

## Re: Covariate in ANCOVA question

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- *From:* Ray Koopman <[koopman@xxxxxx](mailto:koopman@xxxxxx)>
  - *Date:* Fri, 26 Oct 2007 01:08:19 -0700
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On Oct 25, 7:31 pm, David Winsemius <[doe\\_s...@xxxxxxxxxxxx](mailto:doe_s...@xxxxxxxxxxxx)> wrote:

Bruce Weaver <[bwea...@xxxxxxxxxxxx](mailto:bwea...@xxxxxxxxxxxx)> wrote in  
[news:1193318943.008583.179600@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx](mailto:news:1193318943.008583.179600@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx):

On Oct 24, 8:57 pm, David Winsemius <[doe\\_s...@xxxxxxxxxxxx](mailto:doe_s...@xxxxxxxxxxxx)> wrote:

Bruce Weaver <[bwea...@xxxxxxxxxxxx](mailto:bwea...@xxxxxxxxxxxx)> wrote  
[innews:1193226596.924562.47100@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx](mailto:innews:1193226596.924562.47100@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx):

--- snip ---

So because there are 3 groups we should not think about type I errors in post-hoc testing? Why, then, do the texts I have talk about controlling for alpha and use three group examples?

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David Winsemius

Good question. I can only speculate about the reasons. Fisher's LSD fell out of favour generally because it does not control the family-wise alpha well when there are 4 or more groups. I think that over time, we (collectively) have forgotten that it *\*does\** control family-wise alpha when there are 3 groups. Howell's book is the only one I'm aware of that says this.

The only one, eh. Could that be because the logic is questionable?

Re: Covariate in ANCOVA question

I think you should go back to the argument you offered from Howell and think more deeply. When you say he says "assume none of the  $\mu$ 's are equal" and as a result says type I error is not possible...that is a tautology rather than a statistical inference. When you know there is a difference then the question is what is power of the test to support that. The risk is a type II error. Type I errors occur when there is no difference and one risks (falsely) concluding that there is a difference.

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David Winsemius

Whatever its faults may be when there are more than 3 groups, the Fisher LSD procedure does keep the actual familywise type I error rate at its nominal level when there are 3 groups.

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