31	33.9	31.6
confinan	(n.d.)	(n.d.)	32.9	40.5	42.7	33.4	32.5	27.2	24.1	32.5	21.4	27.9	27.4	19.4	18.2	12.6	15.3	18	25.4	26.3	29.9	22.4	28.2	30.1	19.2
conlabor	16.2	18.8	10.8	12.6	15.4	11.6	15.9	13.1	8.3	8.8	8.4	11	10.5	10	11.3	11.8	8.9	10.5	12.2	12	14.1	11.7	12.4	12.4	12.7
conarmy	32.6	40.7	37	41.7	37.5	30.6	28.8	31.3	30.2	37.1	32.3	35.6	35.1	33.8	33.6	60.7	42.6	37.7	38.5	37.2	40	54.8	56.8	47.8	51.9

Continued

Table 26.4 Cont'd—(b) Same table where all columns with above average scores are shaded

	1973	1974	1975	1976	1977	1978	1980	1982	1983	1984	1986	1987	1988	1989	1990	1991	1993	1994	1996	1998	2000	2002	2004	2006	2008	Ave.
coneduc	37.5	49.8	31.5	38.2	41.0	28.9	30.5	34.2	29.2	28.8	28	34.8	30.0	30.8	27.4	30.6	22.6	25.2	23.2	27.2	27.1	25.1	27.5	28.3	29.5	30.7
conpress	23.4	26.2	24.5	29.0	25.7	20.5	22.6	18.1	13.7	17.3	18.6	18.8	18.9	17.1	15.2	16.7	11.0	9.9	11.0	9.5	10.4	10.2	9.2	10.3	8.6	16.7
conmedic	54.6	61.3	51.3	54.8	52.1	46.4	53.1	45.7	52.3	51.5	46.5	52.4	51.7	47.0	46.1	48.1	39.6	41.8	45.1	45.0	44.4	37.2	36.5	40.1	39.2	47.4
conlegis	24.1	17.6	13.7	14.1	19.7	13.3	9.7	13.5	10.2	12.9	16.7	16.7	15.9	17.4	15.8	18.3	7.1	7.9	7.9	10.9	12.6	13.1	13.3	11.9	10.5	13.8
contv	18.8	23.7	18.3	19.1	17.7	14.0	16.3	14.2	12.7	13.4	15.2	12.0	14.4	14.3	13.9	14.5	11.7	9.6	10.4	10.4	10.0	9.6	10.3	9.1	9.3	13.7
conclergy	36.1	45.2	26.0	32.7	41.4	31.9	36.7	33.7	29.4	32.2	26.0	30.0	20.6	22.4	23.7	25.9	23.6	24.8	26.3	27.8	28.7	18.8	24.1	24.7	20.4	28.5
conbus	31.4	32.5	20.4	23.2	28.3	22.7	28.8	24.5	24.8	31.8	25.0	31.5	25.8	25.1	25.8	21.2	21.8	26.3	24.2	27.5	29.1	17.7	17.0	18.3	16.0	24.8
consci	40.8	50.4	42.2	48.6	44.5	39.5	45.9	42.3	44.4	47.4	41.3	47.5	42.1	44.2	40.9	43.7	41.1	40.6	42.7	43.0	44.8	39.2	42.5	43.0	40.4	43.3
confed	29.9	13.9	13.7	13.9	28.8	12.9	12.5	19.9	13.3	19.0	21.2	19.3	17.1	20.5	24.2	26.6	12.2	11.5	10.5	14.4	13.8	27.3	20.8	16.0	10.9	17.8
conjudge	32.6	34.8	32.2	37.5	37.2	29.4	26.1	31.4	28.3	34.5	30.9	38.0	36.3	36.2	36.6	38.6	31.9	31.2	29.8	32.7	33.9	36.5	31.0	33.9	31.6	33.3
confinan	(n.d.)	(n.d.)	32.9	40.5	42.7	33.4	32.5	27.2	24.1	32.5	21.4	27.9	27.4	19.4	18.2	12.6	15.3	18.0	25.4	26.3	29.9	22.4	28.2	30.1	19.2	26.4
conlabor	16.2	18.8	10.8	12.6	15.4	11.6	15.9	13.1	8.3	8.8	8.4	11.0	10.5	10.0	11.3	11.8	8.9	10.5	12.2	12.0	14.1	11.7	12.4	12.4	12.7	12.1
conarmy	32.6	40.7	37.0	41.7	37.5	30.6	28.8	31.3	30.2	37.1	32.3	35.6	35.1	33.8	33.6	60.7	42.6	37.7	38.5	37.2	40.0	54.8	56.8	47.8	51.9	39.4
Ave.	31.5	34.6	27.3	31.2	33.2	25.8	27.6	26.9	24.7	28.2	25.5	28.9	26.6	26.0	25.6	28.4	22.3	22.7	23.6	24.9	26.1	24.9	25.4	25.1	23.1	26.8

Data source: General Social Survey, USA.

those values that are determined to be above the overall mean of the row are shaded. In most cases this operation yields a patchwork quilt of black and white cells. The task of the analyst then is to arrange the rows by essentially cutting and pasting them into a pattern with a meaningful visual order, resulting in more or less discrete blocks of shaded cells. In this particular case, the final order was produced by beginning at the top with those rows whose scores dropped below the mean for the row at an earlier point in time, and descending to those that drop below the mean in later years.¹⁹ Thus, the table begins with CONEDUC and CONPRESS at the top – both of which drop below the mean in 1989 – to CONLABOR and CONARMY, which still had above-average scores in 2008.

Next, an average for each of the columns measuring the mean for the sum of the institutions by year was compiled and those values that were above average on the last row were shaded in a 25 percent grayscale. Viewed in this format, the following pattern is visible in Table 26.4(b):

- a big drop in confidence in 1975 with a quick rebound to previous levels
- a big drop in 1978 from the low fourth decile to the high third decile
- a small drop in 1983 and a quick rebound
- a big drop in 1993 from the high third decile to the low third decile.

When summarized, the general pattern shows a more or less steady overall decline of **8.2** percentage points from 1973 to 2008, which takes place in two big drops: 1978 and 1993. For emphasis, I have bolded the values for these 2 years in the bottom row of Table 26.4(b).

These two drops are separated by 15 years and hint at the influence of generational change, which was suggested by our multiple regressions and clearly noted by Smith in his survey of the confidence in institutions data:

For most institutions cohort has a curvilinear relationship with confidence... [C]onfidence declines

from the pre-1923 generations to a nadir in the 1943–1952 cohort. Confidence then rises to a high point for the cohort born in 1983 and later. Confidence among the newest cohort exceeds that of all earlier cohorts. The individual trends [for each cohort] all agree to a greater or lesser extent with this summary pattern, but differ considerably in details.... But since relatively optimistic new cohorts have been largely replacing positive early generations, this has generally not driven up confidence. But as the most pessimistic middle cohorts begin to edge out, cohort turnover should become an engine for rising confidence (2008: 9–10).

If Smith is correct, this curvilinear pattern explains why more confidence in institutions correlates both with earlier generations (in the past) and younger people (in the present). Nevertheless, Smith does not pay as much attention to the role of generational cohorts in changing public attitudes as he might, because his concern with detail has obscured attending to the big picture that Table 26.4(b) suggests and Figure 26.12 provides.

Figure 26.13 is a bar graph of the number of people in each birth cohort, or generation, who express a ‘great deal of confidence’ in all 13 institutions. The cohorts are dated somewhat differently than Smith’s, and are based on the years that Strauss and Howe (1991 and 1997) in their widely cited work on generational theory use to demarcate American generations. The GSS covers six of these generations and in a decade or so will begin to include a seventh in its sample. These generational cohorts, to use Strauss and Howe’s nomenclature, comprise:

- 1883–1900 ‘The Lost Generation’
- 1901–1924 ‘The GI Generation’
- 1925–1942 ‘The Silent Generation’
- 1943–1960 ‘The Baby Boom Generation’
- 1961–1981 ‘Generation X’
- 1982–2002 ‘The Millennial Generation’.

Figure 26.13 shows a clear curvilinear pattern, bottoming out with the Baby Boomers. Care must be shown, however, when comparing generational responses over time because the age composition of each cohort in this survey period may vary.

For example, everyone in the Lost Generation surveyed by the GSS was above 65 years old at the time, and, as of 2008, the oldest members in the Millennial Generation were only 26 years old.

One way to avoid comparing what might turn out to be apples and oranges is to control generation for age. Table 26.5 uses the 'Draw Table' function of Word to create a template that graphs how attitudes vary at defined stages of the life cycle over six succeeding generations. The numbers represent the percentage in each age group with a 'great deal of confidence' in either the Congress (CONLEGIS) or the Military (CONARMY). Reading from top left to right

in Table 26.5(a), we see that 18–24 year olds in the Baby Boomer Generation were the first age group of younger people interviewed by the GSS at its inception in 1973. The first oldest age group (75–89) the GSS followed was composed of people in the Lost Generation, and so on. The blank cells with the diagonal stripe on the left of the chart will never be filled with information from this database because the survey wasn't administered before 1973 when earlier generations would have been younger. In time, all of the empty cells to the right will be filled in, so long as the GSS continues to be administered. The numbers in italics represent those cells with less than 75 respondents and, thus,

Table 26.5 Percent of population with a 'great deal of confidence' by age (AGE) and generation (COHORT). (a) Contains responses for Congress (CONLEGIS). (b) Contains responses for the Military (CONARMY)

(a) CONLEGIS

	1881– 1900 Lost	1901– 1924 GI	1925– 1942 Silent	1943– 1960 Boomer	1961– 1981 Gen-X	1982– 2002 Millennial
18–24				14	19	25
25–34			17	12	13	14
35–44			15	11	10	
45–54		21	15	9	9	
55–64		17	11	7		
65–74	29	16	9	9		
75–89	19	13	11			

(b) CONARMY

	1881– 1900 Lost	1901– 1924 GI	1925– 1942 Silent	1943– 1960 Boomer	1961– 1981 Gen-X	1982– 2002 Millennial
18–24				35	44	62
25–34			37	29	43	55
35–44			35	33	48	
45–54		40	35	40	46	
55–64		41	43	45		
65–74	47	42	51	55		
75–89	41	47	59			

Data source: General Social Survey, USA.

possess less statistical significance. With each succeeding survey, the numbers in these italicized cells on the right side of the frame will become more robust. Finally, the numbers are sized larger for that cohort with the lowest confidence to make the patterns more legible.

Reading Table 26.5 for story reveals the following patterns:

- Both tables show that the lowest scores are found either in the Baby Boomer Generation (CONLEGIS) or in a complex pattern that descends from the very oldest group of the Lost Generation through the GI Generation and Silent Generation and bottoms out with the Baby Boomer Generation for those 44 or under (CONARMY).
- Confidence in the Military increases as a cohort ages while confidence in Congress decreases over the life course.
- Both institutions show a slight (CONLEGIS) or dramatic (CONARMY) rebound effect beginning with Gen-X and continuing through the Millennial Generation.
- Utilizing the same template to examine the remaining 11 institutions reveals that confidence in all of them – with the single exception of the Military – either stays level or declines over the life course.
- In terms of generational change the institutions fall into one of two patterns displayed in Table 26.6. First, the 'Weak Confidence' group shows little, or no, evidence of a rebound in confidence among more recent cohorts, which includes all of the institutions in the *Least Confidence* category in Table 26.3 with the addition of organized religion (CONCLERG) and big business (CONBUS). Secondly, the 'Strong Confidence' group is composed of the rest of those in Table 26.3 with *Moderate Confidence* and also includes the scientific community (CONSCI). Most of these institutions evidence a rebound in more recent cohorts. Organized medicine (CONMEDIC), which has the highest overall support over the course of the GSS, continues to decline although it shows signs of leveling off in the Millennial Generation. All in all, nine of the 13 institutions plummet to their lowest confidence levels with the Baby Boomer Generation (1943–1960).²⁰

It is important to recognize that, while we have controlled for age in Table 26.5, each

Table 26.6 Confidence levels for institutions (Table 26.3 revised)

<i>Confidence level</i>	<i>Institutions</i>
Weak and level confidence	CONLABOR CONTV CONLEGIS CONFED CONPRESS CONCLERG CONBUS
Strong and often growing confidence*	CONFINAN CONJUDGE CONEDUC CONARMY CONSCI CONMEDIC

*The two exceptions are CONSCI, where the proportion of those having a 'great deal of confidence' remains level, and CONMEDIC, which has had a 15 percentage point drop. Nevertheless, almost two out of five (39 percent) Americans expressed 'a great deal of confidence' in Medicine.

cell may encompass as much as 20 calendar years or so. Because this way of defining a generational age group tends to be chronologically diffused, it is generally advisable, then, to also construct a line graph for each institution, charting how different generations – no matter how much their members' ages vary – respond in any given year.

Figure 26.14 charts confidence in education by cohort and year. It is representative of the nine institutions where confidence levels bottom out with the Baby Boomer Generation, and generally reflects the patterns of the remaining four. Figure 26.14(a) includes the three earliest cohorts, while Figure 26.14(b) includes the latest two. The Baby Boomer Generation is placed in both charts to facilitate comparison. Visual inspection reveals the following:

- Each succeeding generation tends to have lower confidence scores than the one before until it levels off with the Baby Boomer Generation, and then increases with each subsequent generation.
- Generally, all of the generational cohorts' scores move in tandem and reflect the two big drops in 1978 and 1993.

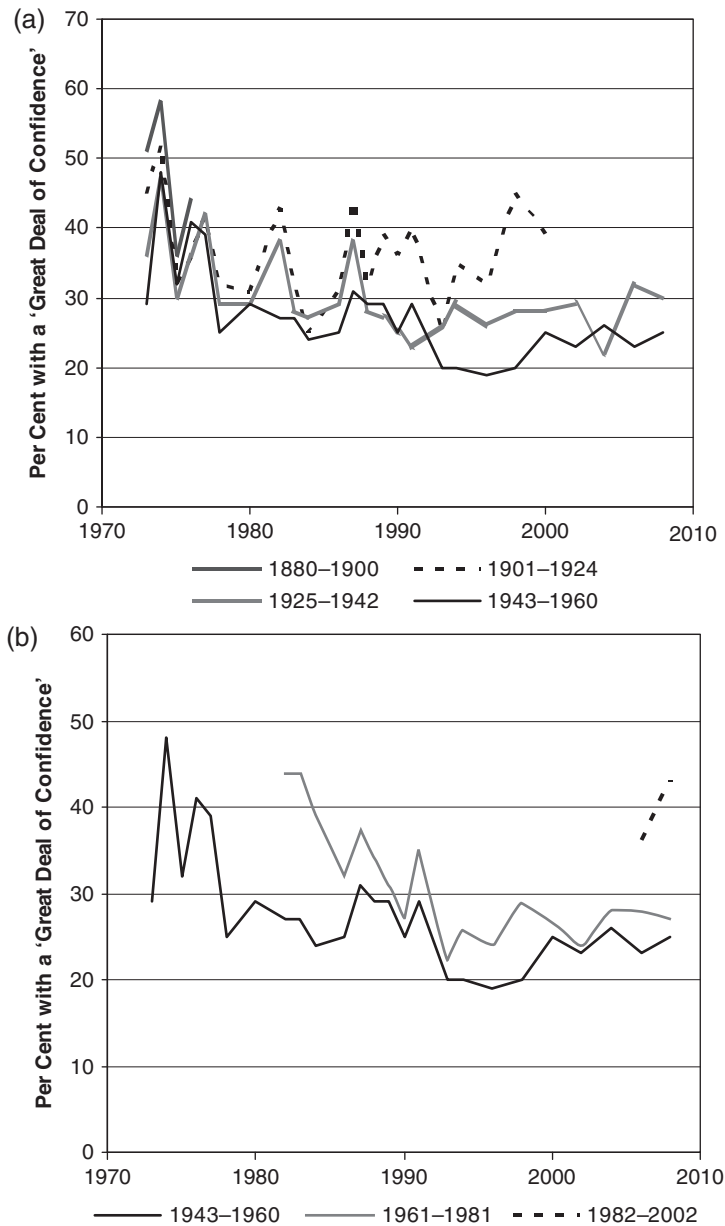


Figure 26.14a,b Confidence in education by cohort and by year

Data source: General Social Survey (GSS), USA.

These patterns suggest that if there is an increase in overall confidence in coming years, it will most likely be gradual because the 'cohort replacement effect' of rising Gen-Xers (1961–1981) and Millennials

(1982–2002) will first push out a more confident generation – the Silent Generation (1925–1942) – before they replace the least confident Baby Boomers (1943–1960), as Smith (2008: 10) has indicated.

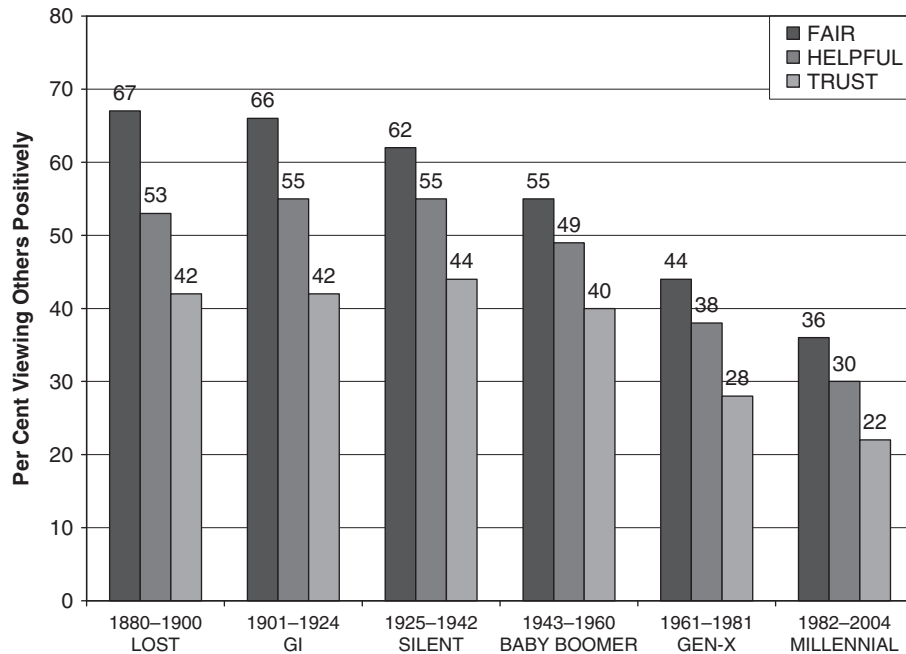


Figure 26.15 Percent viewing others as 'Fair', 'Helpful' and 'Trustworthy' by cohort

Data source: General Social Survey (GSS), USA.

There is one final puzzle that must be addressed before we assess what this visual excursion has revealed about Americans' confidence in their institutions. Figure 26.15 shows that the steady decline in confidence in other people that was charted as a 'Misanthropy Scale' in Figure 26.7 reflects generational differences, which remain more or less stable in the Lost, GI and Silent generations and then decline precipitously through each succeeding cohort. The Millennial Generation, which has evidenced increased confidence in institutions, here occupies rock bottom. Barely more than a third of those in this generation believe that others will treat you fairly (36 percent) and less than one out of four find others to be 'trustworthy' (22 percent).²¹ In other words, the two most recent generations, which are gaining confidence in their institutions, are also the ones whose faith in their fellows is plummeting toward all-time lows.

One way of resolving this paradox is Pamela Paxton's view that Gen-Xers and Millennials compensate for uncertainty in social relationships by putting their faith in institutions, not people (Paxton, 2005). But what accounts for this growing misanthropy, and just how might it translate into increased support for institutions? Figures 26.16 and 26.17 and Tables 26.6 through 26.8, address this conundrum, and suggest another explanation that – while it doesn't contradict Paxton – more clearly illuminates both the historic context and social dynamics of the rebound in institutional confidence among more recent generations.

Table 26.6 establishes that trends in the confidence data sort institutions into two groups. 'Strong' institutions are those with higher overall levels of a 'great deal of confidence' that generally show evidence of a rebound since 1994. 'Weak' institutions have lower confidence levels and, generally, no

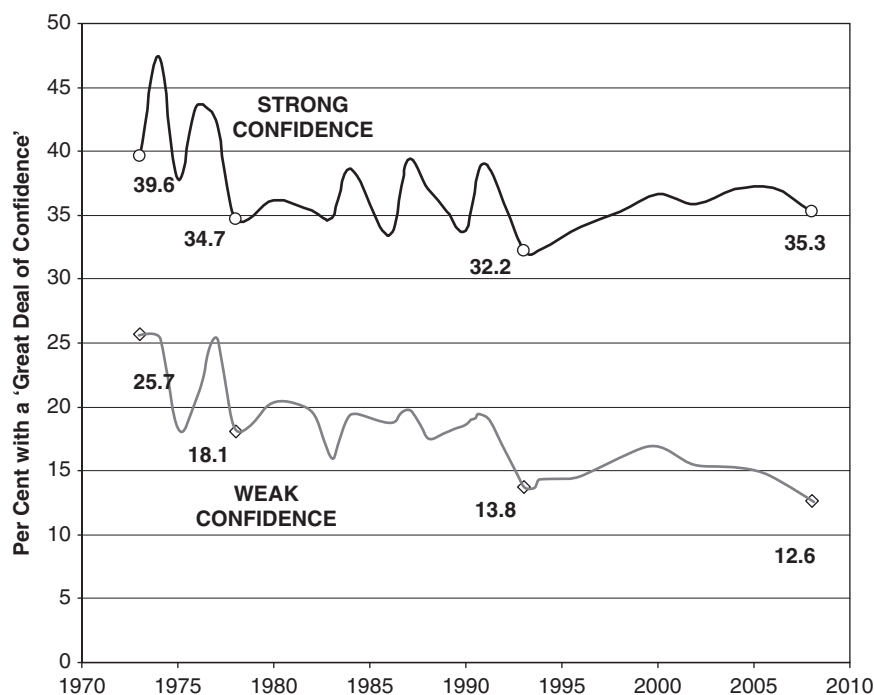


Figure 26.16 Percent of population with a 'great deal of confidence' in institutions in the 'strong' and 'weak' confidence groupings 1973–2008

Data source: General Social Survey (GSS), USA.

rebound. Reading Figure 26.16 for story suggests the following:

- For the most part, the two institutional confidence levels trend in a similar direction, although the gap between them widens significantly, from 13.9 to 22.7 percentage points.
- The 'Strong' institutions drop a total of 4.3 percentage points, or almost 11 percent between 1973 and 2008. There is, however, clear evidence of a rebound since 1994.
- During the same period, the 'Weak' institutions decline by a total of 13.1 percentage points, which is over 51 percent, with no rebound.

Also, very important are differences in the organizational characteristics of the two groups listed in Table 26.6. 'Strong' institutions tend to be led by professionals who manage organizational cultures with clear missions and clearly articulated, if not rigorous, standards. 'Weak' institutions,

however, are more dependent on public approval or support. Their high officials are either elected (congress or the presidency); respond, if not pander, to popular concerns and desires (television, the press), or they address and channel mass aspirations for a better world (organized religion and the labor movement).

In other words, the rebound in confidence is not distributed across all institutions. The professionally dominated 'Strong' institutions not only have evidenced a small decline in confidence over the years but also appear to be rebounding, while those institutions where either the electorate, consumer or member is king have witnessed a startling decline in confidence and no evidence of a rebound. In addition, Table 26.7 demonstrates that Gen-Xers – and especially Millennials – are more apt to have confidence in the 'strong' institutions than are

Table 26.7 Confidence in institutions by cohort and age group (18–26)

	<i>STRONG CONFIDENCE</i>		
	<i>1943–1960 Baby Boomer</i>	<i>1961–1981 Gen-X</i>	<i>1982–2002 Millennial</i>
CONFINAN	26.8	30.3	41.9
CONARMY	32.5	43.2	58.0
CONEDUC	33.9	34.6	39.7
CONMEDIC	61.1	57.1	55.4
CONSIC	45.6	48.2	49.4
CONJUDGE	34.6	42.3	38.9
Average	39.1	42.6	47.2

	<i>WEAK CONFIDENCE</i>		
	<i>1943–1960 Baby Boomer</i>	<i>1961–1981 Gen-X</i>	<i>1982–2002 Millennial</i>
CONLEGIS	13.5	19.0	23.5
CONLABOR	15.1	17.1	21.1
CONFED	15.6	19.8	19.4
CONTV	21.0	17.5	13.2
CONBUS	19.8	27.3	23.8
CONPRESS	24.6	18.2	13.0
CONCLERG	30.3	26.5	28.0
Average	20.0	20.8	20.3

Data Source: General Social Survey, USA.

their Baby Boomer elders, even though their more negative evaluation of the ‘Weak’ institutions is virtually the same as the Baby Boomers. In short, it appears that only the ‘Strong’ institutions inspire the confidence that can, perhaps, compensate for what people cannot count on from others. But why should these institutions inspire increased confidence among more recent cohorts?

A ‘generation’ can be defined as ‘a cohort-group whose length approximates the span of a phase of life [roughly twenty years or so]... [has] a common age location [in historic time], common beliefs and behavior, and perceived membership in a common generation [however inchoate]’ (assembled from Strauss and Howe, 1991: 60–64).

While it is generally acknowledged that important dimensions of a generation’s beliefs are formed in childhood, it is certainly

true that they are codified when people become adults where – both as values and norms – they are used to regulate their own children’s lives. This process, however, is quite dynamic and children incessantly test the strictures, with which they are inculcated, in the cauldron of experience and history for consistency and efficacy. Parents often pass on to their children what they believe is an improved version not only of what they themselves received from their parents but also what they imagine they would have told themselves as children had they been their own parents. This dynamic tends to produce forms of cultural exaggeration that often overemphasize the value of certain strictures and virtues more than others, and under-appreciate the importance of what has not been stressed, either through neglect or out-right rejection.

A close examination of Table 26.8 and Figure 26.17 suggests that one reason why more recent cohorts have regained faith in the ‘strong’ institutions is that these institutions may address needs that were not satisfied by their parents’ patterns of child rearing. This claim for the effect of child-rearing ideology is based on data generated by two series of questions in the GSS. Between 1973 and 1983 the GSS asked people to name their three most desirable traits in children out of a list of 13. The line of questioning was changed in 1986 to a five-trait scale and has been administered ever since.

Table 26.8 represents how often each of the 13 traits was identified as one of the ‘three most desirable qualities in children’ by members of different generations. They are ranked from those most often (#1), to least often (#13), mentioned within each cohort. There are five different patterns: ‘level’ (HONEST and ROLE); ‘secular decrease’ (CONTROL and STUDIOUS); ‘secular increase’ (SUCCESS and INTEREST); ‘curvilinear “U” shaped’ (MANNERS, OBEYS, CLEAN, and AMICABLE); ‘curvilinear “∩” shaped’ (JUDGMENT, CONSIDERATE, and RESPONSIBLE). While the ‘level’ pattern appears to represent persisting cultural

Table 26.8 Desirable qualities in children by cohort. 'Which three qualities... would you say are desirable for a child to have: be honest (HONEST); good manners (MANNERS), obeys parents well (OBEYS), gets along well with other children (AMICABLE), good sense and sound judgment (JUDGMENT), self-control (CONTROL), neat and clean (CLEAN), a good student (STUDIOUS), tries hard to succeed (SUCCESS), interest in how and why things happen (INTEREST), acts like a boy or girl (ROLE), considerate of others (CONSIDERATE), responsible (RESPONSIBLE)'. Ranked in order from most to least often mentioned

	<i>Lost</i> 1881–1900	<i>GI</i> 1901–1924	<i>Silent</i> 1925–1942	<i>Baby Boomer</i> 1943–1960	<i>Gen-X</i> 1961–1980
1	HONEST	HONEST	HONEST	HONEST	HONEST
2	MANNERS	MANNERS	RESPONSIBLE	RESPONSIBLE	MANNERS
3	OBEYS	RESPONSIBLE	CONSIDERATE	CONSIDERATE	SUCCESS
4	AMICABLE	OBEYS	JUDGMENT	JUDGMENT	OBEYS
5	JUDGMENT	CONSIDERATE	MANNERS	MANNERS	RESPONSIBLE
6	CONSIDERATE	JUDGMENT	OBEYS	INTEREST	CONSIDERATE
7	CONTROL	CONTROL	CONTROL	OBEYS	INTEREST
8	RESPONSIBLE	AMICABLE	INTEREST	CONTROL	JUDGMENT
9	CLEAN	INTEREST	SUCCESS	SUCCESS	AMICABLE
10	STUDIOUS	SUCCESS	AMICABLE	AMICABLE	CLEAN
11	SUCCESS	CLEAN	CLEAN	CLEAN	CONTROL
12	INTEREST	STUDIOUS	STUDIOUS	STUDIOUS	STUDIOUS
13	ROLE	ROLE	ROLE	ROLE	ROLE

Data source: General Social Survey, USA.

values, the 'secular decrease' and 'secular increase' represent century-long trends. For our purposes, I will focus on the contrast between the two curvilinear patterns, which suggest a pattern of cyclical change.

Put simply, the 'curvilinear "∩" shaped' (JUDGMENT, CONSIDERATE, and RESPONSIBLE) emphasize the child as a 'rule definer,' one who is expected to decide what is proper in a given situation or course of action. The 'curvilinear "U" shaped' (MANNERS, OBEYS, CLEAN, and AMICABLE), however, imagines a child as one who is 'rule attentive,' or concerned with aligning their behavior to well-established rules and conventions. The Baby Boomer Generation envisioned a future for their children wherein they would make their own way in life, showing judgment, exercising

responsibility for their actions, and, of course, being considerate of those with whom you had to manage these new social contracts, perhaps because the Baby Boomers found the 'role attentiveness' of their own parents' strictures to be overly constraining in the rapid social mobility of post-World War II America when they grew up.

The five-trait scale represented in Figure 26.17 also reflects the same curvilinear patterns. Thinking for oneself (THINKSELF) is just another way of eliciting a commitment to 'rule defining', while valuing hard work (WORKHARD) only makes sense in a social environment that predictably rewards such effort. OBEY in Figure 26.17 does not follow the same pattern as OBEYS in Table 26.8, probably because it is about obedience in general and

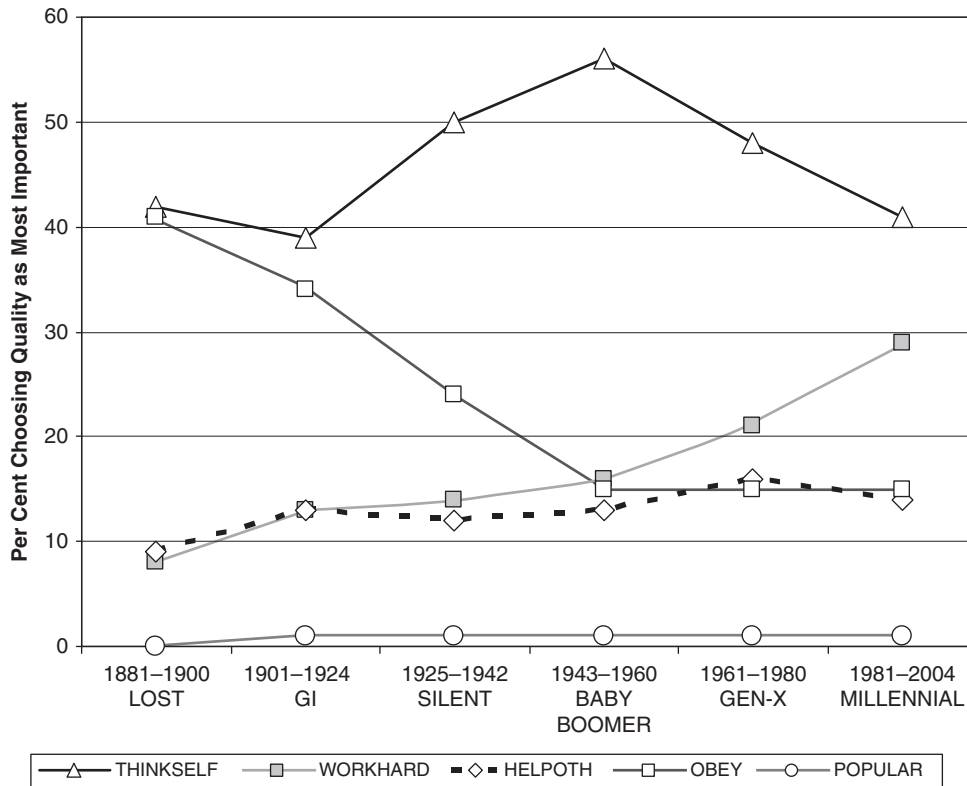


Figure 26.17 Desirable qualities in children by cohort. If you had to choose, which thing on this list would you pick as the most important for a child to learn to prepare him or her for life: to obey (OBEY); to think for himself or herself (THINKSELF); to work hard (WORKHARD); to help others when they need help (HELPTH); to be well liked or popular (POPULAR).

Data source: General Social Survey (GSS), USA.

not just obedience to one's parents. I've included Figure 26.17 because the later line of questioning has the time depth to include Millennials.

This shift in child-rearing ideology suggests that Gen-Xers and Millennials, who were expected to take responsibility to think for themselves, may have found themselves wanting more structure in their lives to provide a latticework of rules and stable expectations, which would reward working hard toward the goals that they had been encouraged to set. Such a generation, presumably, might arrive at not only an increased wariness of others in a world where rules and contracts were expected to be constantly

negotiable but also develop more of an appreciation of the value of reasonably well-functioning institutions than their parents had. An inter-generational socialization dynamic of this sort, therefore, is consistent with a pattern of both increased misanthropy and also growing support for institutions that possess an organizational culture not unlike like that which characterizes the 'Strong' institutions in Table 26.6: professional leaders, clear missions, and rigorous standards.

In sum, there are reasons to be sanguine that Americans' confidence in some of their institutions is growing. The inter-generational dynamic that is producing more confident recent cohorts is one that might also

encourage a positive feedback loop. Being able to look at the bright side encourages people to invest their energies in what they value, which can lead, in this case, to 'Strong' institutions being able to recruit more highly motivated employees.

The future, however, does not appear to be that bright for the group of 'Weak' institutions. 'We have seen the enemy, and he is us!', Pogo announces in Walt Kelly's cartoon of the same name. When we elect our leaders, select our media, and choose our associations, we have, in a sense, no one to blame but ourselves when they lack sufficiency in our eyes. The value system of the Gen-Xers and Millennials may not be designed to readily enlist their loyalties and energies for institutions with no clear sense of purpose and direction. While it is possible for trends like these to change, it usually takes a perceived sense of crisis spurring a broad cultural and moral reawakening to create the political realignment necessary to re-energize popular energies and institutional commitments (Fogel, 2000). It is beyond the scope of this paper to consider the likelihood of such an eventuality. However, the current prospects for confidence in those institutions that are most sensitive to the popular will appear to justify those who worry about cultural malaise and the 'fraying' of America.²²

CONCLUSION

This chapter, which began with a concern about general institutional decline in the contemporary United States, has become a sort of sociologist's *Tale of Two Cities*. On the one hand, Americans have generally retained their confidence in professionally dominated institutions, which only promises to increase in the long run because support for them is growing among more recent cohorts. On the other hand, those institutions that are most responsive to public demand and popular control appear to be in somewhat of a free

fall in confidence with no rebound in sight among these same generations. My concluding remarks, however, will shift back to the animating purpose of this chapter and reiterate the important role that visualizing data has played in the analysis, and draw some lessons from this.

Getting an audience to consider the topics and issues that have been raised about the visual display of information encounters two obstacles: on the one hand, the visual tends to be dismissed because it is too accessible; on the other hand, however, viewers don't attend to images because they are exasperating and often demand too much effort to decipher. We like to look at pictures, including charts and diagrams, but because anyone can do it – one line of reasoning suggests – therefore it mustn't be either that important or significant. Stanley Lieberman compares this contemporary academic scenario to the old Jewish joke that expresses dismay at how demeaning it is to join a club, which would accept you as a member:

Empirical data can tell us what is happening far more readily than they can tell us why it is happening. 'What happens' can include all of the cross-tabulations, interactions, controls, modeling, and the like, that one might desire. There is nothing wrong with contemporary social science research in that regard... [T]he use of social research to describe or examine a set of events is perfectly appropriate. The social sciences are better equipped to do such work, and it is tragic to look down on these skills and the desirable function of describing the state of society (Lieberman, 1985: 219).

This chapter has argued that because the basic tasks of social description and analysis are at the core of sociology's mission, using visualization to improve our performance in this regard should be regarded as a priority for social scientists, and visual sociologists in particular. But, as this chapter has demonstrated, designing charts is demanding work. It requires care and attention to choose the most illuminating forms of display, and some effort to make the final published display as legible as possible. There is a craft both to

visualization and how it is deployed in analysis and discovery, which social scientists need to develop. This is all the more important when designing more unconventional ways of displaying information.

Howard Becker states:

Someone once told me that ‘word people’ and ‘picture people’ are two different breeds, but I don’t believe it. The people whose studies I’ve discussed here made both words and pictures work for them. The combination produces, I’m convinced, increased understanding. But it is uncommon. Like [John] Tukey’s statistical innovations – box-and-whisker diagrams, for instance – they require users to work a little harder. Data don’t appear in simple formulaic patterns that users can inspect quickly. Users have to put some effort into extracting the meaning (Becker, 2007: 185).

For social scientists the hard nut at the core of their craft is that they cannot avoid the challenge of how numbers, words and pictures intersect in their minds and in their communications. This is a work of logic, craft, intuition and the imagination. Social scientists tell true stories with data. No less than literary journalists, they have to write about what they discover, even if it is based on nothing more than reams of numbers generated by a computer. They have to find ways to discern meaning in their data and ways to communicate that clearly to their audiences. Enlisting the visual is indispensable to achieve this goal, as is learning the craft of visual display and analysis, and how to commit what is envisioned to paper.

Read from top to bottom, Figure 26.18 represents the sequence in which the visual displays appear in this chapter’s narrative. It identifies five different threads of evidence, which have been woven into a story about contemporary American attitudes (‘misanthropy’; ‘great deal of confidence in institutions’; ‘three confidence values and general confidence’; ‘cohorts’; and ‘desirable qualities in children’). It also shows that on four occasions, deciding whether a chart should be included in the narrative required that the same chart should first be created for each of

the institutions, and then analyzed in depth. Note that each of those analytic moments is linked to revisions in the typology of institutions. Thus, the progression from a four-fold categorization of institutions – ‘More,’ ‘Moderate,’ ‘Least’ and ‘Volatile’ – to the final typology of ‘Strong’ and ‘Weak’ institutions is driven by a visual analysis of various kinds of displays created for that purpose. Also note that, apart from Figure 26.1, which functions as a ‘grabber’, the story is developed in stages from threads that begin with ‘Misanthropy’ and culminate with ‘Qualities’. If all the text in this chapter suddenly disappeared, the argument could be reconstructed from the sequence of illustrations alone. But this is only because both the diagrams and the argument are two modes of thinking whose relationship makes analysis possible.

It requires just as much effort to look at a chart as it does a photograph or painting. This is especially true, as Becker points out, when the chart is an innovation (2007: 71–91). One way of encouraging readers to look at these charts carefully is to construct them thoughtfully, and then discuss their contents at some length. The writing should be limpid and use the power of language to capture and enliven the patterns in the chart. If the charts are the skeleton of an argument, then the written word is its flesh and blood. The more that the craft of turning numbers into pictures and then into words is valued, the more comfortable people will become reading them. Graphs in sociology, therefore, should function as paintings and photographs do in art history, and the art of constructing and interpreting them should be an integral part of the discipline’s curriculum.

Some of the charts designed for idiosyncratic purposes – like Minard’s famous graph of Napoleon’s march to Moscow (see Wainer, 1997: 63–65) – may rarely, if ever, be replicated. But this is not so with Tables 26.4, 26.5 and 26.8, which could easily serve as templates to construct, variously, the types of graphic matrices that Jacques Bertin recommends, visualizing, as they do, the life course over time and comparing rankings.

Misanthropy	Great deal of confidence	All values	Cohorts	Qualities	Analyze all variants	Typology
	Fig 1 Wainer					
						Fig 2 Visual Displays
Fig 3 Fair (2008)						
Fig 4 Fair (1964)						
Tab 1 Fair						
	Tab 2 Three Institutions					
	Fig 5 Amos					
	Fig 6 Amos Revised					
Fig 7 Misanthropy						
	Fig 8 Small Multiples:				Comparison & Analysis	
		Fig 9 All Values			Comparison & Analysis	
		Fig 10 All Values (Bar chart)				
	Tab 3 Three Types					
		Fig 11 "General" Confidence (Bar chart)				
	Fig 12 Three types by Year					
	Tab 4 Shaded table				Comparison & Analysis	
			Fig 13 Cohorts			
			Tab 5 Cohort by Age Grade			
	Tab 6 Strong vs. Weak					
			Fig 14 Cohort by Year		Comparison & Analysis	
Fig 15 Misanthropy by Cohort						
	Figure 16 Two Types (line chart)					
			Tab 7 Recent Cohorts			
				Tab 8 Thirteen qualities		
				Fig 17 Five qualities		

Figure 26.18 Tables and figures as threads of story in this chapter

It is often the case that the best solution for a particular puzzle can also be applied to similar problems.

Finally, Table 26.8 shows us how a graph can help transform numbers into words. Table 26.8 charts a total of 15 variables: the 13 desirable qualities, generation, and rank order. Once the qualities are arranged in the appropriate rank order, the numbers are no longer necessary, and how the concepts cluster almost dictates what will be written about them. The same is true for Table 26.6, where the GSS' marvelous mnemonics suggest the organizational characteristics of the two institutional groups. Transforming numbers into words on our charts, whenever possible, can also suggest associations that lead to further discoveries.²³

We live in an era where we are awash in information that is growing geometrically. In order to avoid information overload, we need to find ways of simplifying data without losing sight of its variety and complexity. Statisticians provide us with increasingly complex algorithms, which enable us to manipulate vast amounts of information in ways that are as productive as they are interesting. Very often, the output from these statistical manipulations leaves us at some remove from the evidence itself. The danger in this situation is that it reduces our analysis to a formula, which hinders our ability to switch our analytic perspective from the big picture to seeing how it plays itself out in the details. Visualization of data into images for analytic purposes complements these more sophisticated statistical approaches by enabling us to shift our vision from the large scale to the medium range to the micro level (Grady, 2008). The result is pictures of various sorts – whether photographs, renderings, or, as in our case, standardized charts and creative graphic designs – that can be interpreted, compared and analyzed. A sociology that incorporates a visual sensibility and the craft of image production and display not only will be more fully grounded in its evidence but also will produce accounts and explanations that are more supple than those

that do not avail themselves of these modes of seeing and thinking.

NOTES

1 Jon Prosser, Arnie Lieber, Jenni Lund and Howard Wainer provided very useful feedback on this chapter. None of them, of course, is culpable for what I have made of it.

2 The General Social Survey is online at <http://sda.berkeley.edu/cgi-bin/hsda?harcsda+gss08>. Every one of its questions, or variables, is assigned a MNEMONIC code, which is usually easy to remember and often describes the question well. It only takes a class period to learn how to do simple correlations with what is generally acknowledged to be the most rigorously conducted and exhaustive social survey in the world of a country's beliefs and attitudes. The GSS has been administered since 1972. A useful guide is Davis and Smith (1992) and a good overview of the GSS as a resource for studying social change is provided by Davis (1997).

3 The institutions are Medicine (CONMEDIC), Science (CONSCI), the Military (CONARMY), Education (CONEDUC), the Supreme Court (CONJUDGE), Banks and Financial Institutions (CONFINAN), Big Business (CONBUS), Religion (CONCLERG), the Executive Office (CONFED), the Press (CONPRESS), the Congress (CONLEGIS), Television (CONTV) and Unions (CONLABOR).

4 Tufte's work includes *The Visual Display of Quantitative Information* (1983), *Envisioning Information* (1990), *Visual Explanations* (1997) and *Beautiful Evidence* (2006).

5 See Grady (2006) for a discussion of what Tufte offers the social sciences.

6 There are a number of very good manuals that articulate principles to guide choice of design. These include Robert L. Harris' *Information Graphics* (1999), Stephen Few's *Show Me the Numbers* (2004) and Stephen Kosslyn's *Elements of Graph Design* (1994). Kosslyn's book is particularly illuminating because he tempers aesthetic considerations with careful attention to issues of visual perception and cognition.

7 Lists of these fonts are readily available on the Internet. In this case I used Verdana.

8 'If you cannot fit all the labels in wedges, then place all of them next to the appropriate wedges; do not put some labels in wedges, and others next to wedges' (Kosslyn, 1994: 108).

9 When color is not an option, more limited effects can be derived from shading in grayscale. To be legible, however, shading also might require increasing the size of the font, as I did in the body of the text.

10 This formal procedure is rooted in the neuropsychological process of scanning, which can be molded by experience into various scanning strategies. 'A typical scanning strategy is the one we use when reading: we start in the upper left-hand corner and move our eyes across from left to right starting at the top and progressing down' (Ware, 2008: 38). The visual inspection of an image is very much like this strategy.

11 I am indebted to Howard Wainer for bringing this flaw to my attention and to Phil Woodward for showing me how to remedy it.

12 The three questions about others' 'fairness', 'helpfulness' and 'trustworthiness' are commonly referred to as measures of 'misanthropy'.

13 Stephen Few's section on small multiples in *Show Me the Numbers* (2004) is a useful guide. Also, see Tufte's seminal and imaginative discussions in *Envisioning Information* (1990: 67–80) and *Visual Explanations* (1997: 105–121).

14 To arrive at these ratios, I consulted the tabular data. What the eyes direct us to see, the mind should count!

15 The SDA software has a very user-friendly capacity for carrying out a number of sophisticated statistical analyses, including multiple regression.

16 *Science Magazine* reported in December 2003 on a number of scientific 'breakthroughs' for the previous year that could have had a countervailing effect and resulted in a boost of confidence in science. These events included finding genetic markers for mental illness, discerning climate change impacts, the role of RNA molecules in modulating gene expressions, connecting gamma ray bursts and supernovas, and the role of anti-angiogenesis in blocking the growth of cancer cells, to mention a few. Presumably any of these, singly or together, could have compensated for the discouragement by the Columbia tragedy.

17 Parenthetically, it is important that evidence of period effects be considered in a comprehensive manner. For example, once Caitlin Amos (2009) realized that CONFINAN appeared to be tracking periods of economic recession, she re-examined the evidence to see whether the trend tracked every recession since 1975 or just those that she had noticed. This sort of close reading is necessary when evaluating historic events and can improve our theoretical sensitivity as sociologists. In this regard, while it seems self-evident that there should be an increase in confidence in the military after the Gulf and Iraq wars, it is not clear why there also should have been an increase in confidence in 1984 after the Invasion of Granada, but no noticeable effect after the Invasion of Panama in 1989, which was an equally limited military engagement. Comparisons like these can contribute to a more thorough understanding of what properties of historical events influence public opinion. In short, well-designed visual displays are

goldmines for new research questions, angles and insight and should be exploited as such.

18 Bertin's major works include *Graphics and Graphic Information Processing* (1977) and *Semiology of Graphics*, which will be reissued in 2010. An accessible introduction to Bertin can be found in Wainer (2009: 193–198).

19 This is not to say, however, that further manipulation of the rows might not yield an even more elegant way of representing the data. Invariably, all analysis is provisional in this way.

20 One is in the Silent Generation (1925–1942), two in Generation X (1961–1981) and one in the Millennial Generation (1982–2002).

21 Generally speaking, those groups that tend to be more misanthropic are those with less resources and histories of discrimination – the poor, blacks, the young, the uneducated, all of which factors compound each other. Thus, for example, between 1994 and 2008, just fewer than three out of four (73 percent) older white middle or upper class males with at least a college education asserted that other people were fair. The corresponding figure for young lower or working class black males with less than a 4-year college education was one out of five (20 percent). Age groups were young (18–29) and old (40–60). Class was self-defined (CLASS).

22 A brief note is in order about CONFINAN and CONBUS, which together measure confidence in organized capitalism. While their organizing principle is the profit motive, they prosper by providing people access to a world of material abundance. It is thus not surprising that CONBUS is relegated to the 'Weak' institutions group. Additionally, CONFINAN is the least robust of the 'Strong' institutions, and may in time be counted as one of the 'Weak' institutions.

23 For example, I never figured out what it was about 1978 and 1993 that led to two big drops in institutional confidence. I'm still not sure why it was those years and not others. But, if we rename the years for incumbent presidents, we notice that Carter was president in 1977 and Clinton in 1993 and, with a little sleuthing, that each represented the first member of his generation to reach the Oval Office. It is possible that the public, generally, may be ambivalent and apprehensive about a decision to anoint a new generation of leaders, and that this may aggravate all of the other factors encouraging a decline in confidence.

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