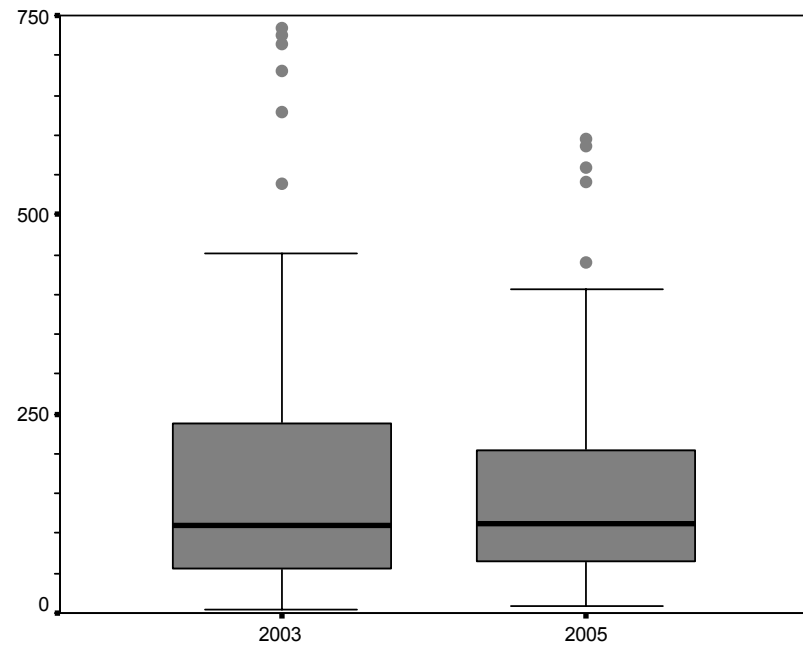


# Interpreting boxplots

- Summary plot based on the median, quartiles, and extreme values.
- The box represents the interquartile range(25%-75% of the data).  
And contains 50% of the data values.  
(e.g. 50% of the schools had an enrolment in 2003 between ~60 and ~250)
- The line across the box indicates the mean of the data (average).  
(e.g. The average enrolment in 2003 was ~110)
- The whiskers are the lines that extend from the box to the highest and lowest values, excluding outliers.  
(e.g. nearly all of the schools had an enrolment in 2003 between ~5 and ~450)
- Points outside the whiskers indicate outliers (extreme cases).  
(e.g. a few schools in 2003 had enrolment up to almost 750)

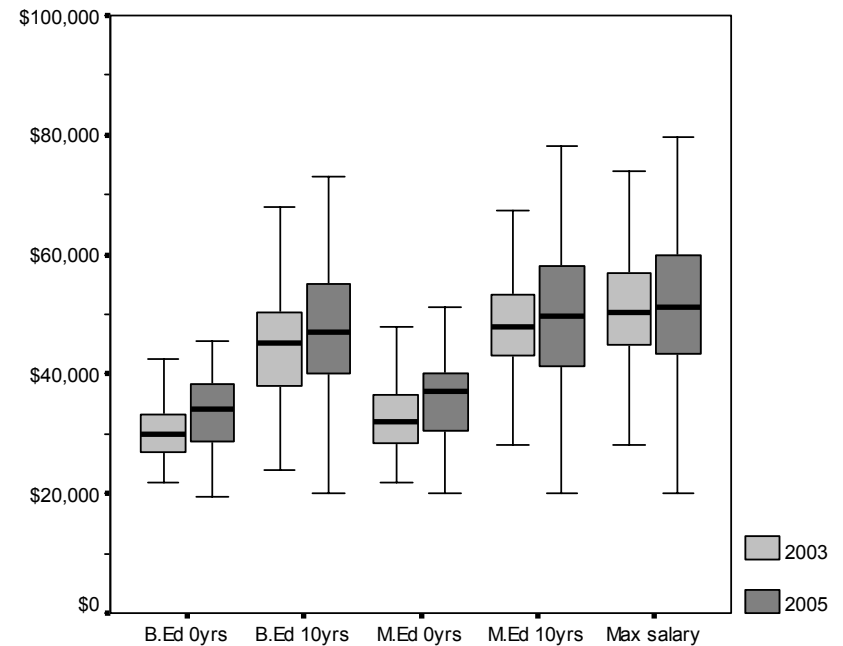
# Enrolment comparison

- Simple comparison of enrolment figures
- Grey dots indicate outliers (extreme cases)



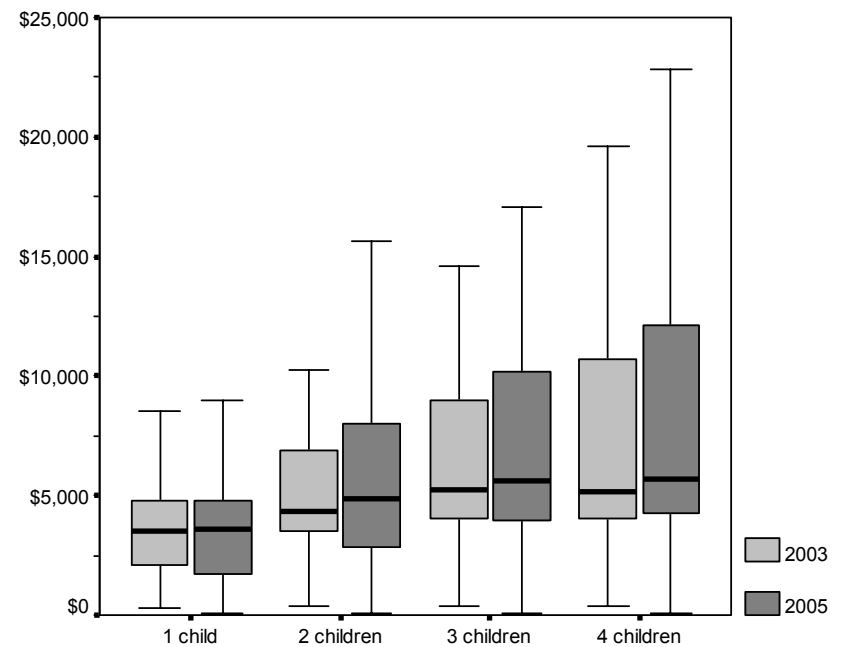
# Salary comparison - grouped

- Salary figures with years grouped side-by-side for easy comparison of changes between years



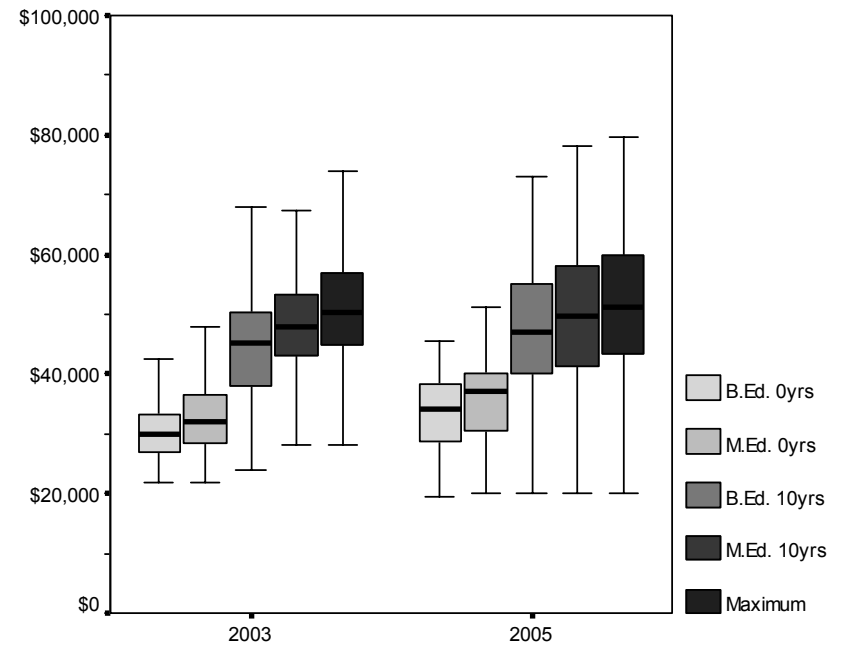
# Tuition comparison - grouped

- Tuition figures with years grouped side-by-side for easy comparison of changes between years



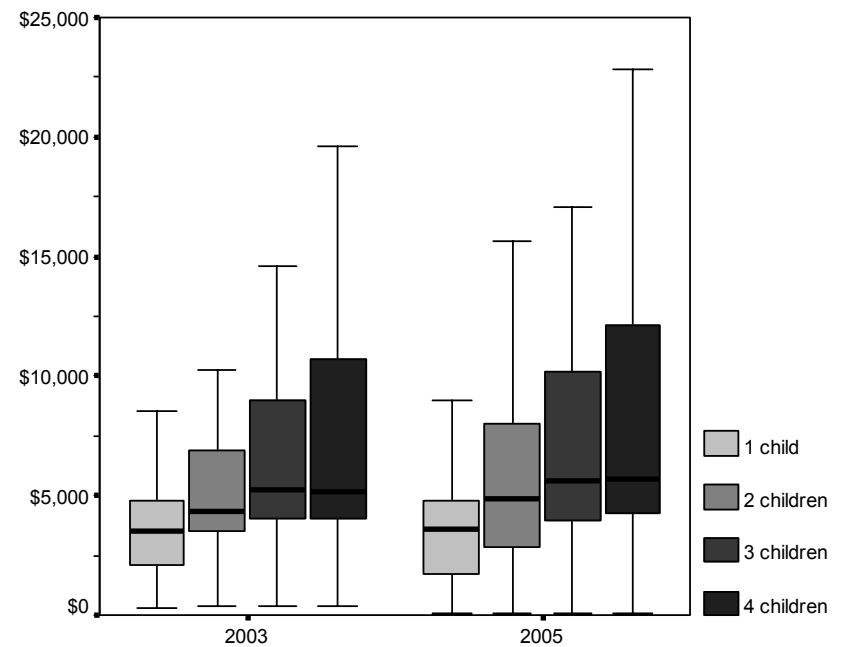
# Salary comparison - clumped

- Salary figures with years clumped together for easy comparison of range of salaries per year



# Tuition comparison - clumped

- Tuition figures with years clumped together for easy comparison of range of salaries per year



# Tuition categories

- Comparison of how tuition amounts (for 1 child) fall into categories

	Number			Percent		
	2003	2005	difference	2003	2005	difference
Total	71	77	6	100	100	0.0
x < 2000	17	21	4	23.9	27.3	3.3
2000 < x < 4000	26	24	-2	36.6	31.2	-5.5
x > 4000	28	32	4	39.4	41.6	2.1

# t-test results

(two-sample paired t-test for means,  
1-tailed (2003 ≤ 2005) hypothesis)

Paired t-test

Salaries

The TTEST Procedure

Statistics

Difference	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err
BEd_0yrs_2005 - BEd_0yrs_2003	49	1683.2	<b>2494.8</b>	3306.3	2356.2	2825.4	3529.8	403.63
MEd_0yrs_2005 - MEd_0yrs_2003	47	1863.6	<b>3003.9</b>	4144.1	3227.1	3883.5	4877.6	566.47
BEd_10yrs_2005 - BEd_10yrs_2003	49	1501.8	<b>2619.6</b>	3737.4	3245.4	3891.7	4861.9	555.96
MEd_10yrs_2005 - MEd_10yrs_2003	46	999.53	<b>2493.5</b>	3987.4	4172.7	5030.8	6336.4	741.75
Max_salary_2005 - Max_salary_2003	43	2205	<b>3387.6</b>	4570.3	3168.5	3842.8	4884.2	586.02

T-Tests

Difference	DF	t Value	Pr >  t
BEd_0yrs_2005 - BEd_0yrs_2003	48	6.18	<.0001 ***
MEd_0yrs_2005 - MEd_0yrs_2003	46	5.30	<.0001 ***
BEd_10yrs_2005 - BEd_10yrs_2003	48	4.71	<.0001 ***
MEd_10yrs_2005 - MEd_10yrs_2003	45	3.36	0.0016 ***
Max_salary_2005 - Max_salary_2003	42	5.78	<.0001 ***

\* significant increase if  $\alpha=0.10$  (moderately significant)

\*\* significant increase if  $\alpha=0.05$  (significant)

\*\*\* significant increase if  $\alpha=0.01$  (highly significant)

( ) almost significant to specified degree

# t-test results

(two-sample paired t-test for means,  
1-tailed (2003  $\leq$  2005) hypothesis)

Paired t-test

Tuition

The TTEST Procedure

Statistics

Difference	N	Lower CL	Upper CL	Lower CL	Upper CL	Std Dev	Std Dev	Std Dev	Std Err
		Mean	Mean	Mean	Mean				
one_child_2005 - one_child_2003	50	212.23	<b>476.83</b>	741.44	777.76	931.07	1160.2	131.67	
two_children_2005 - two_children_2003	50	254.99	<b>862.22</b>	1469.5	1784.8	2136.7	2662.6	302.17	
three_children_2005 - three_children_2003	50	-53.63	<b>709.02</b>	1471.7	2241.7	2683.6	3344.1	379.51	
four_children_2005 - four_children_2003	48	-337.8	<b>819.88</b>	1977.5	3318.9	3986.8	4993.8	575.44	

T-Tests

Difference	DF	t Value	Pr >  t
one_child_2005 - one_child_2003	49	3.62	0.0007 ***
two_children_2005 - two_children_2003	49	2.85	0.0063 ***
three_children_2005 - three_children_2003	49	1.87	0.0677 **
four_children_2005 - four_children_2003	47	1.42	0.1608 * (**)

\* significant increase if  $\alpha=0.10$  (moderately significant)

\*\* significant increase if  $\alpha=0.05$  (significant)

\*\*\* significant increase if  $\alpha=0.01$  (highly significant)

( ) almost significant to specified degree

# T-test interpretation

- The average increase for each variable is presented in the “means” column in the first output block.
- The t-test results show that there was a *statistically* significant increase in the tuition paid by families with up to three children. There was an increase in tuition paid by families with four children, but that this increase was less *statistically* significant.
- The results also show that there were *statistically* significant increases in salaries in every grid position reported.
- \* A statistically significant result does not *necessarily* mean that the difference is significant/noticeable *practically* speaking \*
- See <http://www.ats.ucla.edu/stat/sas/output/ttest.htm> for detailed notes on interpretation of these results.