Geog 3250 Social Science Method

Lab: Quantitative Analysis using SPSS

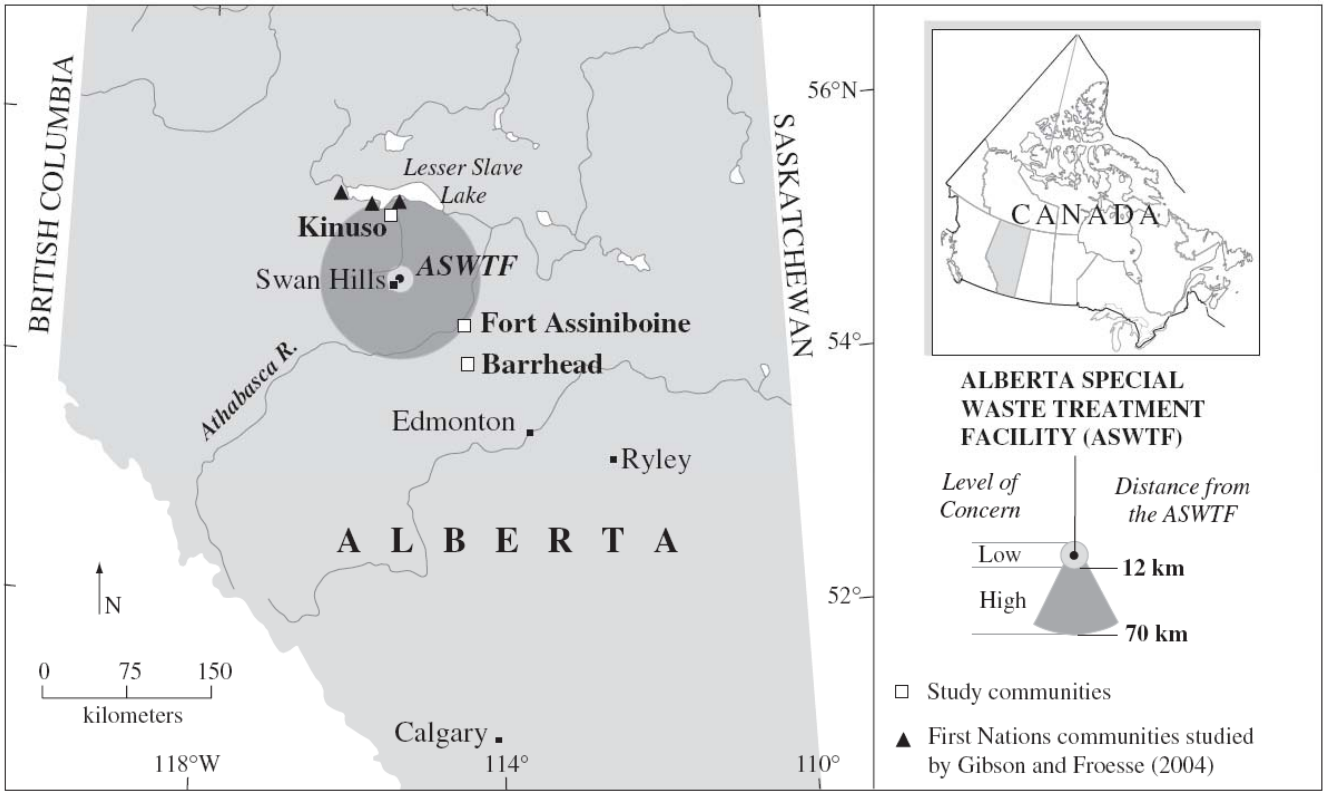
Introduction/Purpose

- These slides introduce you to the Alberta Special Waste Treatment study and data set.
- A survey was administered by telephone to residents in Swan Hills, Kinuso and Fort Assiniboine and you will conduct some analyses on the data.
- You will use the very brief background to develop hypotheses and then use the data to test those hypotheses.

Study Outline

- The Alberta Special Waste Treatment Facilities disposes all manner of hazardous waste including PCBs through incineration mainly
- All treated material is landfilled onsite or put down a deep well
- The facility leaked PCBs and dioxins and the survey was administered a couple of years after this event.
- Swan Hills (approx. 1500 residents), Kinuso (approx. 1000) and Ft. Assiniboine (approx. 1000) are the *closest* towns (see next slide) (Barrhead is much further away)
- About 100 people from Swan Hills work there, but none from the other towns

Study Communities



These conclusions are based on interviews

Figure 1

Donut rather than distance decay of concern. Distance tells only part of the story of the spatial patterning of concern. At the region level, there seems to be a donut of concern in the towns at a medium distance from the ASWTF hazardous waste facility (Fort Assiniboine, 70 km; Kinuso, 70 km) with a low-concern centre (Swan Hills, 12 km) and similarly low concern outside the donut (Barrhead, 120 km). Though the distribution of risk and benefit comprises part of the explanation, threats to ways of life and worldviews further explain this pattern

Source: Baxter, J. and Greenlaw, K. (2005) Explaining perceptions of a technological environmental hazard using comparative analysis, *The Canadian Geographer*, 49(1): 61-80. (available on Sakai)

Explaining Facility Concern

- The following figure is an *analytical framework* (diagram showing how study variables fit together, i.e. a representation of hypotheses) from Baxter (2009) gives you a sense of some of the main variables expected to influence concern

- You do not have data for "trusted information sources", but you do have data for "trust to ensure facility safety"

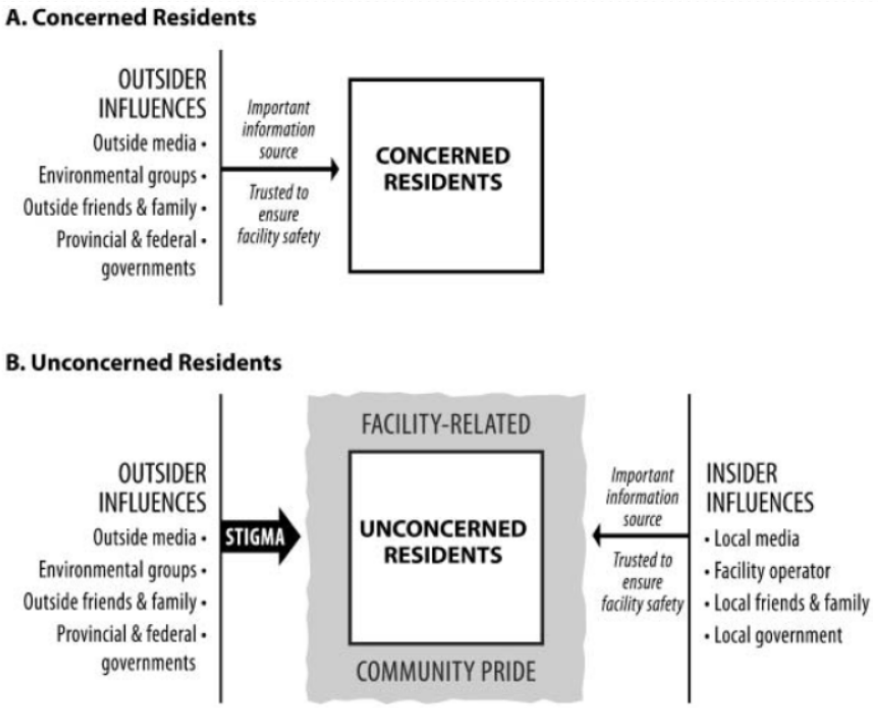


Figure 1. Insiders, outsiders and a hazardous waste facility at Swan Hills. (A) The concerned residents prefer information sources, and trust groups to ensure facility safety, from outside the community. (B) Insiders react to outsiders with a heightened sense of community pride to challenge stigma, which sustains low concern about the facility (see also Baxter and Lee 2004).

Source: Baxter, J. (2009) Risk Perception: A Quantitative investigation of the insider/outsider dimension of cultural theory and place, *Journal of Risk Research*, 12(6): 771-91.

All of the ASWTF publications are on Sakai – See Resources; Quantitative_Analysis_Lab

Qualitative Findings

- These findings are from qualitative, inductive, face-to-face in-depth semi-structured interviews

Table 1
Residents *concerned* and *unconcerned* about Alberta Special Waste Treatment Facility*

	Fort Assiniboine	Barrhead	Kinuso	Total
Concerned residents	19 (90)	7 (39)	16 (100)	42 (76)
Unconcerned residents	2 (10)	11 (61)	0	13 (24)
Total	21	18	16	55

*Residents are defined as 'concerned' if: (i) they responded that they were when asked directly and/or (ii) they repeatedly expressed concerns or opposition to the hazardous waste facility despite expressing lack of concern when asked directly near the beginning of the interview. All but one were of the first type. (Percentages given in parentheses.)

FERNANDO (Fort Assiniboine): We are downwind and downstream from the facility. The scientists tell us that there is no danger, because at the hearings they said the plume that comes out of the stack only goes (pause), it has fall out within about 800 meters of the facility. Which, in my opinion, is lame, B.S. What do we know as lay people how this works its way through the food chain? Is there anything in the fish that we might fish in our area? What about the moose we hunt? And so, there is no problem? Then why do they [Bovar] buy out, for instance, all the trap lines that are around?

Qualitative Findings

- These findings are from qualitative, inductive, face-to-face in-depth semi-structured interviews

INTERVIEWER: So, you don't trust the university at all?

ADRIAN: Nope, that's government! And I don't trust any government. No, I don't. I trust Bovar a far sight less. Ralph Klein [Premier of Alberta] only shut all of these private labs down for one reason. So people can't get their stuff [samples] checked!

VIVIAN (Kinuso): The impression I got the night we went to that presentation was, there was a lot of people there, for a community this small. There had to be close to a hundred people, and when everybody left that meeting, they were pretty upset. Cause, I know one lady there sat afterwards and said to the guy, 'Okay, I've got grandkids here. Why don't you move here and bring your grandkids if you are telling me this safe'. He just laughed and said, and 'I don't follow', and she said, 'Then what are you telling me?'.

ART: Why is it like this? If these guys figure it is so safe, why don't they come down here and live down here? You know?

VIVIAN: Everybody left the meeting more upset than when they went, because they learned more about the Indians getting bought off and Bovar's attitude is we're making money, so shut up and leave us alone.

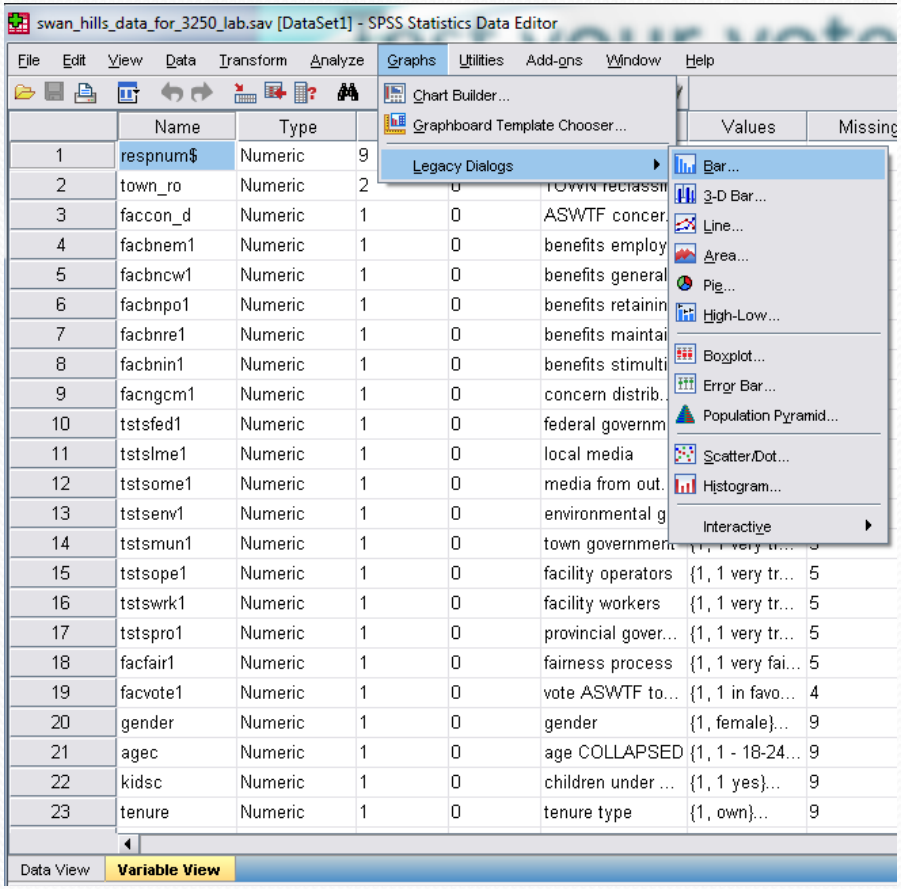
Hypothesis: Vote by Community

- Create a graph of "vote ASWTF today" ('If there was a community referendum today would you vote in favour of the facility') across the three communities.
- Before you do this state an hypothesis about how intended voting might differ across the communities.
- Finish this sentence (it will be your hypothesis for this portion of the lab):
  - People who live in _____ are more likely to say they would vote in favour of the ASWT facility "today" compared to those who live in _____.

Test your vote by community hypothesis – Create a Graph

- With the data open in SPSS, open the bar chart dialog as per the adjacent figure

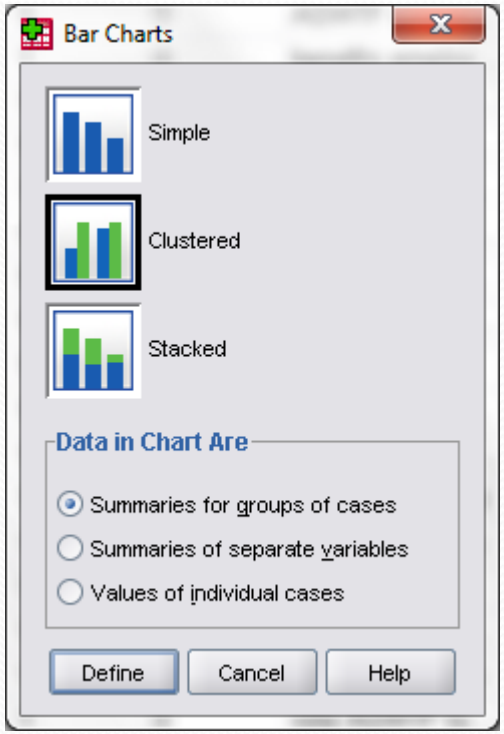
Figure SPSS 1: Open Bar Chart Dialogue



Test your vote by community hypothesis – Create a Graph

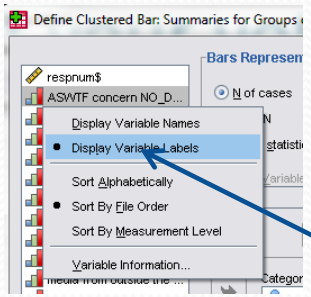
- Select the “clustered” option and leave “Summaries for groups of cases” as the radio button selection

Figure SPSS 2: Select “Clustered”



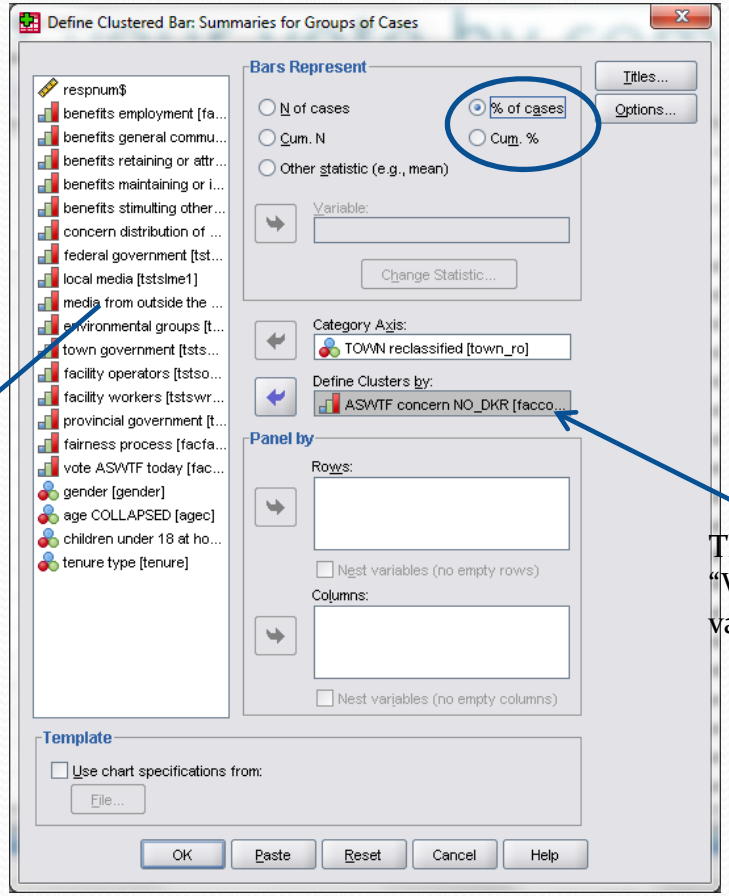
Test your vote by community hypothesis – Create a Graph

- Select the "TOWN" variable for the category axis and the "Vote ASWTF" variable to define the clusters
- Select Bars Represent % of cases



HINT: if you cannot see the labels listed above, right click anywhere on the variable list and select "Display Variable Labels"

Figure SPSS 3: Select Variables to Graph



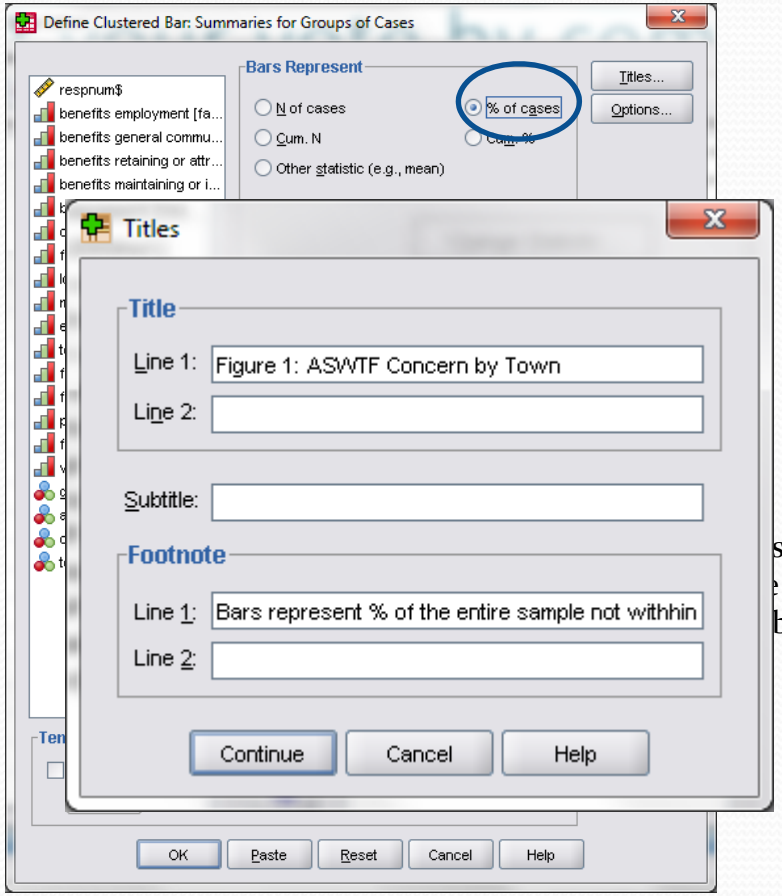
This should be the "Vote ASWTF"* variable

*Throughout these slide the "ASWTF Concern" variable is used for demonstration purposes

Test your vote by community hypothesis – Create a Graph

- Press the "Titles…" button and fill in as needed.

Figure SPSS 4: Insert Title and Notes

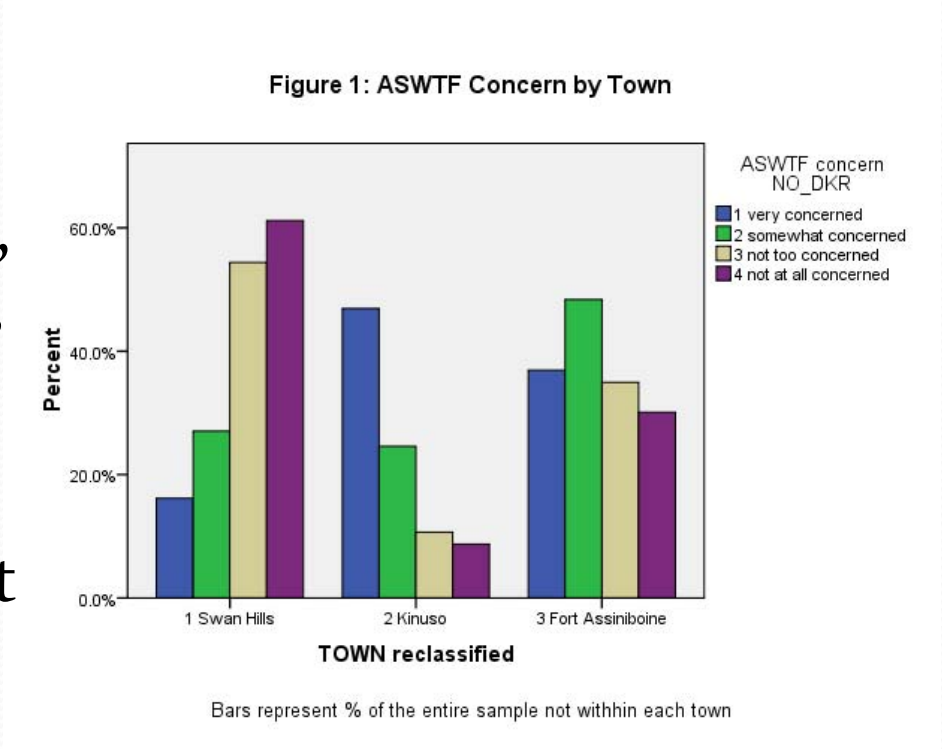


should be the
ASWTF"
ble

Test your vote by community hypothesis – Create a Graph

- If you double click anywhere on the graph an editor opens to change colours etc., but you can leave as is
- Copy and paste the graph into your assignment document e.g., MS Word.

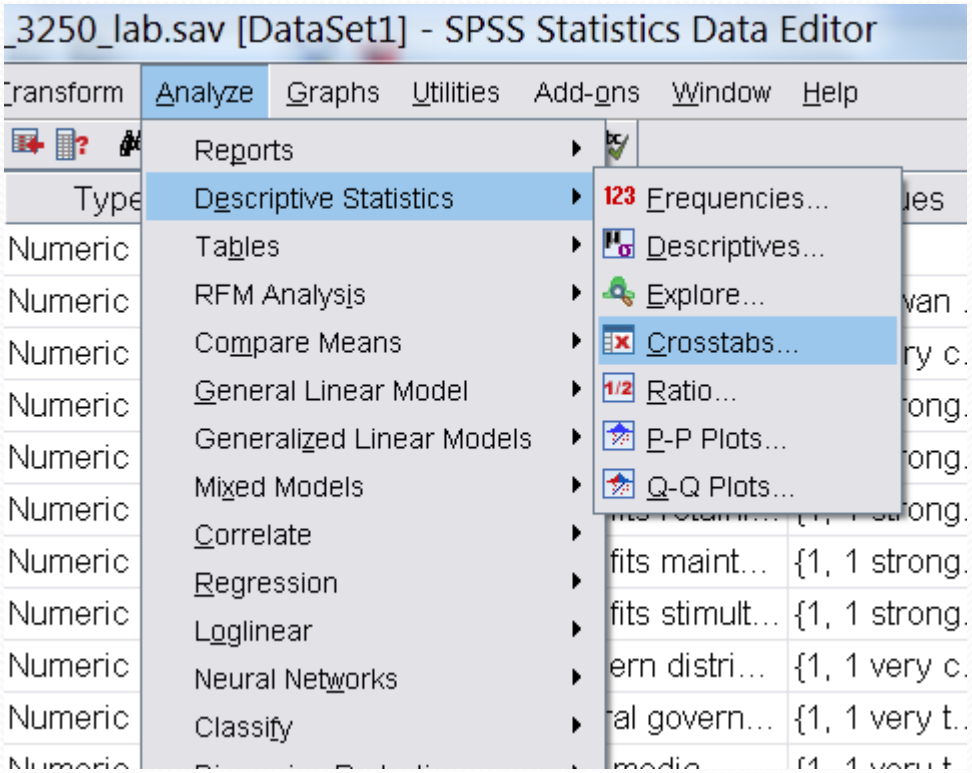
Figure SPSS 5: Tweak Final Graph



Test your vote by community hypothesis – Test for statistical significance

- Open the crosstabs dialog in order to see the correlation between the variables and whether the relationship is statistically significant

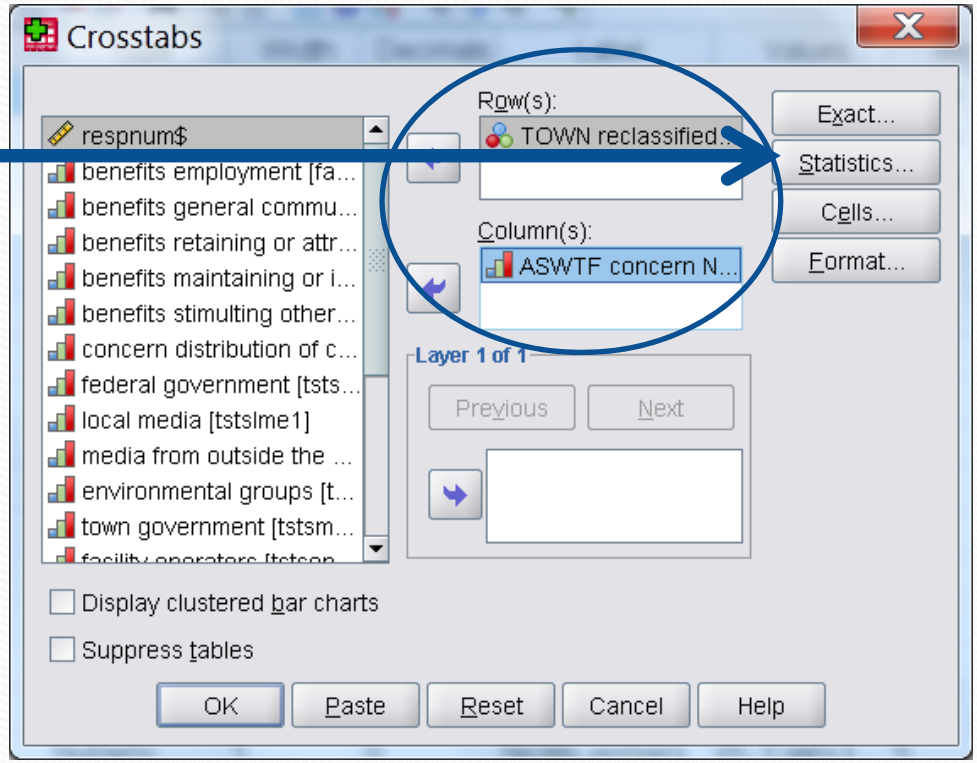
Figure SPSS 6: Open crosstabs dialog



Test your vote by community hypothesis – Test for statistical significance

- Select the "TOWN" and "Vote" variables
- Click the "Statistics" button

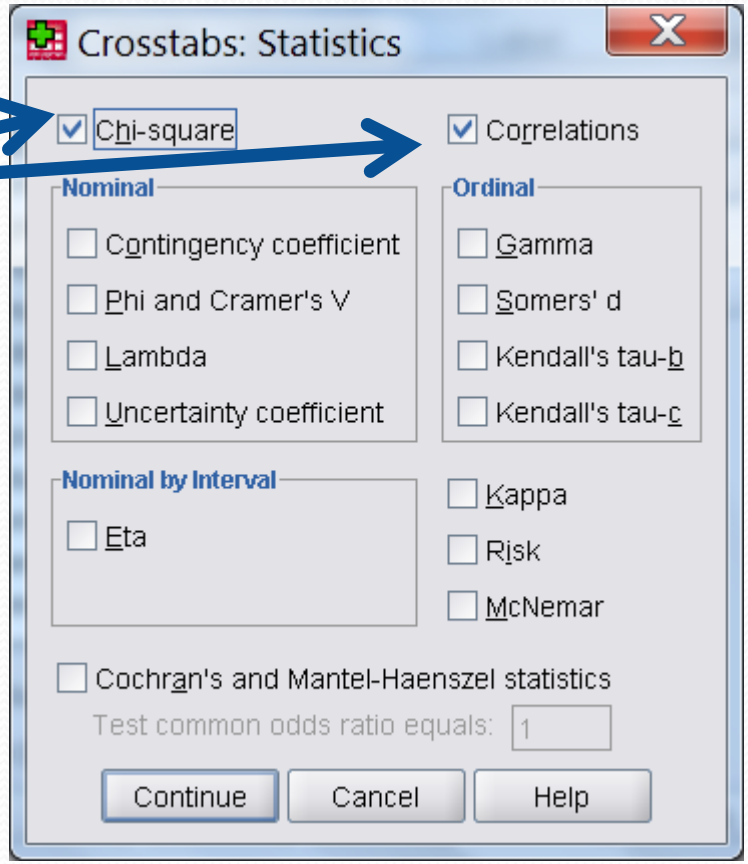
Figure SPSS 7: Select 2 Variables and Click Statistics



Test your vote by community hypothesis – Test for statistical significance

- In the "Statistics" dialogue box check the boxes next to "Chi-square" and "Correlations"
- Press "Continue"

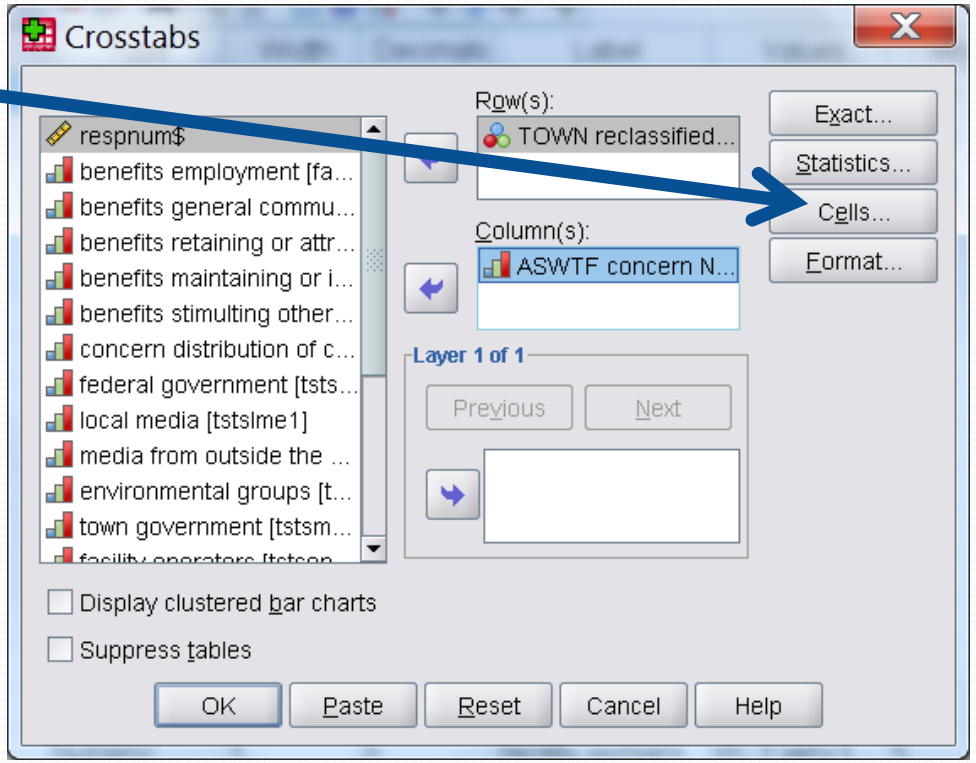
Figure SPSS 8: Statistics dialog – check two boxes



Test your vote by community hypothesis – Test for statistical significance

- Back in the Crosstabs dialogue area, select "Cells"

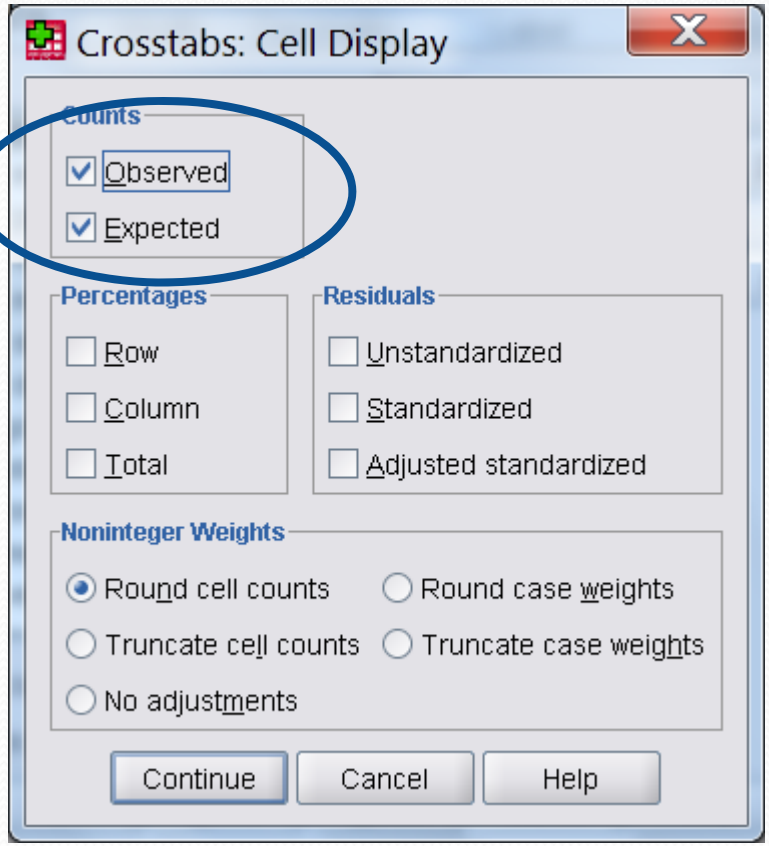
Figure SPSS 9: Open the Cells Dialogue



Test your vote by community hypothesis – Test for statistical significance

- In the "Cells" dialogue, make sure both the "Observed" and "Expected" boxes are checked
- Press the "Continue" button

Figure SPSS 10: Cells Dialogue – check "Expected"



Test your vote by community hypothesis – Test for statistical significance

- The main table contains the "observed" and "expected" values for each cell. For example, 21 residents of Swan Hills are very concerned about the ASWTF while far more were expected to be concerned, 49.1 to be exact, based on the ratio of row to column totals. If observed and expected values are similar this means there is little variation in concern across towns – this is certainly not the case here. Check out the opposite relationship for Kinuso in the cell below the circled one.

Figure SPSS 11: Crosstabs table

TOWN reclassified * ASWTF concern NO_DKR Crosstabulation

			ASWTF concern NO_DKR				Total
			1 very concerned	2 somewhat concerned	3 not too concerned	4 not at all concerned	
TOWN reclassified	1 Swan Hills	Count	21	33	56	63	173
		Expected Count	49.1	46.1	38.9	38.9	173.0
	2 Kinuso	Count	61	30	11	9	111
		Expected Count	31.5	29.6	25.0	25.0	111.0
	3 Fort Assiniboine	Count	48	59	36	31	174
		Expected Count	49.4	46.3	39.1	39.1	174.0
Total		Count	130	122	103	103	458
		Expected Count	130.0	122.0	103.0	103.0	458.0

Test your vote by community hypothesis – Test for statistical significance

- The Chi Square test determines the likelihood of the previous table occurring by chance. If the result has a low probability i.e., only happens 5% of the time or less (i.e., 0.05 or lower), we say it is statistically significant. We have three Chi Square measures that are all below 0.05 so the results in the previous table is not likely to have occurred by chance – the relationship is statistically significant. Thus, concern about the ASWTF varies significantly by town.

Figure SPSS 12 Chi Square

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	93.296[a]	6	.000
Likelihood Ratio	94.179	6	.000
Linear-by-Linear Association	28.418	1	.000
N of Valid Cases	458		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 24.96.

HINT: These are "p-values" or probabilities. Less than 0.05 is improbable, or statistically significant

Test your vote by community hypothesis – Test for statistical significance

- Is the association in the direction you expected? The original table of observed and expected tells you this, but if you want to state it as a single statistic use the ordinal by ordinal "Spearman Correlation" statistic (but is the town variable ordinal?). This shows a -0.25 correlation between town and concern which is again improbable, so is statistically significant. The negative relationship is expected too and this should make more sense for the next hypotheses where you will compare five sets of two truly ordinal variables.

Figure SPSS 13 Association and direction of effect

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.249	.044	-5.499	.000[c]
Ordinal by Ordinal	Spearman Correlation	-.247	.045	-5.433	.000[c]
N of Valid Cases		458			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Five Other Hypotheses

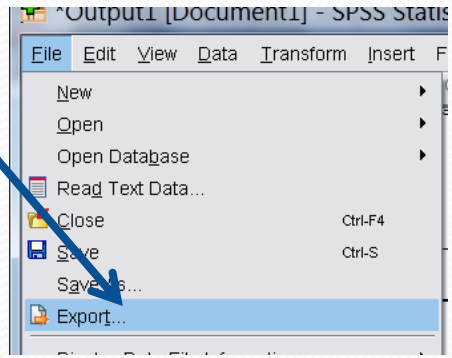
- Based on the method above state five hypotheses with vote in favour of the facility ("vote ASWTF today") as the dependant variable.
- **For example**:
  - Those who say they would vote in favour of the ASWT facility "today" feel the original siting process was fair ("fairness process").

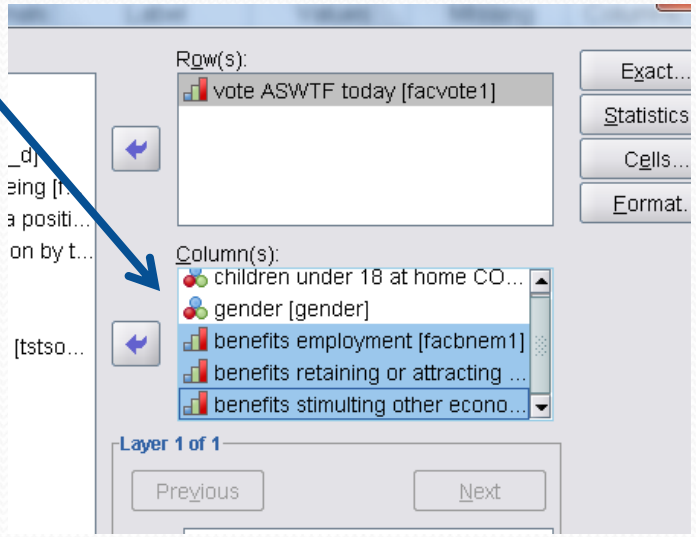
Five Other Hypotheses

- Ensure that at least two of your variables are "sociodemographic" – e.g., gender, tenure
- Use only the crosstabs procedures, there is no need to create graphs for these hypotheses

HINT: Notice each new process you run is appended to your output file. Export your final output file as a .doc or .rtf file for writeup. This way you do not need SPSS for writeup

HINT: Notice you can analyze all 5 variables at once





Don’t Know/Refused?

- If you open up the Variable View tab, you will notice some variables have a category for “don’t know/refused”
- Check out the “missing values” column and some of your output. What is happening with this category in the analysis?