

How can I do classical ANOVA designs using xtmixed in Stata 12?

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To do classical ANOVA designs using xtmixed in Stata 12, you can follow these steps:

1. Load your dataset: Start by loading your dataset into Stata. Make sure your variables are properly labeled and formatted.
2. Specify the model: Use the xtmixed command to specify the model you want to run. For example, if you want to run a one-way ANOVA with a random intercept, your command would look like this: `xtmixed outcome_var || group_var:, variance`. This command specifies the outcome variable (`outcome_var`) and the group variable (`group_var`). The `||` indicates that you want to include a random intercept for `group_var`. The `variance` option tells Stata to estimate the variance components for the random effects.
3. Check the model assumptions: Before running the analysis, it is important to check the assumptions of the ANOVA model. You can use the `predict` command to generate the predicted values for each group and then use the `graph twoway` command to plot the residuals against the predicted values. This will help you check for homogeneity of variance and normality of residuals.
4. Run the analysis: Once you have confirmed that the model assumptions are met, you can run the analysis by executing the xtmixed command. Stata will provide you with the results of the ANOVA, including the F-statistic, p-value, and estimated group means.
5. Post-hoc tests: If you want to conduct post-hoc tests to compare specific groups, you can use the `margins` command. For example, to compare the means of group 1 and group 2, you can use the following command: `margins, at(group_var=(1 2))`. This will give you the estimated means for each group and the p-value for the comparison between group 1 and group 2.
6. Interpret the results: Finally, you can interpret the results of your analysis and discuss the significance of any differences between groups. Make sure to also report the effect size, such as eta-squared or Cohen's d, to provide a measure of the magnitude of the differences between groups.

Overall, using xtmixed allows you to conduct ANOVA designs while accounting for the hierarchical structure of the data, which is especially useful when dealing with nested or clustered data.

How can I do classical ANOVA designs using xtmixed? (Stata 12) | Stata FAQ

Note: The xtmixed syntax used on this page works in Stata 11, but the contrast command needs Stata 12.

This FAQ presents some classical ANOVA designs using xtmixed.

Included is the code for factorial designs, a randomized block design, a randomized block factorial design, three split-plot factorial designs, and a completely randomized hierarchical (nested) design.

The examples are taken from Roger Kirk's Experimental Design.

For the purposes of this FAQ only the code for the examples are presented. You will actually need to run the examples to see the output.

All of the examples are run using REML and for balanced designs will produce the same results as classical analysis of variance. For unbalanced designs the results will differ from the ANOVA solutions.

Note: The contrast outputs the results as chi-square after xtmixed, to rescale as F-ratios divide chi-square by the degrees of freedom.

Why do we need the contrast command? The reason we need the contrast command with xtmixed is because the standard coding of factor

variables is dummy coding.

Consider the model, $xtmixed\ y\ a\#\#b$. If we were to do test 2.a 3.a we would not get the "true" main effect for a. We would get the simple effect of a for b held at its reference value. However, contrast a will give us the "true" main effect.

```

/*****
*****/

/* */
/* completely randomized factorial design */
/* */

/*      from      kirk      --      see
https://stats.idre.ucla.edu/stat/stata/examples/kirk/kirkstata9.htm */
/* */

/*****
*****/

```

use

<https://stats.idre.ucla.edu/stat/stata/examples/kirk/crf33>,
clear

```

/*****/
/* fixed effects model: a & b fixed */
/* anova code: anova y a##b */
/*****/

xtmixed y a##b, var reml

contrast a##b

/*****/
/* mixed-effects model; a fixed & b random */
/* a*b interaction is also random */
/* can only test the fixed effect */
/*****/

/* create a by b factor for interaction */
egen ab = group(a b), label

xtmixed y i.a || _all: R.b || _all: R.ab, var reml

contrast a

/*****/
/* random effects model; a & b random */
/* no fixed effects in model */
/*****/

```

```
/* create a by b factor for interaction */
```

```
egen ab = group(a b), label
```

```
xtmixed y || _all: R.a || _all: R.b || _all: R.ab, var reml
```

```
/******
```

```
******/
```

```
/* */
```

```
/* randomized block design */
```

```
/* */
```

```
/* from kirk -- see
```

```
https://stats.idre.ucla.edu/stat/stata/examples/kirk/kirkst
```

```
ata7.htm */
```

```
/* */
```

```
/******
```

```
******/
```

```
use
```

```
https://stats.idre.ucla.edu/stat/stata/examples/kirk/rb4,
```

```
clear
```

```
/* anova code: */ anova y a s, repeated(a)
```

```
xtmixed y i.a || s:, var reml
```

```
contrast a
```

```

/*****
*****/

/* */

/* randomized block factorial design */

/* */

/* */

/*****
*****/

use
https://stats.idre.ucla.edu/stat/stata/examples/kirk/rbf33,
clear

/* anova code: */ anova y s a##b, repeated(a b)

anovalator a b, main 2way fratio

/*****
*****/

/* */

/* split-plot factorial designs */

/* */

/* */

/*****
*****/

```

```
/* spf-2.4 subjects nested in a */
```

```
/* between subjects: a */
```

```
/* within subjects: b */
```

```
use
```

```
https://stats.idre.ucla.edu/stat/stata/examples/kirk/spf2-4, clear
```

```
/* anova code: */ anova y a / s|a b a#b /, repeated(b)
```

```
xtmixed y a##b || s:, var reml
```

```
contrast a##b
```

```
/* spf-22.4 subjects nested in a*c */
```

```
/* between subjects: a & c */
```

```
/* within subjects: b */
```

```
use
```

```
https://stats.idre.ucla.edu/stat/stata/examples/kirk/spf22-4, clear
```

```
/* anova code: */ anova y a c a#c / s|a#c b a#b b#c a#b#c /, repeated(b)
```

```
xtmixed y a##c##b || s:, var reml
```

contrast a##c##b

/* spf-2.22 subjects nested in a */

/* between subjects: a */

/* within subjects: b & c */

use

<https://stats.idre.ucla.edu/stat/stata/examples/kirk/spf2-22>, clear

/* anova code: */ anova y a / s|a b a#b / b#s|a c a#c / c#s|a b#c a#b#c /, repeated(b c)

xtmixed y a##b##c || s: || s: R.b || s: R.c, var reml

contrast a##b##c

**/*

******/**

/* */

/* completely randomized hierarchical (nested) design */

/* */

/* */

**/*

******/**

```
/* chr-2(8) b is nested in a */
```

```
use
```

```
https://stats.idre.ucla.edu/stat/stata/examples/kirk/crh28
```

```
, clear
```

```
/* anova code: */ anova y a / b|a /
```

```
xtmixed y i.a || b:, var reml
```

```
/* test for main-effect of a */
```

```
contrast a
```

```
/* test for b nested in a */
```

```
xtmixed y i.a a#b, var reml
```

```
contrast b, noestimcheck
```