Chapter 10: Comparing two means

Labcoat Leni's Real Research

The beautiful people

Problem

Gelman, A., & Weakliem, D. (2009). *American Scientist, 97*, 310–316.

Apparently there are more beautiful women in the world than there are handsome men.

Satoshi Kanazawa explains this finding in terms of good-looking parents being more likely to have a baby daughter as their first child than a baby son. Perhaps more controversially, he suggests that, from an evolutionary point of view, beauty is a more valuable trait for women than for men (Kanazawa, 2007). In a playful and very informative paper, Andrew Gelman and David Weakliem discuss various statistical errors and misunderstandings, some of which have implications for Kanazawa's claims. The 'playful' part of the paper is that to illustrate their point they collected data on the 50 most beautiful celebrities (as listed by *People* magazine) of 1995–2000. They counted how many male and female children they had as of 2007. If Kanazawa is correct, these beautiful people whould have produced more girls than boys. Do a *t*-test to find out whether they did. The data are in **Gelman & Weakliem (2009).sav**.

Solution

We need to run a paired samples *t*-test on these data because the researchers recorded the number of daughters and sons for each participant (repeated-measures design). Looking below, we can see that there was a non-significant difference between the number of sons and daughters produced by the 'beautiful' celebrities.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Number of Sons - Number of Daughters	.059	1.166	.073	-.085	.203	.807	253	.420

We are going to calculate Cohen's *d* as our effect size. To do this we first need to get some descriptive statistics for these data – the means and standard deviations:

Descriptive Statistics

	N	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Number of Sons	254	0	4	.68	.057	.901
Number of Daughters	254	0	7	.62	.057	.902
Valid N (listwise)	254					

We can now compute Cohen's *d* using the two means (.68 and .62) and the standard deviation of the control group (it doesn't matter which one you choose here, but I have chosen to use the sons):

$$\hat{d} = \frac{\bar{X}_{\text{Daughters}} - \bar{X}_{\text{Sons}}}{s_{\text{Sons}}} = \frac{0.62 - 0.68}{0.901} = -0.07$$

This means that there is –0.07 of a standard deviation difference between the number of sons and daughters produced by the celebrities, which is a very small effect.

In this example the SPSS output tells us that the value of *t* was 0.81, that this was based on 253 degrees of freedom, and that it was non-significant, $p = .420$. We also calculated the means for each group. We could write this as follows:

- ✓ There was no significant difference between the number of daughters ($M = 0.62$, $SE = 0.06$) produced by the 'beautiful' celebrities and the number of sons ($M = 0.68$, $SE = 0.06$), $t(253) = 0.81$, $p > .05$, $d = -0.07$.