From datasets to resultssets in Stata

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This presentation, including the handout and examples, can be downloaded from the conference website at
http://www.stata.com/support/meeting/10uk/

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- The term was coined by Nick Cox, who has used it a few times on Statalist.
- SAS users should note that Stata datasets do the job of SAS data sets, and Stata resultssets do the job of SAS output data sets.
- Stata resultssets may be saved to disk files, and/or written to the memory (overwriting any existing data), and/or simply listed to the Stata log and/or Results window.

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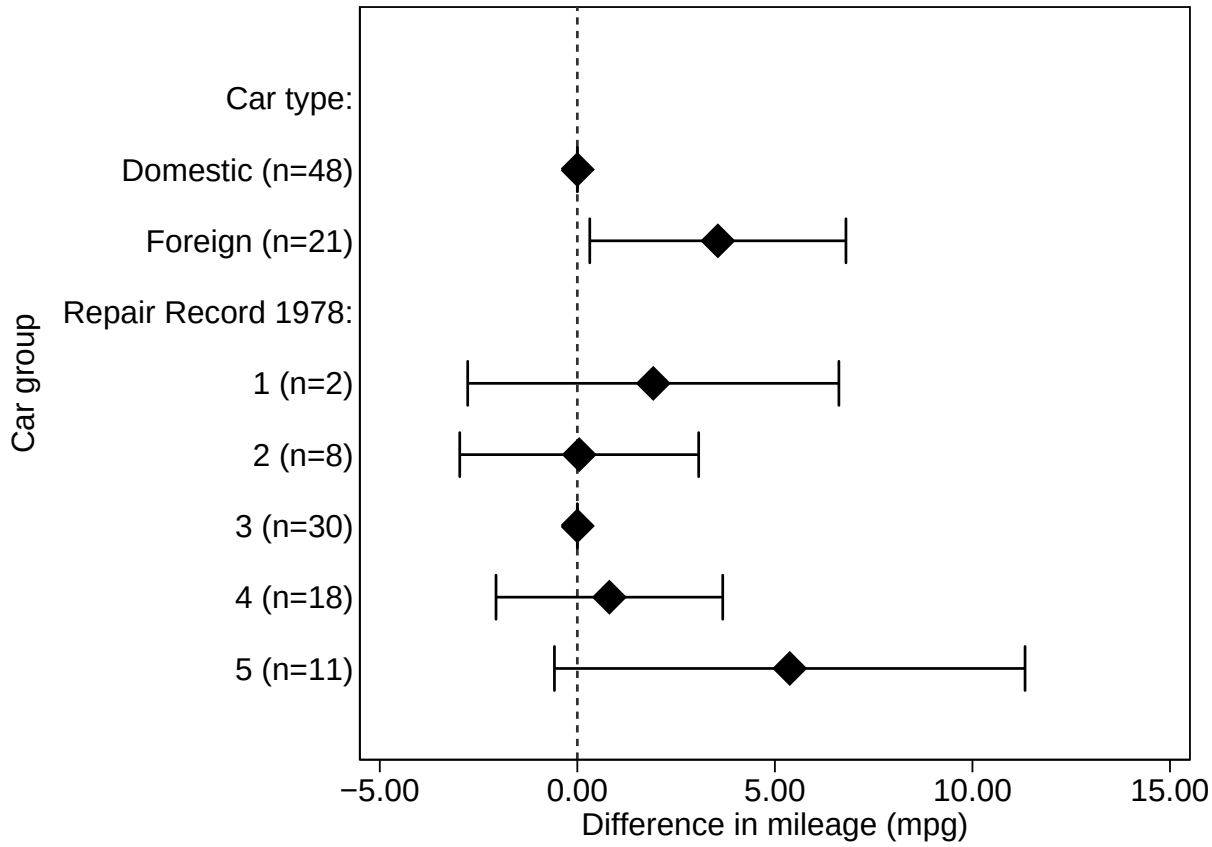
- *However*, they are usually paid to produce presentation-ready plots and/or publication-ready tables.
- To do this, they require datasets with one observation per table row, or per axis label, and usually produce them manually using spreadsheets.
- We will demonstrate alternative ways of producing such datasets in Stata.

Differences in mileage in the `auto` data (compared with US cars with a medium repair record of 3)



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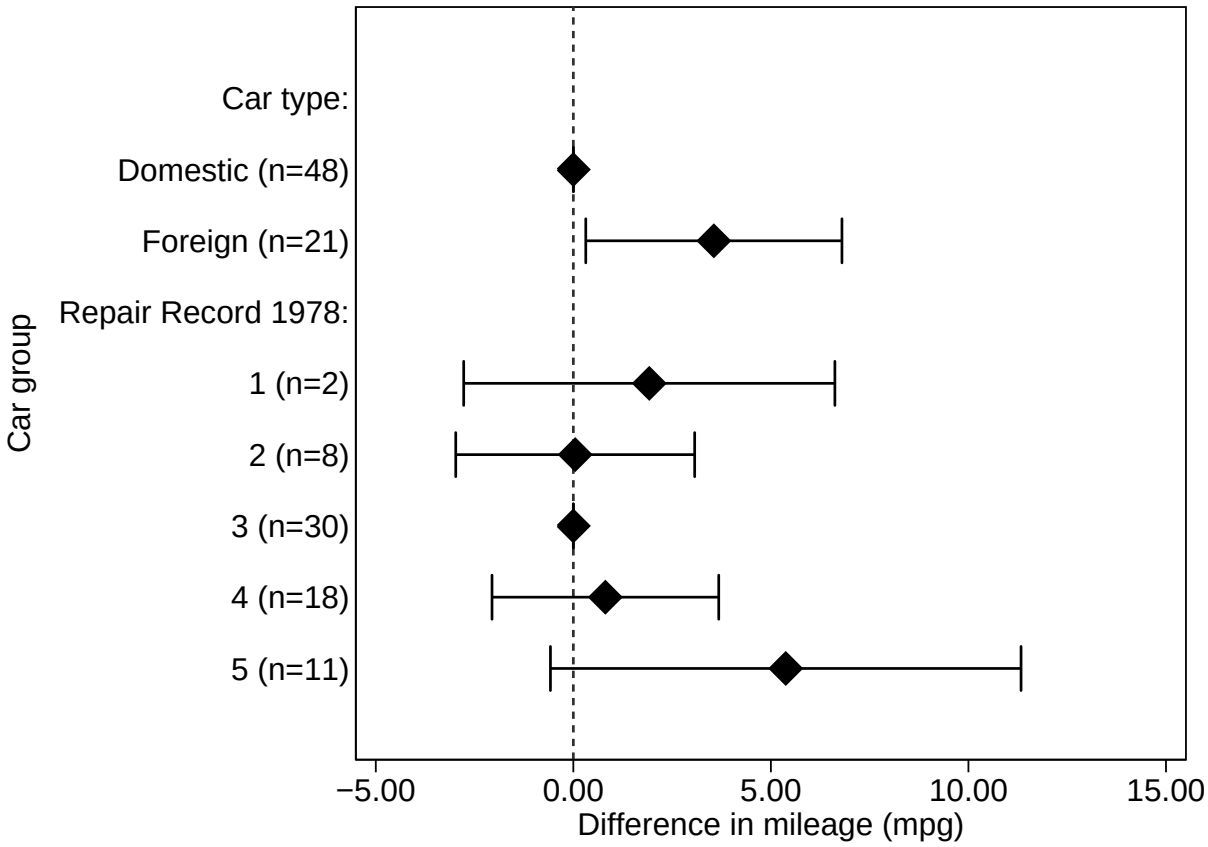

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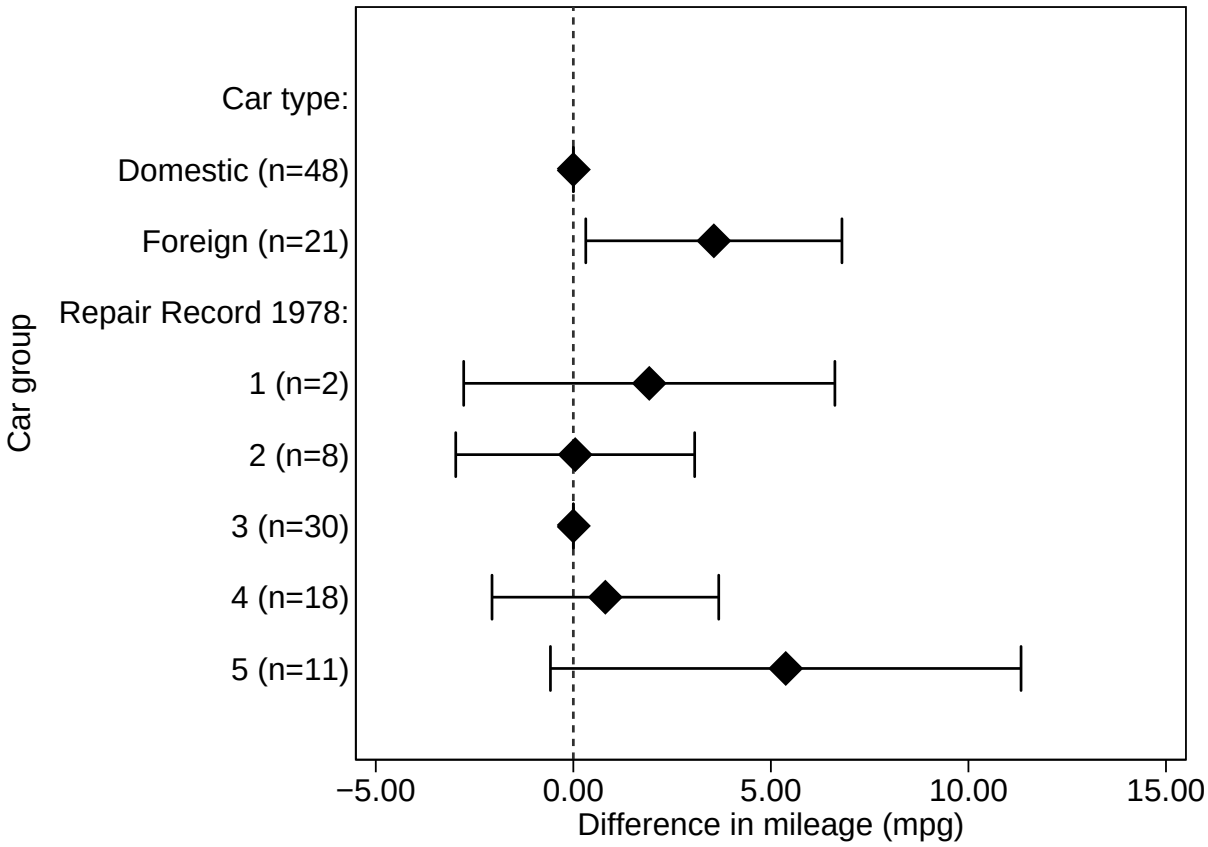

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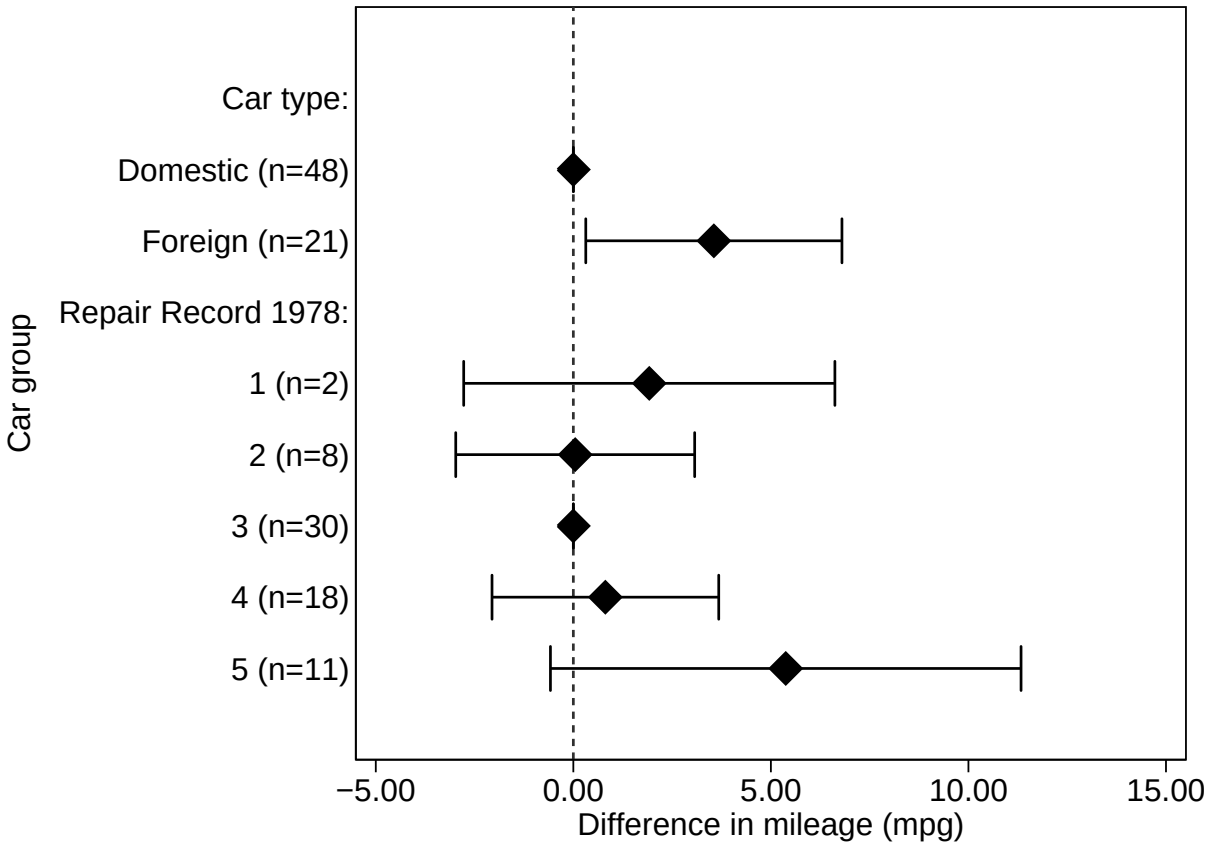
- `eclplot` inputs a dataset with 1 observation per parameter, and data on estimates, confidence limits, and one more variable for the other axis.
- It *cannot* create this plot directly using the original `auto` data.



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Car group	*Difference (mpg)*	*(95%*	*CI)*	*P*
Car type:				
Domestic (n=48)	0.00	(ref.)		
Foreign (n=21)	3.56	(0.32,	6.80)	.032
Repair Record 1978:				
1 (n=2)	1.92	(−2.78,	6.62)	.42
2 (n=8)	0.05	(−2.98,	3.07)	.98
3 (n=30)	0.00	(ref.)		
4 (n=18)	0.81	(−2.06,	3.68)	.57
5 (n=11)	5.38	(−0.58,	11.33)	.076

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This table was produced using `listtex`, which produces TEX, HTML and Microsoft Word tables, and inputs a dataset with one observation per table row.

Resultsset-generating programs downloadable from SSC

	The resultsset contains:	
Program	*one observation per...*	*and data on...*
`descsave`	variable	variable attributes
`parmest`	estimated parameter	parameter attributes
`parmby`	parameter per by-group	parameter attributes
`xcollapse`	by-group	basic summary statistics
`xcontract`	combination of variable values	frequencies and percentages

Official Stata resultsset-generating programs include `collapse`, `contract`, `statsby`, `bootstrap`, `simulate`, and the utility `post`.

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- Each program inputs the `auto` dataset and writes a resultsset to the memory.
- We then `describe` the variables, and `list` the observations.

Common resultsset-destination options for resultsset-generating programs

Option	*Function*
`list()`	List the resultsset to the log or Results window
`saving()`	Save the resultsset to a disk file
`norestore` (or `replace`)	Write the resultsset to memory
`fast`	Fast version of `norestore` for programmers
`flist()`	Global macro accumulating `saving()` filenames

These options are not mutually exclusive.

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- This ability is an advantage of the resultsset method over more "instant" complementary methods, using `estimates table`, `outreg` or `reformat`.
- These complementary methods produce tables (but *not* plots) of results from a *single* model.

Common resultsset-modifying options for resultsset-generating programs

Option	*Function*
`rename()`	Give variables in resultsset nondefault names
`format()`	Give variables in resultsset nondefault formats
`idnum()`	Value of numeric resultsset ID variable
`idstr()`	Value of string resultsset ID variable
`by()`	Specify by-groups

The `idnum()` and `idstr()` options are useful if multiple resultssets are concatenated. The `by()` option causes the resultsset to be "concatenated at birth", with a "resultssubset" for each by-group.

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- Stata has the advantage over SAS of processing a whole dataset in memory.
- *However*, it can only do this with one dataset at a time.
- *Therefore*, Stata users who concatenate resultssets should know at least enough about macros to produce `tempfiles`.

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- We concatenate the files ‘`tf1`’ to ‘`tf9`’ into the memory to form a long resultsset, with one observation per variable per car type.
- We then `merge` in the `descsave` resultsset in ‘`tf0`’, adding variable labels.

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- Official Stata has 4 programs for this, `encode`, `decode`, `tostring` and `destring`, which all have limitations (especially `encode`).
- I therefore developed the packages `sencode` and `sdecode` for string-numeric conversion, and `factext` and `factmerg` for string-factor conversion.

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- The `manyto1` option allows multiple numeric codes to share one string label.
- `sdecode` decodes a numeric variable to string, using value labels if possible and display formats otherwise.

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- We compare their performance as diagnostic predictors of the "condition" of non-US origin, using Somers' D.
- Somers' D is related to the area A under the sensitivity-specificity (or ROC) curve by the formula $D = 2A - 1$.
- The two performance measures are therefore equivalent, but Somers' D is positive for positive predictors, negative for negative predictors, and zero for non-predictors.

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- This resultsset contains a variable `label`, containing the variable label of the predictor.

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- This resultsset contains a variable `label`, containing the variable label of the predictor.
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- We then use `sdecode` to convert the confidence limits to string, and produce a confidence interval table.

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- Many predictor variables are dummy variables for categorical factors, produced mainly by `xi`, with variable labels of the form
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  which are stored in the `label` variable of `parmby` resultssets.

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- `factext` inputs the `label` variable and generates a list of factors, with names from the left-hand side and values from the right-hand side.

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- `factext` runs this do-file to reconstruct the factors, which are then ready for use in confidence interval plots.

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- A multi-factor table, by contrast, usually has a *single* left column of row labels, containing information on *all* the factors.
- `factmerg` inputs a list of factors, and generates up to 3 string variables, containing the factors' names, variable labels and string values.
- These string variables can in turn be used to create row label variables for multi-factor tables. (Or for multi-factor plots.)

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- In the `auto` data, we use `descsave` to write a do-file to reconstruct the two factors `foreign` and `rep78`.
- We then fit a regression model predicting `mpg` from these two factors, storing the results in a `parmby` resultsset.

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- Using `factmerg`, we merge the two factors together, and draw a multi-factor confidence interval plot.

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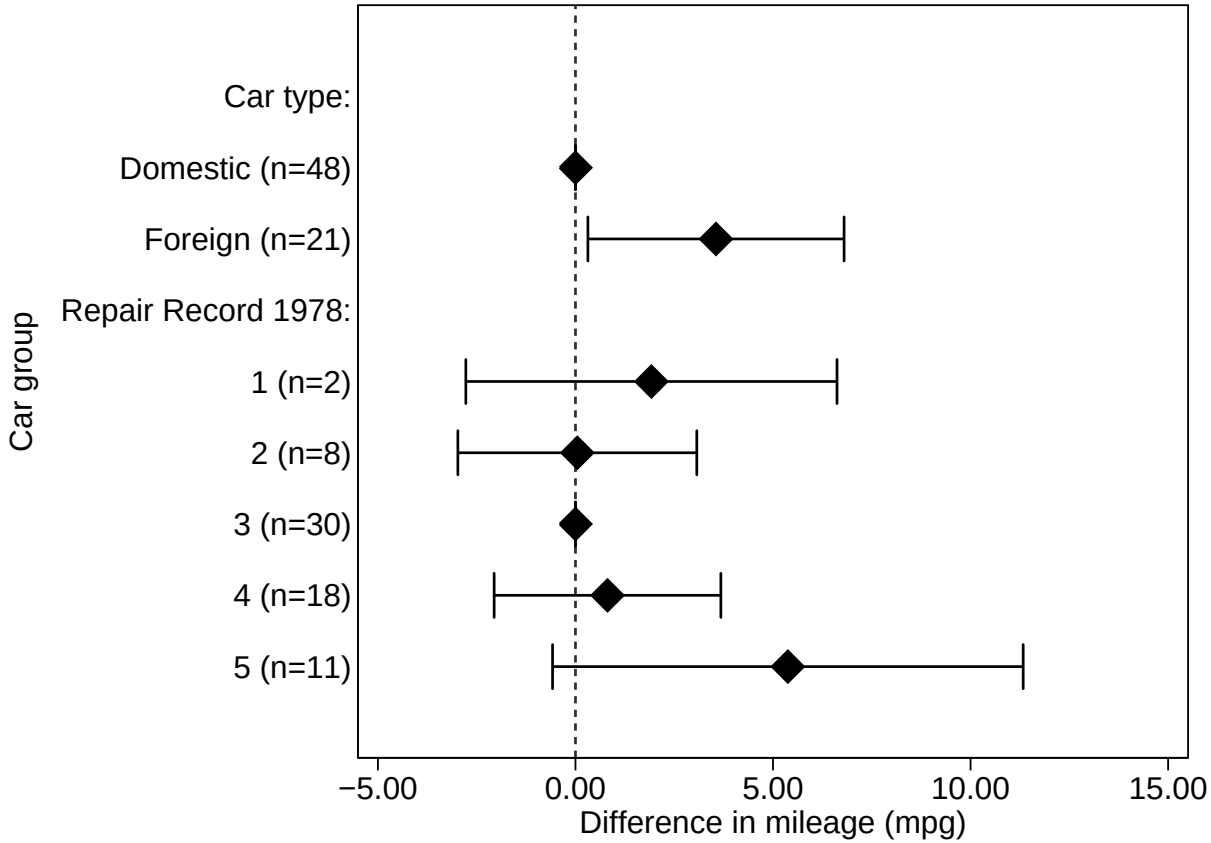

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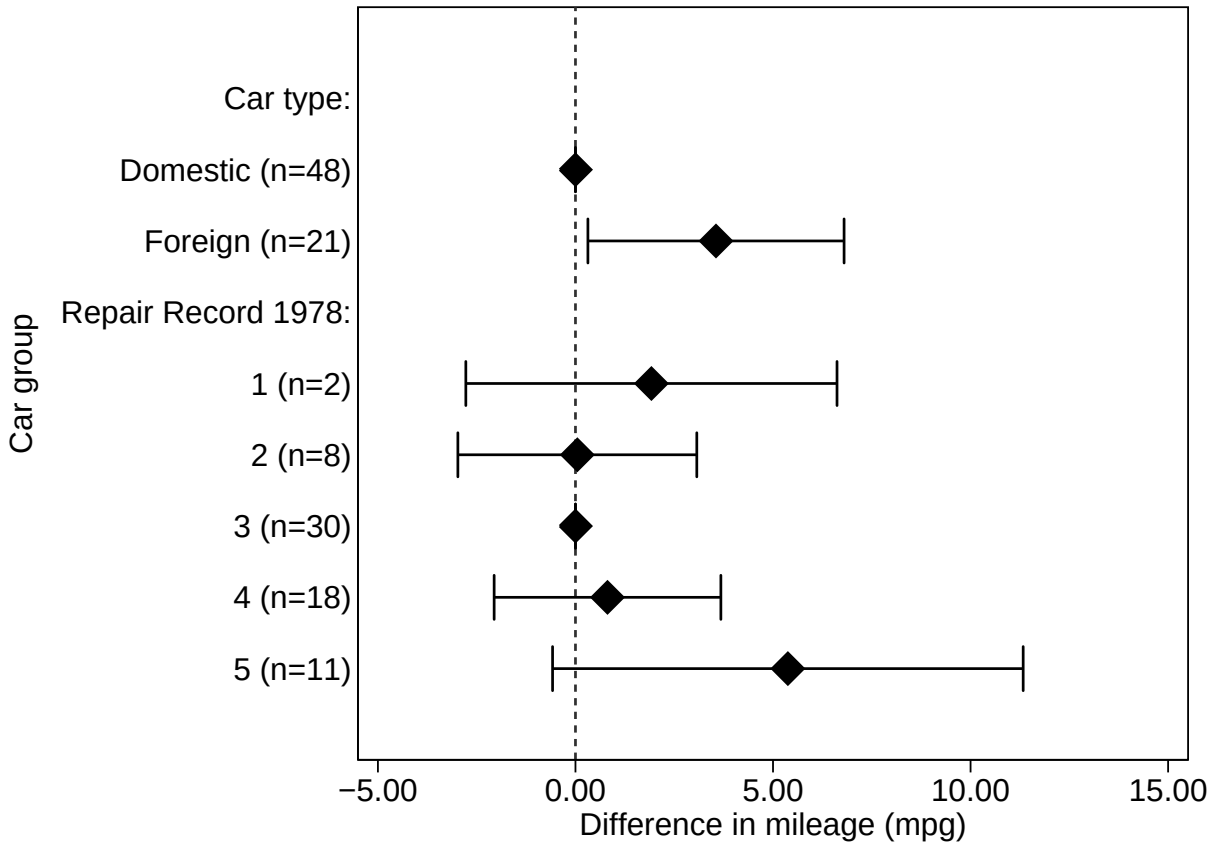
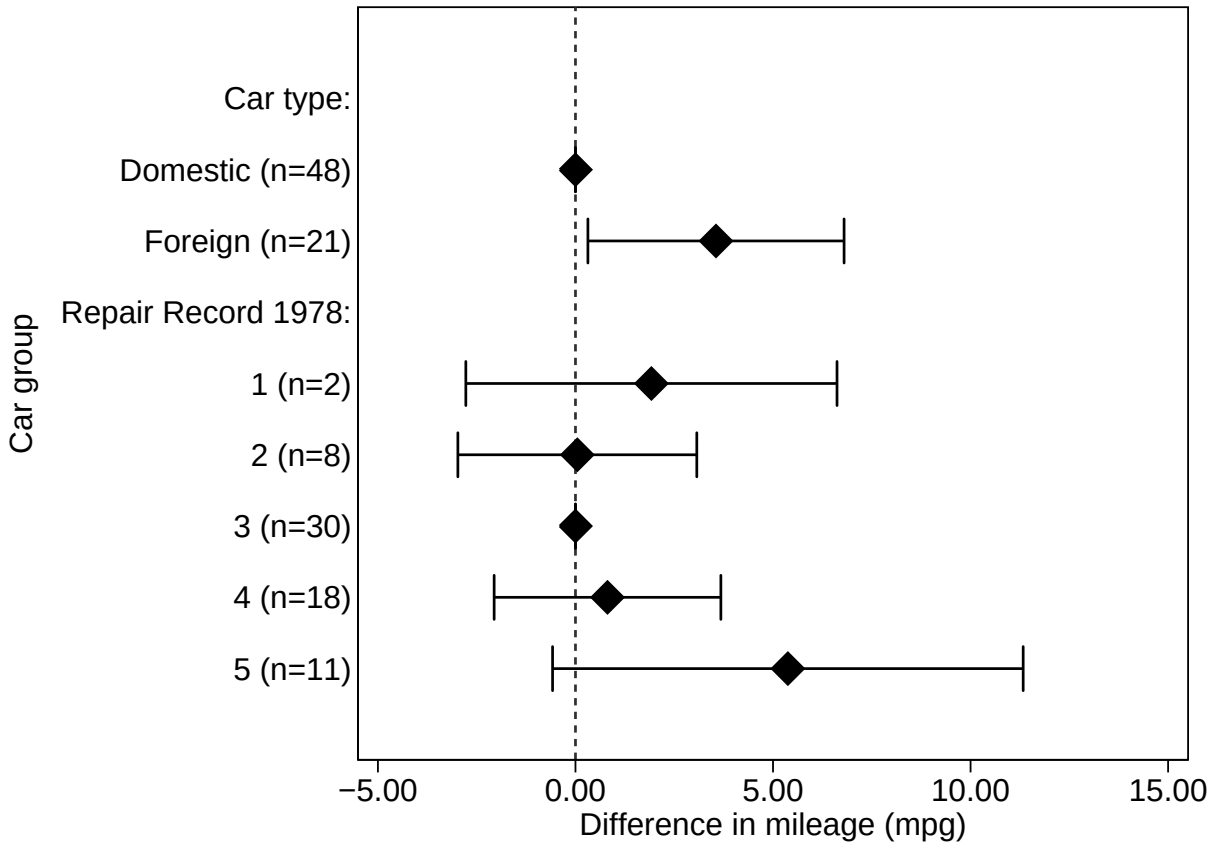
- This plot has group frequencies as well as group names.



`example4.do` does not create this confidence interval plot

- This plot has group frequencies as well as group names.
- It also has reference groups (US-made and medium-reliability cars).



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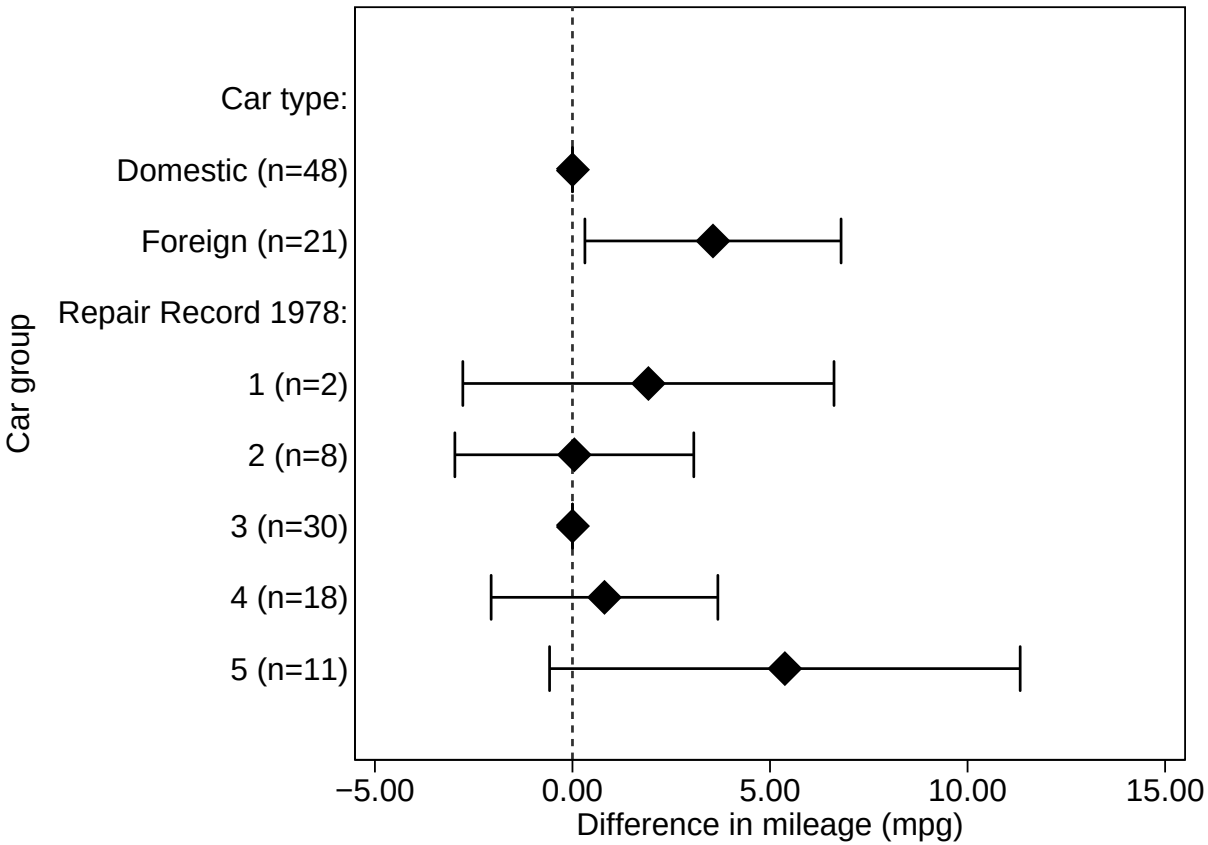
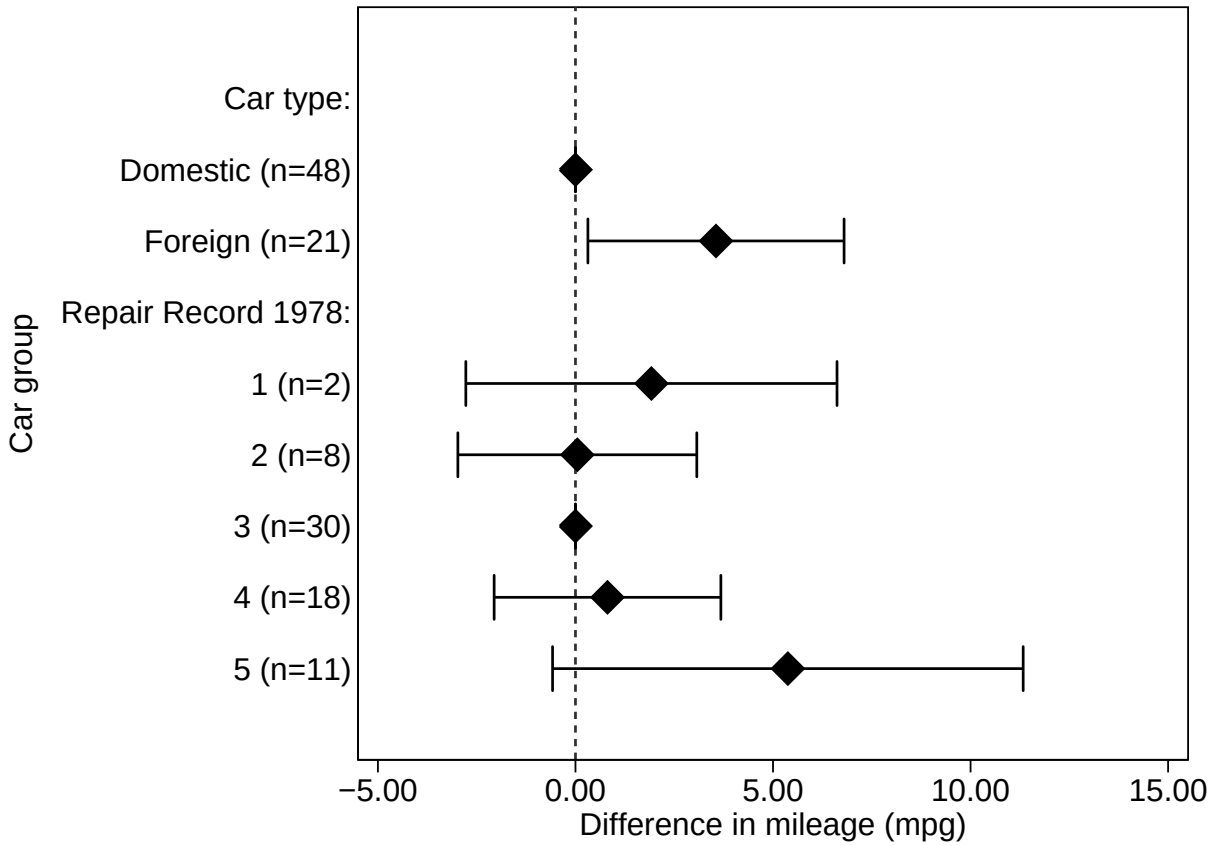
- This plot has group frequencies as well as group names.
- It also has reference groups (US-made and medium-reliability cars).
- It also has the factor names in gap rows, instead of repeating them.



`example4.do` does not create this confidence interval plot

- This plot has group frequencies as well as group names.
- It also has reference groups (US-made and medium-reliability cars).
- It also has the factor names in gap rows, instead of repeating them.
- The first two improvements are enabled by `xcontract`, and the third by `ingap`.



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`example5.do`: Creating the plot and table that we saw earlier

- Our final example is an improved version of `example4.do`.
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- We generate the row label variable `cargp` (car group), this time using `ingap` to insert gap rows.

Differences in mileage in the `auto` data (compared with US cars with a medium repair record of 3)

Car group	*Difference (mpg)*	*(95%*	*CI)*	*P*
Car type:				
Domestic (n=48)	0.00	(ref.)		
Foreign (n=21)	3.56	(0.32,	6.80)	.032
Repair Record 1978:				
1 (n=2)	1.92	(−2.78,	6.62)	.42
2 (n=8)	0.05	(−2.98,	3.07)	.98
3 (n=30)	0.00	(ref.)		
4 (n=18)	0.81	(−2.06,	3.68)	.57
5 (n=11)	5.38	(−0.58,	11.33)	.076

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`example5.do` may seem a complicated way to create a small plot and table. *However*, economies of scale become important with large plots and tables, multiple plots and tables, or multiple versions of the same plots and tables.

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All these programs are downloadable from SSC. The overheads, handout and example do-files can be downloaded from the conference website at
http://www.stata.com/support/meeting/10uk/