**Chart Smart Report**

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**Note: In the text below, I use the term “chart” to refer to charts, graphs, & tables in general.**

**Goals:**

In the quest to increase students' information literacy, some instructors may choose to focus on teaching students to create better charts, but for my 100-level, introductory course in sociology, I choose to emphasize developing the ability to interpret charts. Hopefully, as students progress through college and find themselves needing to produce charts of their own, they will be able to draw upon the skills which they learned with me in doing their own work. Specifically, I would like to help students learn to recognize relationships between variables, whether they are correlational or causal, when these relationships are expressed in chart form. Also, when charts display change over time, students should be able to trace these changes. When charts display data in misleading or unhelpful ways, students should be able to recognize this and to understand if/how it would be possible to improve the presentation. After providing links to multiple online sources of charts that could be useful in a SOCI 101 course, I present some sample questions/assignments that are linked to specific charts. These can be used to assess students' information literacy over the course of the semester.

**Sources of Data in Chart Form:**

Hans Rosling, a medical doctor, appears in many videos produced by the [Gapminder](http://www.gapminder.org/) organization, a Swedish non-profit which was founded “to pursue the development of the Trendalyzer software. Trendalyzer sought to unveil the beauty of statistical time series by converting boring numbers into enjoyable, animated and interactive graphics” (<http://www.gapminder.org/about-gapminder/our-mission/>). In his various TED talks and other video presentations, which are collected on the [Gapminder website](http://www.gapminder.org/), Rosling uses animated graphs to support his arguments regarding the disappearing gap between so-called [“developing” and “developed” nations](http://www.gapminder.org/videos/the-river-of-myths/) and the relationship between [religion, income, & fertility rates](http://www.gapminder.org/videos/religions-and-babies/). Because of their comparative, cross-national orientation, both of these videos (as well as others on the Gapminder website) would be useful in a globalization section of an Introductory Sociology course or in a class dedicated to the topic of globalization.

While the videos on the Gapminder website provide a helpful way to introduce students to the interpretation of data in graph form, the website also includes [links](http://www.gapminder.org/data/) to over 500 graphs which relate multiple nations’ income levels (i.e., per capita GDP) to everything from yearly carbon dioxide emissions to infant mortality rates. All of these graphs are animated to show change over time, and each graph includes information about the source(s) of the data presented. An important component of teaching information literacy is to encourage students to recognize that data does not just materialize out of nowhere, but rather is collected by individuals and by organizations. This can be a valuable component of a discussion of subjectivity and objectivity.

Whereas Gapminder is a good source of charts that primarily compare nations with each other, the [State of Working America website](http://stateofworkingamerica.org/) takes a more (although [not entirely](http://stateofworkingamerica.org/subjects/international/)) domestic perspective, including links to visual representations of “a wide variety of data on family incomes, wages, jobs, unemployment, wealth, and poverty that allow for a clear, unbiased understanding of the economy’s effect on the living standards of working Americans” ([http://stateofworkingamerica.org](http://stateofworkingamerica.org/)). The website includes links to numerous, up-to-date charts which can be sorted by subject or by demographic. To thoroughly examine all of the charts on this website would take hours.

Another source of charts illustrating domestic trends is the [website](http://www.pewresearch.org/) of the Pew Research Center. While the Pew Center does analyze what their website calls “social trends,” such as [changing gun homicide rates](http://www.pewsocialtrends.org/2013/05/07/gun-homicide-rate-down-49-since-1993-peak-public-unaware/), the Pew Center also conducts numerous polls of public opinions/attitudes. In the chart-based assignments for my own course (Intro. to Sociology), I intend to focus more on social trend charts than upon charts that illustrate public opinion poll results, because opinion polls results tend to be less challenging to interpret. A chart showing changing public attitudes on an issue over time might be more difficult for students to interpret, but I am interested in using the Chart Smart assignments to foster a “fact-based world view,” to quote the headline of the [Gapminder website](http://www.gapminder.org/). The Pew Center also sponsors research projects into topics as diverse as the [internet and American life](http://www.pewinternet.org/), [religion and public life](http://www.pewforum.org/), and [Hispanic life](http://www.pewhispanic.org/), among others. I have incorporated some Pew charts into my Religion & Society course in the past with some success, andI hope to do more of that in coming semesters. The usefulness of this website (and of the other websites discussed above) is not limited to an Introductory Sociology course.

In addition to the sources of data described above, within this paragraph are links to examples of news articles with charts that could be incorporated into assignments. I have chosen these articles because they are recent (as of June, 2013), because they cover issues (such as [health care costs](http://www.pbs.org/newshour/rundown/2012/10/health-costs-how-the-us-compares-with-other-countries.html)) that are the source of intense national debate, and also because they cover topics that might be of direct interest to college students, such as changing [student loan interest rates](http://www.washingtonpost.com/blogs/wonkblog/wp/2013/06/13/everything-you-need-to-know-about-the-student-loan-rate-hike/) and [rising athletic budgets](http://m.theatlantic.com/business/archive/2013/01/this-outrageous-5-year-rise-of-college-sports-spending/267287/#disqus_thread) at US universities.

In addition to the ability to interpret well-constructed charts, another valuable skill is the ability to recognize poorly-constructed charts. This [link](http://www.smashingmagazine.com/2010/05/10/imagine-a-pie-chart-stomping-on-an-infographic-forever/) opens an online article about poor chart construction, including examples of such bad charts. Of particular interest to me is the [violent crime rates](http://media.smashingmagazine.com/wp-content/uploads/2010/04/violent-crime.jpg) graph, which originally appeared in the *Economist* magazine. This graph illustrates the dangers of poorly-labeled axes, which can easily lead one to interpret a line showing the change in crime rates as showing the crime rates themselves. Given that so many students in SOCI 101 are interested in Criminal Justice, such a graph might be interesting to them.

**Assignments:**

Ideally, I would like to meet with students individually in order to discuss a chart and then ask the student questions about the same chart. By “discuss,” I mean to become generally familiar with a chart, as in what variable are being depicted, etc. After establishing a certain level of familiarity with the chart as a whole, I would ask specific questions, which I would grade as a quiz. Below I present sample graphs and associated questions, but before I do so, I would like to say something about the feasibility of one-on-one meetings. Meeting in this way might be easier in a smaller class, but SOCI 101 courses include 45 students. Meeting individually with each student in such a context would take up a lot of time, especially since I plan to administer such quizzes 2-3 times per semester.

An alternative would be to meet with students in groups of 2-3. This would save some time, and hopefully these groups would be small enough to prevent the “free rider” problem. In group work, “free riders” feel free to do nothing, because they know that the group is being graded as a whole, so someone is bound to do their share of work for them. Even such small group meetings would take up a fair amount of class time, though, so the more realistic expectation is to give Chart Smart quizzes as a mixture of small group and written assignments. The questions for each type of assignment are similar, and I present examples of such questions below. Answers are in *italics*:

1. This [graph](http://stateofworkingamerica.org/chart/swa-wages-figure-4t-gender-wage-gap-age/) is entitled “Gender wage gap, by age cohort.” Examine the graph and answer the following questions. For written responses, aim for 1-2 sentences per question, and explain your responses:

What is meant by “age cohort?” *A cohort is a group of people born during the same range of years.*

Is the wage gap wider or narrower for women born more recently, compared with women born previously? *The gap is narrower for women born 1966-'75 than for women born previously. Women born between 1966-'75 generally make 10-20% less than men, while women born previously generally make at least 20% less.*

For all women, is the wage gap wider or narrower at age 20 than at age 30? *It is narrower at age 20. For all women shown, the graph lines are higher at age 30, indicating a wider wage gap between men and women.*

2. This [graph](http://www.gapminder.org/world/#$majorMode=chart$is;shi=t;ly=2003;lb=f;il=t;fs=11;al=30;stl=t;st=t;nsl=t;se=t$wst;tts=C$ts;sp=5.59290322580644;ti=2011$zpv;v=0$inc_x;mmid=XCOORDS;iid=phAwcNAVuyj1jiMAkmq1iMg;by=ind$inc_y;mmid=YCOORDS;iid=phAwcNAVuyj1NHPC9MyZ9SQ;by=ind$inc_s;uniValue=8.21;) shows the changing annual carbon dioxide (CO2) emission levels of multiple nations over time. Click “Play” to animate the graph and answer the following questions. For written responses, aim for 1-2 sentences per question, and explain your responses:

What three nations had the highest total CO2 emission levels in 2011? *China, US, & India. These nations are the highest on the y-axis in 2011.*

Does the graph suggest that there is a relationship between countries' income per person and CO2 emission levels? In other words, do richer/poorer nations have higher/lower emission levels, in general? *Not really. China & India are low on the income scale but high on emissions, while the US is high on both.*

What information would you need to know in order to calculate the average CO2 emissions per person in a particular nation? Can you figure out how to get that information from this graph? *You would need to know total emissions & total population of each nation. Total emissions is the y-axis. When you place the cursor over a nation's bubble on the graph, its population total is given in the lower right corner of the graph, labeled "Population, total."*

3. This [graph](http://www.pewsocialtrends.org/files/2012/09/09-12-12-Household-Income-02.png) shows changes in household income during and after the five most recent economic recessions in the US. Examine the graph and answer the following questions. For written responses, aim for 1-2 sentences per question, and explain your responses:

Did recessions before 1990 have a greater or lesser impact on household incomes than the post-1990 recessions? *The earlier recessions had a greater impact. Income decreased by more than 5% during both earlier recessions, as opposed to less than 5% during more recent recessions.*

How did income levels in the years after pre-1990 recessions change in comparison with the time periods after the other recessions depicted? *After pre-'90 recessions, income increased during the recovery. During the recoveries after more recent recessions, however, income has continued to decrease.*

What is the source of the data in this graph? *US Census Bureau*

Which recovery period has been the worst for median income levels? *The recovery period after the 2007-'09 recession has been worst, because income has decreased by more than during any other recovery.*

What years does this worst recovery period include? *2009-2011*