```
                                        - or -
ANALYSIS( REPEATED  [CONDITIONAL]      )    /
                    [UNCONDITIONAL]
```

PARTITION subdivides the degrees of freedom of a factor.

```
PARTITION(factorname) [= (df1, df2,..)]  /
```

CONTRAST indicates the type of contrast desired for a factor.

```
                                { DEVIATION [(refcat)]   }
                                { DIFFERENCE             }
                                { HELMERT                }
CONTRAST(factorname) =          { SIMPLE [(refcat)]      }  /
                                { REPEATED               }
                                { POLYNOMIAL [(metric)]  }
                                { SPECIAL (matrix)       }
```

ERROR specifies the error term to be used in the model.

```
                { WITHIN or W                }
                { RESIDUAL or R              }
ERROR =         { WITHIN + RESIDUAL or WR    }  /
                { n                          }
```

DESIGN specifies the design model to be analyzed.

```
DESIGN = effect1, effect2,../
```

The DESIGN specification should be the last subcommand of a complete MANOVA run. All the computational and output options are applied to the subsequent DESIGN models unless overridden.

As an example of specifications for MANOVA, consider the following:

```
MANOVA          Y BY A(1,3) B(1,4) WITH X/
                PRINT=CELLINFO(MEANS)/
                METHOD=ESTIMATION(BALANCED)/
                DESIGN=A,B/
                METHOD=ESTIMATION(QR)/
                DESIGN=A,B,A BY B/
```

An analysis of covariance model is specified with Y as the dependent variable, X as the covariate, and A and B as factor variables with three and four levels respectively. The PRINT subcommand requests cell information. The METHOD subcommand indicates that a special balanced processing method be used for parameter estimation. These two options apply to the first DESIGN specification, which requests a main effects model. The second METHOD subcommand requests the (default) QR method for estimating the parameters in the second DESIGN specification (a full model). The PRINT subcommand applied to the first DESIGN will also apply to the second DESIGN.

Note that if the last command is not a DESIGN specification, MANOVA will generate a full model design specification for the problem.

1.2 UNIVARIATE ANALYSIS OF VARIANCE

The basic features of MANOVA useful for univariate analysis of variance are illustrated in the following example taken from Winer (1971, p. 436). An experiment was conducted to evaluate the relative effectiveness of three drugs (Factor DRUG) in bringing about behavioral changes in two categories of patients (Factor CAT). Three patients of each category were assigned at random to one of three drugs, and criterion ratings (Y) were made for each patient. The data are given in Table 1.2.

Table 1.2

		DRUG		
		1	2	3
CAT	1	8 4 0	10 8 6	8 6 4
	2	14 10 6	4 2 0	15 12 9