> summary(a<-aov(repdat~factor(Group)\*contrasts,mydata.CRI))

Df Sum Sq Mean Sq F value Pr(>F)

factor(Group) 1 1.8141 1.8141 569.347 < 2e-16 \*\*\*

contrasts 7 0.2471 0.0353 11.079 1.21e-09 \*\*\*

factor(Group):contrasts 7 0.2094 0.0299 9.388 2.16e-08 \*\*\*

Residuals 78 0.2485 0.0032

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

218 observations deleted due to missingness

>

> mydata.Sedscore<-make.rm(1:2,11:24,mydata)

> summary(b<-aov(repdat~factor(Group)\*contrasts,mydata.Sedscore))

Df Sum Sq Mean Sq F value Pr(>F)

factor(Group) 1 0.08 0.077 0.715 0.399

contrasts 13 187.79 14.445 134.409 <2e-16 \*\*\*

factor(Group):contrasts 13 1.94 0.149 1.385 0.173

Residuals 144 15.48 0.107

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

374 observations deleted due to missingness

>

> mydata.hhag<-make.rm(1:2,37:48,mydata)

> summary(c<-aov(repdat~factor(Group)\*contrasts,mydata.hhag))

Df Sum Sq Mean Sq F value Pr(>F)

factor(Group) 1 111 111 0.372 0.5430

contrasts 11 214017 19456 65.389 <2e-16 \*\*\*

factor(Group):contrasts 11 7692 699 2.350 0.0116 \*

Residuals 121 36003 298

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

323 observations deleted due to missingness

>

> mydata.pulse<-make.rm(1:2,49:62,mydata)

> summary(d<-aov(repdat~factor(Group)\*contrasts,mydata.pulse))

Df Sum Sq Mean Sq F value Pr(>F)

factor(Group) 1 1140 1139.7 1.197 0.276

contrasts 13 17861 1373.9 1.443 0.147

factor(Group):contrasts 13 13881 1067.8 1.121 0.346

Residuals 144 137130 952.3

374 observations deleted due to missingness

>

> mydata.sap<-make.rm(1:2,63:71,mydata)

> summary(e<-aov(repdat~factor(Group)\*contrasts,mydata.sap))

Df Sum Sq Mean Sq F value Pr(>F)

factor(Group) 1 2608 2608.1 7.102 0.00914 \*\*

contrasts 8 3357 419.6 1.143 0.34316

factor(Group):contrasts 8 1933 241.6 0.658 0.72692

Residuals 89 32686 367.3

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

244 observations deleted due to missingness

>

> mydata.resp<-make.rm(1:2,72:85,mydata)

> summary(f<-aov(repdat~factor(Group)\*contrasts,mydata.resp))

Df Sum Sq Mean Sq F value Pr(>F)

factor(Group) 1 43 42.88 0.742 0.391

contrasts 13 3743 287.90 4.979 3.41e-07 \*\*\*

factor(Group):contrasts 13 418 32.16 0.556 0.885

Residuals 144 8326 57.82

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

374 observations deleted due to missingness

>

> mydata.temp<-make.rm(1:2,86:99,mydata)

> summary(g<-aov(repdat~factor(Group)\*contrasts,mydata.temp))

Df Sum Sq Mean Sq F value Pr(>F)

factor(Group) 1 9.53 9.531 13.002 0.000428 \*\*\*

contrasts 13 33.27 2.559 3.491 9.87e-05 \*\*\*

factor(Group):contrasts 13 3.64 0.280 0.382 0.973599

Residuals 144 105.56 0.733

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

374 observations deleted due to missingness

>

>

> #Checking for pairwise differences where aov is significant

> #Tukey honest significance difference test recommended as post hoc test

> #Basic & Clinical Biostatistics, B Dawson & RG Trapp (2004), 4th Edition pg173

> TukeyHSD(a,which=c("factor(Group)","factor(Group):contrasts"),ordered=TRUE)

Tukey multiple comparisons of means

95% family-wise confidence level

factor levels have been ordered

Fit: aov(formula = repdat ~ factor(Group) \* contrasts, data = mydata.CRI)

$`factor(Group)`

diff lwr upr p adj

2-1 0.2784099 0.2551808 0.3016391 0

$`factor(Group):contrasts`

diff lwr upr p adj

1:T6-1:T5 5.208333e-05 -0.1153249262 0.1154291 1.0000000

1:T4-1:T5 3.145833e-04 -0.1150624262 0.1156916 1.0000000

1:T7-1:T5 3.645833e-04 -0.1150124262 0.1157416 1.0000000

1:T8-1:T5 5.229167e-04 -0.1626448150 0.1636906 1.0000000

1:T3-1:T5 7.312500e-04 -0.1146457595 0.1161083 1.0000000

1:T2-1:T5 9.395833e-04 -0.1144374262 0.1163166 1.0000000

1:T1-1:T5 1.460417e-03 -0.1139165929 0.1168374 1.0000000

2:T5-1:T5 1.953890e-01 0.0842089198 0.3065691 0.0000026

2:T6-1:T5 2.132461e-01 0.1020660626 0.3244262 0.0000002

2:T7-1:T5 2.281271e-01 0.1127500738 0.3435041 0.0000001

2:T4-1:T5 2.311033e-01 0.1199232055 0.3422833 0.0000000

2:T3-1:T5 2.668176e-01 0.1556374912 0.3779976 0.0000000

2:T2-1:T5 3.025318e-01 0.1913517769 0.4137119 0.0000000

2:T8-1:T5 3.114604e-01 0.1482926850 0.4746281 0.0000003

2:T1-1:T5 4.989604e-01 0.3877803483 0.6101405 0.0000000

1:T4-1:T6 2.625000e-04 -0.1151145095 0.1156395 1.0000000

1:T7-1:T6 3.125000e-04 -0.1150645095 0.1156895 1.0000000

1:T8-1:T6 4.708333e-04 -0.1626968983 0.1636386 1.0000000

1:T3-1:T6 6.791667e-04 -0.1146978429 0.1160562 1.0000000

1:T2-1:T6 8.875000e-04 -0.1144895095 0.1162645 1.0000000

1:T1-1:T6 1.408333e-03 -0.1139686762 0.1167853 1.0000000

2:T5-1:T6 1.953369e-01 0.0841568364 0.3065170 0.0000026

2:T6-1:T6 2.131940e-01 0.1020139793 0.3243741 0.0000002

2:T7-1:T6 2.280750e-01 0.1126979905 0.3434520 0.0000001

2:T4-1:T6 2.310512e-01 0.1198711222 0.3422313 0.0000000

2:T3-1:T6 2.667655e-01 0.1555854079 0.3779455 0.0000000

2:T2-1:T6 3.024798e-01 0.1912996936 0.4136598 0.0000000

2:T8-1:T6 3.114083e-01 0.1482406017 0.4745761 0.0000003

2:T1-1:T6 4.989083e-01 0.3877282650 0.6100884 0.0000000

1:T7-1:T4 5.000000e-05 -0.1153270095 0.1154270 1.0000000

1:T8-1:T4 2.083333e-04 -0.1629593983 0.1633761 1.0000000

1:T3-1:T4 4.166667e-04 -0.1149603429 0.1157937 1.0000000

1:T2-1:T4 6.250000e-04 -0.1147520095 0.1160020 1.0000000

1:T1-1:T4 1.145833e-03 -0.1142311762 0.1165228 1.0000000

2:T5-1:T4 1.950744e-01 0.0838943364 0.3062545 0.0000027

2:T6-1:T4 2.129315e-01 0.1017514793 0.3241116 0.0000002

2:T7-1:T4 2.278125e-01 0.1124354905 0.3431895 0.0000001

2:T4-1:T4 2.307887e-01 0.1196086222 0.3419688 0.0000000

2:T3-1:T4 2.665030e-01 0.1553229079 0.3776830 0.0000000

2:T2-1:T4 3.022173e-01 0.1910371936 0.4133973 0.0000000

2:T8-1:T4 3.111458e-01 0.1479781017 0.4743136 0.0000003

2:T1-1:T4 4.986458e-01 0.3874657650 0.6098259 0.0000000

1:T8-1:T7 1.583333e-04 -0.1630093983 0.1633261 1.0000000

1:T3-1:T7 3.666667e-04 -0.1150103429 0.1157437 1.0000000

1:T2-1:T7 5.750000e-04 -0.1148020095 0.1159520 1.0000000

1:T1-1:T7 1.095833e-03 -0.1142811762 0.1164728 1.0000000

2:T5-1:T7 1.950244e-01 0.0838443364 0.3062045 0.0000028

2:T6-1:T7 2.128815e-01 0.1017014793 0.3240616 0.0000002

2:T7-1:T7 2.277625e-01 0.1123854905 0.3431395 0.0000001

2:T4-1:T7 2.307387e-01 0.1195586222 0.3419188 0.0000000

2:T3-1:T7 2.664530e-01 0.1552729079 0.3776330 0.0000000

2:T2-1:T7 3.021673e-01 0.1909871936 0.4133473 0.0000000

2:T8-1:T7 3.110958e-01 0.1479281017 0.4742636 0.0000003

2:T1-1:T7 4.985958e-01 0.3874157650 0.6097759 0.0000000

1:T3-1:T8 2.083333e-04 -0.1629593983 0.1633761 1.0000000

1:T2-1:T8 4.166667e-04 -0.1627510650 0.1635844 1.0000000

1:T1-1:T8 9.375000e-04 -0.1622302317 0.1641052 1.0000000

2:T5-1:T8 1.948661e-01 0.0346385397 0.3550936 0.0045461

2:T6-1:T8 2.127232e-01 0.0524956826 0.3729507 0.0011217

2:T7-1:T8 2.276042e-01 0.0644364350 0.3907719 0.0004621

2:T4-1:T8 2.305804e-01 0.0703528254 0.3908079 0.0002544

2:T3-1:T8 2.662946e-01 0.1060671111 0.4265222 0.0000108

2:T2-1:T8 3.020089e-01 0.1417813968 0.4622365 0.0000004

2:T8-1:T8 3.109375e-01 0.1110986575 0.5107763 0.0000499

2:T1-1:T8 4.984375e-01 0.3382099683 0.6586650 0.0000000

1:T2-1:T3 2.083333e-04 -0.1151686762 0.1155853 1.0000000

1:T1-1:T3 7.291667e-04 -0.1146478429 0.1161062 1.0000000

2:T5-1:T3 1.946577e-01 0.0834776698 0.3058378 0.0000029

2:T6-1:T3 2.125149e-01 0.1013348126 0.3236949 0.0000003

2:T7-1:T3 2.273958e-01 0.1120188238 0.3427728 0.0000001

2:T4-1:T3 2.303720e-01 0.1191919555 0.3415521 0.0000000

2:T3-1:T3 2.660863e-01 0.1549062412 0.3772664 0.0000000

2:T2-1:T3 3.018006e-01 0.1906205269 0.4129807 0.0000000

2:T8-1:T3 3.107292e-01 0.1475614350 0.4738969 0.0000003

2:T1-1:T3 4.982292e-01 0.3870490983 0.6094092 0.0000000

1:T1-1:T2 5.208333e-04 -0.1148561762 0.1158978 1.0000000

2:T5-1:T2 1.944494e-01 0.0832693364 0.3056295 0.0000030

2:T6-1:T2 2.123065e-01 0.1011264793 0.3234866 0.0000003

2:T7-1:T2 2.271875e-01 0.1118104905 0.3425645 0.0000001

2:T4-1:T2 2.301637e-01 0.1189836222 0.3413438 0.0000000

2:T3-1:T2 2.658780e-01 0.1546979079 0.3770580 0.0000000

2:T2-1:T2 3.015923e-01 0.1904121936 0.4127723 0.0000000

2:T8-1:T2 3.105208e-01 0.1473531017 0.4736886 0.0000003

2:T1-1:T2 4.980208e-01 0.3868407650 0.6092009 0.0000000

2:T5-1:T1 1.939286e-01 0.0827485031 0.3051086 0.0000032

2:T6-1:T1 2.117857e-01 0.1006056460 0.3229658 0.0000003

2:T7-1:T1 2.266667e-01 0.1112896571 0.3420437 0.0000001

2:T4-1:T1 2.296429e-01 0.1184627888 0.3408229 0.0000000

2:T3-1:T1 2.653571e-01 0.1541770745 0.3765372 0.0000000

2:T2-1:T1 3.010714e-01 0.1898913602 0.4122515 0.0000000

2:T8-1:T1 3.100000e-01 0.1468322683 0.4731677 0.0000003

2:T1-1:T1 4.975000e-01 0.3863199317 0.6086801 0.0000000

2:T6-2:T5 1.785714e-02 -0.0889612116 0.1246755 0.9999997

2:T7-2:T5 3.273810e-02 -0.0784419731 0.1439182 0.9995480

2:T4-2:T5 3.571429e-02 -0.0711040688 0.1425326 0.9980833

2:T3-2:T5 7.142857e-02 -0.0353897831 0.1782469 0.5767675

2:T2-2:T5 1.071429e-01 0.0003245027 0.2139612 0.0485143

2:T8-2:T5 1.160714e-01 -0.0441561032 0.2762990 0.4376517

2:T1-2:T5 3.035714e-01 0.1967530741 0.4103898 0.0000000

2:T7-2:T6 1.488095e-02 -0.0962991159 0.1260610 1.0000000

2:T4-2:T6 1.785714e-02 -0.0889612116 0.1246755 0.9999997

2:T3-2:T6 5.357143e-02 -0.0532469259 0.1603898 0.9175317

2:T2-2:T6 8.928571e-02 -0.0175326402 0.1961041 0.2111531

2:T8-2:T6 9.821429e-02 -0.0620132460 0.2584418 0.7142885

2:T1-2:T6 2.857143e-01 0.1788959312 0.3925326 0.0000000

2:T4-2:T7 2.976190e-03 -0.1082038778 0.1141563 1.0000000

2:T3-2:T7 3.869048e-02 -0.0724895921 0.1498705 0.9970450

2:T2-2:T7 7.440476e-02 -0.0367753064 0.1855848 0.5754090

2:T8-2:T7 8.333333e-02 -0.0798343983 0.2465011 0.9059509

2:T1-2:T7 2.708333e-01 0.1596532650 0.3820134 0.0000000

2:T3-2:T4 3.571429e-02 -0.0711040688 0.1425326 0.9980833

2:T2-2:T4 7.142857e-02 -0.0353897831 0.1782469 0.5767675

2:T8-2:T4 8.035714e-02 -0.0798703889 0.2405847 0.9175317

2:T1-2:T4 2.678571e-01 0.1610387884 0.3746755 0.0000000

2:T2-2:T3 3.571429e-02 -0.0711040688 0.1425326 0.9980833

2:T8-2:T3 4.464286e-02 -0.1155846746 0.2048704 0.9997661

2:T1-2:T3 2.321429e-01 0.1253245027 0.3389612 0.0000000

2:T8-2:T2 8.928571e-03 -0.1512989603 0.1691561 1.0000000

2:T1-2:T2 1.964286e-01 0.0896102169 0.3032469 0.0000008

2:T1-2:T8 1.875000e-01 0.0272724683 0.3477275 0.0078662

> TukeyHSD(b,which=c("factor(Group)","factor(Group):contrasts"),ordered=TRUE)

Tukey multiple comparisons of means

95% family-wise confidence level

factor levels have been ordered

Fit: aov(formula = repdat ~ factor(Group) \* contrasts, data = mydata.Sedscore)

$`factor(Group)`

diff lwr upr p adj

2-1 0.0423913 -0.05666666 0.1414493 0.3990318

$`factor(Group):contrasts`

diff lwr upr p adj

1:T14-2:T1 6.557255e-16 -0.69136126 0.6913613 1.0000000

2:T14-2:T1 1.432882e-15 -0.66423842 0.6642384 1.0000000

1:T13-2:T1 1.453698e-15 -0.69136126 0.6913613 1.0000000

1:T11-2:T1 2.241263e-15 -0.69136126 0.6913613 1.0000000

2:T13-2:T1 2.300243e-15 -0.66423842 0.6642384 1.0000000

1:T1-2:T1 2.347659e-15 -0.69136126 0.6913613 1.0000000

1:T12-2:T1 2.570860e-15 -0.69136126 0.6913613 1.0000000

2:T11-2:T1 3.098216e-15 -0.66423842 0.6642384 1.0000000

2:T12-2:T1 3.174544e-15 -0.66423842 0.6642384 1.0000000

2:T10-2:T1 2.857143e-01 -0.37852413 0.9499527 0.9978329

1:T10-2:T1 5.000000e-01 -0.19136126 1.1913613 0.5630179

1:T2-2:T1 1.666667e+00 0.97530540 2.3580279 0.0000000

1:T8-2:T1 1.833333e+00 1.14197207 2.5246946 0.0000000

2:T7-2:T1 2.000000e+00 1.33576158 2.6642384 0.0000000

2:T8-2:T1 2.000000e+00 1.30863874 2.6913613 0.0000000

1:T9-2:T1 2.000000e+00 1.00364238 2.9963576 0.0000000

2:T9-2:T1 2.000000e+00 1.00364238 2.9963576 0.0000000

2:T6-2:T1 2.000000e+00 1.33576158 2.6642384 0.0000000

2:T5-2:T1 2.142857e+00 1.47861873 2.8070956 0.0000000

1:T4-2:T1 2.166667e+00 1.47530540 2.8580279 0.0000000

1:T5-2:T1 2.166667e+00 1.47530540 2.8580279 0.0000000

1:T7-2:T1 2.166667e+00 1.47530540 2.8580279 0.0000000

1:T6-2:T1 2.166667e+00 1.47530540 2.8580279 0.0000000

2:T2-2:T1 2.285714e+00 1.62147587 2.9499527 0.0000000

1:T3-2:T1 2.333333e+00 1.64197207 3.0246946 0.0000000

2:T4-2:T1 2.428571e+00 1.76433301 3.0928098 0.0000000

2:T3-2:T1 2.571429e+00 1.90719016 3.2356670 0.0000000

2:T14-1:T14 7.771561e-16 -0.69136126 0.6913613 1.0000000

1:T13-1:T14 7.979728e-16 -0.71745949 0.7174595 1.0000000

1:T11-1:T14 1.585537e-15 -0.71745949 0.7174595 1.0000000

2:T13-1:T14 1.644518e-15 -0.69136126 0.6913613 1.0000000

1:T1-1:T14 1.691934e-15 -0.71745949 0.7174595 1.0000000

1:T12-1:T14 1.915135e-15 -0.71745949 0.7174595 1.0000000

2:T11-1:T14 2.442491e-15 -0.69136126 0.6913613 1.0000000

2:T12-1:T14 2.518818e-15 -0.69136126 0.6913613 1.0000000

2:T10-1:T14 2.857143e-01 -0.40564698 0.9770755 0.9988433

1:T10-1:T14 5.000000e-01 -0.21745949 1.2174595 0.6404586

1:T2-1:T14 1.666667e+00 0.94920718 2.3841262 0.0000000

1:T8-1:T14 1.833333e+00 1.11587384 2.5507928 0.0000000

2:T7-1:T14 2.000000e+00 1.30863874 2.6913613 0.0000000

2:T8-1:T14 2.000000e+00 1.28254051 2.7174595 0.0000000

1:T9-1:T14 2.000000e+00 0.98535906 3.0146409 0.0000000

2:T9-1:T14 2.000000e+00 0.98535906 3.0146409 0.0000000

2:T6-1:T14 2.000000e+00 1.30863874 2.6913613 0.0000000

2:T5-1:T14 2.142857e+00 1.45149588 2.8342184 0.0000000

1:T4-1:T14 2.166667e+00 1.44920718 2.8841262 0.0000000

1:T5-1:T14 2.166667e+00 1.44920718 2.8841262 0.0000000

1:T7-1:T14 2.166667e+00 1.44920718 2.8841262 0.0000000

1:T6-1:T14 2.166667e+00 1.44920718 2.8841262 0.0000000

2:T2-1:T14 2.285714e+00 1.59435302 2.9770755 0.0000000

1:T3-1:T14 2.333333e+00 1.61587384 3.0507928 0.0000000

2:T4-1:T14 2.428571e+00 1.73721017 3.1199327 0.0000000

2:T3-1:T14 2.571429e+00 1.88006731 3.2627898 0.0000000

1:T13-2:T14 2.081668e-17 -0.69136126 0.6913613 1.0000000

1:T11-2:T14 8.083811e-16 -0.69136126 0.6913613 1.0000000

2:T13-2:T14 8.673617e-16 -0.66423842 0.6642384 1.0000000

1:T1-2:T14 9.147775e-16 -0.69136126 0.6913613 1.0000000

1:T12-2:T14 1.137979e-15 -0.69136126 0.6913613 1.0000000

2:T11-2:T14 1.665335e-15 -0.66423842 0.6642384 1.0000000

2:T12-2:T14 1.741662e-15 -0.66423842 0.6642384 1.0000000

2:T10-2:T14 2.857143e-01 -0.37852413 0.9499527 0.9978329

1:T10-2:T14 5.000000e-01 -0.19136126 1.1913613 0.5630179

1:T2-2:T14 1.666667e+00 0.97530540 2.3580279 0.0000000

1:T8-2:T14 1.833333e+00 1.14197207 2.5246946 0.0000000

2:T7-2:T14 2.000000e+00 1.33576158 2.6642384 0.0000000

2:T8-2:T14 2.000000e+00 1.30863874 2.6913613 0.0000000

1:T9-2:T14 2.000000e+00 1.00364238 2.9963576 0.0000000

2:T9-2:T14 2.000000e+00 1.00364238 2.9963576 0.0000000

2:T6-2:T14 2.000000e+00 1.33576158 2.6642384 0.0000000

2:T5-2:T14 2.142857e+00 1.47861873 2.8070956 0.0000000

1:T4-2:T14 2.166667e+00 1.47530540 2.8580279 0.0000000

1:T5-2:T14 2.166667e+00 1.47530540 2.8580279 0.0000000

1:T7-2:T14 2.166667e+00 1.47530540 2.8580279 0.0000000

1:T6-2:T14 2.166667e+00 1.47530540 2.8580279 0.0000000

2:T2-2:T14 2.285714e+00 1.62147587 2.9499527 0.0000000

1:T3-2:T14 2.333333e+00 1.64197207 3.0246946 0.0000000

2:T4-2:T14 2.428571e+00 1.76433301 3.0928098 0.0000000

2:T3-2:T14 2.571429e+00 1.90719016 3.2356670 0.0000000

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1:T6-2:T9 1.666667e-01 -0.84797427 1.1813076 1.0000000

2:T2-2:T9 2.857143e-01 -0.71064334 1.2820719 0.9999988

1:T3-2:T9 3.333333e-01 -0.68130761 1.3479743 0.9999806

2:T4-2:T9 4.285714e-01 -0.56778620 1.4249291 0.9978329

2:T3-2:T9 5.714286e-01 -0.42492905 1.5677862 0.9188150

2:T5-2:T6 1.428571e-01 -0.52138127 0.8070956 1.0000000

1:T4-2:T6 1.666667e-01 -0.52469460 0.8580279 1.0000000

1:T5-2:T6 1.666667e-01 -0.52469460 0.8580279 1.0000000

1:T7-2:T6 1.666667e-01 -0.52469460 0.8580279 1.0000000

1:T6-2:T6 1.666667e-01 -0.52469460 0.8580279 1.0000000

2:T2-2:T6 2.857143e-01 -0.37852413 0.9499527 0.9978329

1:T3-2:T6 3.333333e-01 -0.35802793 1.0246946 0.9889208

2:T4-2:T6 4.285714e-01 -0.23566699 1.0928098 0.7806046

2:T3-2:T6 5.714286e-01 -0.09280984 1.2356670 0.2126924

1:T4-2:T5 2.380952e-02 -0.66755174 0.7151708 1.0000000

1:T5-2:T5 2.380952e-02 -0.66755174 0.7151708 1.0000000

1:T7-2:T5 2.380952e-02 -0.66755174 0.7151708 1.0000000

1:T6-2:T5 2.380952e-02 -0.66755174 0.7151708 1.0000000

2:T2-2:T5 1.428571e-01 -0.52138127 0.8070956 1.0000000

1:T3-2:T5 1.904762e-01 -0.50088507 0.8818375 0.9999995

2:T4-2:T5 2.857143e-01 -0.37852413 0.9499527 0.9978329

2:T3-2:T5 4.285714e-01 -0.23566699 1.0928098 0.7806046

1:T5-1:T4 4.440892e-16 -0.71745949 0.7174595 1.0000000

1:T7-1:T4 4.440892e-16 -0.71745949 0.7174595 1.0000000

1:T6-1:T4 1.332268e-15 -0.71745949 0.7174595 1.0000000

2:T2-1:T4 1.190476e-01 -0.57231364 0.8104089 1.0000000

1:T3-1:T4 1.666667e-01 -0.55079282 0.8841262 1.0000000

2:T4-1:T4 2.619048e-01 -0.42945650 0.9532660 0.9997306

2:T3-1:T4 4.047619e-01 -0.28659936 1.0961232 0.9013323

1:T7-1:T5 0.000000e+00 -0.71745949 0.7174595 1.0000000

1:T6-1:T5 8.881784e-16 -0.71745949 0.7174595 1.0000000

2:T2-1:T5 1.190476e-01 -0.57231364 0.8104089 1.0000000

1:T3-1:T5 1.666667e-01 -0.55079282 0.8841262 1.0000000

2:T4-1:T5 2.619048e-01 -0.42945650 0.9532660 0.9997306

2:T3-1:T5 4.047619e-01 -0.28659936 1.0961232 0.9013323

1:T6-1:T7 8.881784e-16 -0.71745949 0.7174595 1.0000000

2:T2-1:T7 1.190476e-01 -0.57231364 0.8104089 1.0000000

1:T3-1:T7 1.666667e-01 -0.55079282 0.8841262 1.0000000

2:T4-1:T7 2.619048e-01 -0.42945650 0.9532660 0.9997306

2:T3-1:T7 4.047619e-01 -0.28659936 1.0961232 0.9013323

2:T2-1:T6 1.190476e-01 -0.57231364 0.8104089 1.0000000

1:T3-1:T6 1.666667e-01 -0.55079282 0.8841262 1.0000000

2:T4-1:T6 2.619048e-01 -0.42945650 0.9532660 0.9997306

2:T3-1:T6 4.047619e-01 -0.28659936 1.0961232 0.9013323

1:T3-2:T2 4.761905e-02 -0.64374222 0.7389803 1.0000000

2:T4-2:T2 1.428571e-01 -0.52138127 0.8070956 1.0000000

2:T3-2:T2 2.857143e-01 -0.37852413 0.9499527 0.9978329

2:T4-1:T3 9.523810e-02 -0.59612317 0.7865994 1.0000000

2:T3-1:T3 2.380952e-01 -0.45326602 0.9294565 0.9999522

2:T3-2:T4 1.428571e-01 -0.52138127 0.8070956 1.0000000

> TukeyHSD(c,which=c("factor(Group)","factor(Group):contrasts"),ordered=TRUE)

Tukey multiple comparisons of means

95% family-wise confidence level

factor levels have been ordered

Fit: aov(formula = repdat ~ factor(Group) \* contrasts, data = mydata.hhag)

$`factor(Group)`

diff lwr upr p adj

1-2 1.752761 -3.935605 7.441127 0.5429884

$`factor(Group):contrasts`

diff lwr upr p adj

2:T2-2:T3 2.622140e+00 -31.70465255 36.94893 1.0000000

1:T6-2:T3 2.682478e+00 -33.04598058 38.41094 1.0000000

1:T5-2:T3 6.568616e+00 -29.15984267 42.29707 1.0000000

2:T6-2:T3 7.413907e+00 -26.91288490 41.74070 1.0000000

2:T4-2:T3 7.872307e+00 -26.45448488 42.19910 0.9999999

1:T7-2:T3 1.078649e+01 -24.94196657 46.51495 0.9999809

2:T5-2:T3 1.321606e+01 -21.11072998 47.54285 0.9990078

1:T4-2:T3 1.816587e+01 -17.56259057 53.89433 0.9655763

2:T7-2:T3 1.888463e+01 -15.44216643 53.21142 0.9251040

1:T3-2:T3 2.271469e+01 -13.01376363 58.44315 0.7660220

1:T8-2:T3 2.921491e+01 -6.51355243 64.94336 0.2850577

2:T8-2:T3 3.548400e+01 -0.24446104 71.21246 0.0539763

1:T9-2:T3 3.630978e+01 -15.18040416 87.79997 0.5794068

1:T2-2:T3 4.212193e+01 6.39346700 77.85038 0.0052761

2:T9-2:T3 4.353823e+01 -7.95196054 95.02842 0.2282587

1:T10-2:T3 8.759044e+01 51.86198369 123.31890 0.0000000

1:T12-2:T3 9.281911e+01 55.21598922 130.42222 0.0000000

1:T11-2:T3 9.387304e+01 58.14458168 129.60150 0.0000000

2:T10-2:T3 9.504417e+01 60.71737340 129.37096 0.0000000

2:T11-2:T3 9.537144e+01 61.04464916 129.69823 0.0000000

1:T1-2:T3 9.698619e+01 61.25773020 132.71465 0.0000000

2:T1-2:T3 9.698619e+01 62.65939610 131.31298 0.0000000

2:T12-2:T3 9.929478e+01 64.96798717 133.62157 0.0000000

1:T6-2:T2 6.033787e-02 -35.66812034 35.78880 1.0000000

1:T5-2:T2 3.946476e+00 -31.78198244 39.67493 1.0000000

2:T6-2:T2 4.791768e+00 -29.53502466 39.11856 1.0000000

2:T4-2:T2 5.250168e+00 -29.07662464 39.57696 1.0000000

1:T7-2:T2 8.164352e+00 -27.56410634 43.89281 0.9999999

2:T5-2:T2 1.059392e+01 -23.73286974 44.92071 0.9999719

1:T4-2:T2 1.554373e+01 -20.18473033 51.27219 0.9945514

2:T7-2:T2 1.626249e+01 -18.06430620 50.58928 0.9843293

1:T3-2:T2 2.009255e+01 -15.63590339 55.82101 0.9087693

1:T8-2:T2 2.659277e+01 -9.13569219 62.32122 0.4691097

2:T8-2:T2 3.286186e+01 -2.86660080 68.59032 0.1165059

1:T9-2:T2 3.368764e+01 -17.80254392 85.17783 0.7195460

1:T2-2:T2 3.949979e+01 3.77132724 75.22824 0.0140034

2:T9-2:T2 4.091609e+01 -10.57410031 92.40628 0.3380105

1:T10-2:T2 8.496830e+01 49.23984393 120.69676 0.0000000

1:T12-2:T2 9.019697e+01 52.59384946 127.80008 0.0000000

1:T11-2:T2 9.125090e+01 55.52244192 126.97936 0.0000000

2:T10-2:T2 9.242203e+01 58.09523363 126.74882 0.0000000

2:T11-2:T2 9.274930e+01 58.42250940 127.07609 0.0000000

1:T1-2:T2 9.436405e+01 58.63559044 130.09251 0.0000000

2:T1-2:T2 9.436405e+01 60.03725634 128.69084 0.0000000

2:T12-2:T2 9.667264e+01 62.34584741 130.99943 0.0000000

1:T5-1:T6 3.886138e+00 -33.19103543 40.96331 1.0000000

2:T6-1:T6 4.731430e+00 -30.99702843 40.45989 1.0000000

2:T4-1:T6 5.189830e+00 -30.53862841 40.91829 1.0000000

1:T7-1:T6 8.104014e+00 -28.97315933 45.18119 1.0000000

2:T5-1:T6 1.053358e+01 -25.19487351 46.26204 0.9999874

1:T4-1:T6 1.548339e+01 -21.59378332 52.56056 0.9968469

2:T7-1:T6 1.620215e+01 -19.52630997 51.93061 0.9907574

1:T3-1:T6 2.003222e+01 -17.04495638 57.10939 0.9367319

1:T8-1:T6 2.653243e+01 -10.54474518 63.60960 0.5497969

2:T8-1:T6 3.280152e+01 -4.27565379 69.87869 0.1623945

1:T9-1:T6 3.362731e+01 -18.80773470 86.06235 0.7524182

1:T2-1:T6 3.943945e+01 2.36227425 76.51662 0.0236566

2:T9-1:T6 4.085575e+01 -11.57929109 93.29079 0.3762939

1:T10-1:T6 8.490796e+01 47.83079094 121.98514 0.0000000

1:T12-1:T6 9.013663e+01 51.24976109 129.02350 0.0000000

1:T11-1:T6 9.119056e+01 54.11338893 128.26774 0.0000000

2:T10-1:T6 9.236169e+01 56.63322986 128.09015 0.0000000

2:T11-1:T6 9.268896e+01 56.96050562 128.41742 0.0000000

1:T1-1:T6 9.430371e+01 57.22653745 131.38088 0.0000000

2:T1-1:T6 9.430371e+01 58.57525257 130.03217 0.0000000

2:T12-1:T6 9.661230e+01 60.88384363 132.34076 0.0000000

2:T6-1:T5 8.452919e-01 -34.88316634 36.57375 1.0000000

2:T4-1:T5 1.303692e+00 -34.42476632 37.03215 1.0000000

1:T7-1:T5 4.217876e+00 -32.85929723 41.29505 1.0000000

2:T5-1:T5 6.647447e+00 -29.08101142 42.37591 1.0000000

1:T4-1:T5 1.159725e+01 -25.47992122 48.67443 0.9999646

2:T7-1:T5 1.231601e+01 -23.41244787 48.04447 0.9998208

1:T3-1:T5 1.614608e+01 -20.93109428 53.22325 0.9944823

1:T8-1:T5 2.264629e+01 -14.43088308 59.72346 0.8227860

2:T8-1:T5 2.891538e+01 -8.16179169 65.99255 0.3745146

1:T9-1:T5 2.974117e+01 -22.69387261 82.17621 0.9017166

1:T2-1:T5 3.555331e+01 -1.52386365 72.63048 0.0782331

2:T9-1:T5 3.696961e+01 -15.46542899 89.40465 0.5797568

1:T10-1:T5 8.102183e+01 43.94465303 118.09900 0.0000000

1:T12-1:T5 8.625049e+01 47.36362318 125.13736 0.0000000

1:T11-1:T5 8.730442e+01 50.22725103 124.38160 0.0000000

2:T10-1:T5 8.847555e+01 52.74709196 124.20401 0.0000000

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1:T1-1:T5 9.041757e+01 53.34039955 127.49475 0.0000000

2:T1-1:T5 9.041757e+01 54.68911466 126.14603 0.0000000

2:T12-1:T5 9.272616e+01 56.99770573 128.45462 0.0000000

2:T4-2:T6 4.584000e-01 -33.86839229 34.78519 1.0000000

1:T7-2:T6 3.372584e+00 -32.35587399 39.10104 1.0000000

2:T5-2:T6 5.802155e+00 -28.52463739 40.12895 1.0000000

1:T4-2:T6 1.075196e+01 -24.97649798 46.48042 0.9999819

2:T7-2:T6 1.147072e+01 -22.85607385 45.79751 0.9998921

1:T3-2:T6 1.530079e+01 -20.42767104 51.02925 0.9955725

1:T8-2:T6 2.180100e+01 -13.92745984 57.52946 0.8240580

2:T8-2:T6 2.807009e+01 -7.65836845 63.79855 0.3600027

1:T9-2:T6 2.889588e+01 -22.59431157 80.38607 0.9104350

1:T2-2:T6 3.470802e+01 -1.02044041 70.43648 0.0684571

2:T9-2:T6 3.612432e+01 -15.36586796 87.61451 0.5896278

1:T10-2:T6 8.017653e+01 44.44807628 115.90499 0.0000000

1:T12-2:T6 8.540520e+01 47.80208181 123.00832 0.0000000

1:T11-2:T6 8.645913e+01 50.73067427 122.18759 0.0000000

2:T10-2:T6 8.763026e+01 53.30346598 121.95705 0.0000000

2:T11-2:T6 8.795753e+01 53.63074175 122.28433 0.0000000

1:T1-2:T6 8.957228e+01 53.84382279 125.30074 0.0000000

2:T1-2:T6 8.957228e+01 55.24548869 123.89907 0.0000000

2:T12-2:T6 9.188087e+01 57.55407976 126.20766 0.0000000

1:T7-2:T4 2.914184e+00 -32.81427401 38.64264 1.0000000

2:T5-2:T4 5.343755e+00 -28.98303742 39.67055 1.0000000

1:T4-2:T4 1.029356e+01 -25.43489800 46.02202 0.9999917

2:T7-2:T4 1.101232e+01 -23.31447387 45.33911 0.9999454

1:T3-2:T4 1.484239e+01 -20.88607106 50.57085 0.9970647

1:T8-2:T4 2.134260e+01 -14.38585986 57.07106 0.8499942

2:T8-2:T4 2.761169e+01 -8.11676847 63.34015 0.3925769

1:T9-2:T4 2.843748e+01 -23.05271160 79.92767 0.9223909

1:T2-2:T4 3.424962e+01 -1.47884043 69.97808 0.0784735

2:T9-2:T4 3.566592e+01 -15.82426798 87.15611 0.6147976

1:T10-2:T4 7.971813e+01 43.98967625 115.44659 0.0000000

1:T12-2:T4 8.494680e+01 47.34368179 122.54992 0.0000000

1:T11-2:T4 8.600073e+01 50.27227425 121.72919 0.0000000

2:T10-2:T4 8.717186e+01 52.84506596 121.49865 0.0000000

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1:T1-2:T4 8.911388e+01 53.38542276 124.84234 0.0000000

2:T1-2:T4 8.911388e+01 54.78708867 123.44067 0.0000000

2:T12-2:T4 9.142247e+01 57.09567973 125.74926 0.0000000

2:T5-1:T7 2.429571e+00 -33.29888752 38.15803 1.0000000

1:T4-1:T7 7.379376e+00 -29.69779732 44.45655 1.0000000

2:T7-1:T7 8.098134e+00 -27.63032397 43.82659 0.9999999

1:T3-1:T7 1.192820e+01 -25.14897038 49.00538 0.9999428

1:T8-1:T7 1.842841e+01 -18.64875918 55.50559 0.9730230

2:T8-1:T7 2.469751e+01 -12.37966779 61.77468 0.6881721

1:T9-1:T7 2.552329e+01 -26.91174871 77.95833 0.9786039

1:T2-1:T7 3.133543e+01 -5.74173975 68.41261 0.2290590

2:T9-1:T7 3.275174e+01 -19.68330509 85.18678 0.7922868

1:T10-1:T7 7.680395e+01 39.72677693 113.88112 0.0000000

1:T12-1:T7 8.203261e+01 43.14574708 120.91948 0.0000000

1:T11-1:T7 8.308655e+01 46.00937493 120.16372 0.0000000

2:T10-1:T7 8.425767e+01 48.52921586 119.98613 0.0000000

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1:T1-1:T7 8.619970e+01 49.12252344 123.27687 0.0000000

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2:T12-1:T7 8.850829e+01 52.77982963 124.23675 0.0000000

1:T4-2:T5 4.949805e+00 -30.77865290 40.67826 1.0000000

2:T7-2:T5 5.668564e+00 -28.65822877 39.99536 1.0000000

1:T3-2:T5 9.498632e+00 -26.22982596 45.22709 0.9999981

1:T8-2:T5 1.599884e+01 -19.72961476 51.72730 0.9921086

2:T8-2:T5 2.226793e+01 -13.46052337 57.99639 0.7953939

1:T9-2:T5 2.309372e+01 -28.39646649 74.58391 0.9919478

1:T2-2:T5 2.890586e+01 -6.82259533 64.63432 0.3043169

2:T9-2:T5 3.032217e+01 -21.16802288 81.81235 0.8658425

1:T10-2:T5 7.437438e+01 38.64592136 110.10284 0.0000000

1:T12-2:T5 7.960304e+01 41.99992689 117.20616 0.0000000

1:T11-2:T5 8.065698e+01 44.92851935 116.38544 0.0000000

2:T10-2:T5 8.182810e+01 47.50131106 116.15490 0.0000000

2:T11-2:T5 8.215538e+01 47.82858683 116.48217 0.0000000

1:T1-2:T5 8.377013e+01 48.04166787 119.49858 0.0000000

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2:T12-2:T5 8.607872e+01 51.75192484 120.40551 0.0000000

2:T7-1:T4 7.187582e-01 -35.00969998 36.44722 1.0000000

1:T3-1:T4 4.548827e+00 -32.52834639 41.62600 1.0000000

1:T8-1:T4 1.104904e+01 -26.02813519 48.12621 0.9999848

2:T8-1:T4 1.731813e+01 -19.75904380 54.39530 0.9867507

1:T9-1:T4 1.814392e+01 -34.29112472 70.57896 0.9998095

1:T2-1:T4 2.395606e+01 -13.12111576 61.03323 0.7404093

2:T9-1:T4 2.537236e+01 -27.06268110 77.80740 0.9799939

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1:T12-1:T4 7.465324e+01 35.76637107 113.54011 0.0000000

1:T11-1:T4 7.570717e+01 38.62999892 112.78435 0.0000000

2:T10-1:T4 7.687830e+01 41.14983985 112.60676 0.0000000

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1:T1-1:T4 7.882032e+01 41.74314744 115.89749 0.0000000

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2:T12-1:T4 8.112891e+01 45.40045362 116.85737 0.0000000

1:T3-2:T7 3.830069e+00 -31.89838951 39.55853 1.0000000

1:T8-2:T7 1.033028e+01 -25.39817830 46.05874 0.9999911

2:T8-2:T7 1.659937e+01 -19.12908691 52.32783 0.9875718

1:T9-2:T7 1.742516e+01 -34.06503004 68.91535 0.9998672

1:T2-2:T7 2.323730e+01 -12.49115887 58.96576 0.7295325

2:T9-2:T7 2.465360e+01 -26.83658642 76.14379 0.9822731

1:T10-2:T7 6.870582e+01 32.97735781 104.43427 0.0000000

1:T12-2:T7 7.393448e+01 36.33136334 111.53760 0.0000000

1:T11-2:T7 7.498841e+01 39.25995580 110.71687 0.0000000

2:T10-2:T7 7.615954e+01 41.83274752 110.48633 0.0000000

2:T11-2:T7 7.648682e+01 42.16002328 110.81361 0.0000000

1:T1-2:T7 7.810156e+01 42.37310432 113.83002 0.0000000

2:T1-2:T7 7.810156e+01 43.77477022 112.42835 0.0000000

2:T12-2:T7 8.041015e+01 46.08336129 114.73695 0.0000000

1:T8-1:T3 6.500211e+00 -30.57696213 43.57738 1.0000000

2:T8-1:T3 1.276930e+01 -24.30787074 49.84648 0.9998234

1:T9-1:T3 1.359509e+01 -38.83995165 66.03013 0.9999988

1:T2-1:T3 1.940723e+01 -17.66994270 56.48440 0.9535780

2:T9-1:T3 2.082353e+01 -31.61150804 73.25857 0.9984411

1:T10-1:T3 6.487575e+01 27.79857399 101.95292 0.0000005

1:T12-1:T3 7.010441e+01 31.21754413 108.99128 0.0000002

1:T11-1:T3 7.115835e+01 34.08117198 108.23552 0.0000000

2:T10-1:T3 7.232947e+01 36.60101291 108.05793 0.0000000

2:T11-1:T3 7.265675e+01 36.92828867 108.38521 0.0000000

1:T1-1:T3 7.427149e+01 37.19432050 111.34867 0.0000000

2:T1-1:T3 7.427149e+01 38.54303562 109.99995 0.0000000

2:T12-1:T3 7.658008e+01 40.85162668 112.30854 0.0000000

2:T8-1:T8 6.269091e+00 -30.80808194 43.34626 1.0000000

1:T9-1:T8 7.094879e+00 -45.34016286 59.52992 1.0000000

1:T2-1:T8 1.290702e+01 -24.17015390 49.98419 0.9997902

2:T9-1:T8 1.432332e+01 -38.11171924 66.75836 0.9999968

1:T10-1:T8 5.837554e+01 21.29836278 95.45271 0.0000107

1:T12-1:T8 6.360420e+01 24.71733293 102.49107 0.0000037

1:T11-1:T8 6.465813e+01 27.58096078 101.73531 0.0000005

2:T10-1:T8 6.582926e+01 30.10080171 101.55772 0.0000001

2:T11-1:T8 6.615654e+01 30.42807747 101.88499 0.0000001

1:T1-1:T8 6.777128e+01 30.69410930 104.84846 0.0000001

2:T1-1:T8 6.777128e+01 32.04282441 103.49974 0.0000000

2:T12-1:T8 7.007987e+01 34.35141548 105.80833 0.0000000

1:T9-2:T8 8.257871e-01 -51.60925425 53.26083 1.0000000

1:T2-2:T8 6.637928e+00 -30.43924529 43.71510 1.0000000

2:T9-2:T8 8.054231e+00 -44.38081063 60.48927 1.0000000

1:T10-2:T8 5.210644e+01 15.02927139 89.18362 0.0001786

1:T12-2:T8 5.733511e+01 18.44824154 96.22198 0.0000580

1:T11-2:T8 5.838904e+01 21.31186939 95.46622 0.0000106

2:T10-2:T8 5.956017e+01 23.83171032 95.28863 0.0000021

2:T11-2:T8 5.988744e+01 24.15898608 95.61590 0.0000018

1:T1-2:T8 6.150219e+01 24.42501791 98.57936 0.0000024

2:T1-2:T8 6.150219e+01 25.77373302 97.23065 0.0000008

2:T12-2:T8 6.381078e+01 28.08232409 99.53924 0.0000002

1:T2-1:T9 5.812141e+00 -46.62290047 58.24718 1.0000000

2:T9-1:T9 7.228444e+00 -56.99110439 71.44799 1.0000000

1:T10-1:T9 5.128066e+01 -1.15438379 103.71570 0.0637795

1:T12-1:T9 5.650932e+01 2.77939312 110.23925 0.0273623

1:T11-1:T9 5.756326e+01 5.12821421 109.99830 0.0154610

2:T10-1:T9 5.873438e+01 7.24419293 110.22457 0.0088512

2:T11-1:T9 5.906166e+01 7.57146869 110.55185 0.0081324

1:T1-1:T9 6.067640e+01 8.24136273 113.11145 0.0070984

2:T1-1:T9 6.067640e+01 9.18621564 112.16659 0.0053154

2:T12-1:T9 6.298500e+01 11.49480670 114.47518 0.0028359

2:T9-1:T2 1.416303e+00 -51.01873867 53.85134 1.0000000

1:T10-1:T2 4.546852e+01 8.39134335 82.54569 0.0027139

1:T12-1:T2 5.069718e+01 11.81031350 89.58405 0.0008693

1:T11-1:T2 5.175111e+01 14.67394135 88.82829 0.0002081

2:T10-1:T2 5.292224e+01 17.19378228 88.65070 0.0000518

2:T11-1:T2 5.324952e+01 17.52105804 88.97797 0.0000444

1:T1-1:T2 5.486426e+01 17.78708987 91.94144 0.0000531

2:T1-1:T2 5.486426e+01 19.13580498 90.59272 0.0000208

2:T12-1:T2 5.717285e+01 21.44439605 92.90131 0.0000068

1:T10-2:T9 4.405221e+01 -8.38282740 96.48726 0.2386908

1:T12-2:T9 4.928088e+01 -4.44905049 103.01081 0.1194740

1:T11-2:T9 5.033481e+01 -2.10022941 102.76985 0.0773751

2:T10-2:T9 5.150594e+01 0.01574932 102.99613 0.0498283

2:T11-2:T9 5.183321e+01 0.34302508 103.32340 0.0463756

1:T1-2:T9 5.344796e+01 1.01291911 105.88300 0.0401185

2:T1-2:T9 5.344796e+01 1.95777202 104.93815 0.0322325

2:T12-2:T9 5.575655e+01 4.26636309 107.24674 0.0186677

1:T12-1:T10 5.228664e+00 -33.65820318 44.11553 1.0000000

1:T11-1:T10 6.282598e+00 -30.79457534 43.35977 1.0000000

2:T10-1:T10 7.453724e+00 -28.27473441 43.18218 1.0000000

2:T11-1:T10 7.781000e+00 -27.94745864 43.50946 1.0000000

1:T1-1:T10 9.395747e+00 -27.68142682 46.47292 0.9999992

2:T1-1:T10 9.395747e+00 -26.33271170 45.12420 0.9999984

2:T12-1:T10 1.170434e+01 -24.02412063 47.43280 0.9999224

1:T11-1:T12 1.053934e+00 -37.83293373 39.94080 1.0000000

2:T10-1:T12 2.225060e+00 -35.37805742 39.82818 1.0000000

2:T11-1:T12 2.552335e+00 -35.05078166 40.15545 1.0000000

1:T1-1:T12 4.167082e+00 -34.71978521 43.05395 1.0000000

2:T1-1:T12 4.167082e+00 -33.43603471 41.77020 1.0000000

2:T12-1:T12 6.475673e+00 -31.12744364 44.07879 1.0000000

2:T10-1:T11 1.171126e+00 -34.55733240 36.89958 1.0000000

2:T11-1:T11 1.498402e+00 -34.23005664 37.22686 1.0000000

1:T1-1:T11 3.113149e+00 -33.96402481 40.19032 1.0000000

2:T1-1:T11 3.113149e+00 -32.61530970 38.84161 1.0000000

2:T12-1:T11 5.421740e+00 -30.30671863 41.15020 1.0000000

2:T11-2:T10 3.272758e-01 -33.99951655 34.65407 1.0000000

1:T1-2:T10 1.942023e+00 -33.78643551 37.67048 1.0000000

2:T1-2:T10 1.942023e+00 -32.38476961 36.26882 1.0000000

2:T12-2:T10 4.250614e+00 -30.07617854 38.57741 1.0000000

1:T1-2:T11 1.614747e+00 -34.11371127 37.34321 1.0000000

2:T1-2:T11 1.614747e+00 -32.71204537 35.94154 1.0000000

2:T12-2:T11 3.923338e+00 -30.40345430 38.25013 1.0000000

2:T1-1:T1 1.705303e-13 -35.72845821 35.72846 1.0000000

2:T12-1:T1 2.308591e+00 -33.41986714 38.03705 1.0000000

2:T12-2:T1 2.308591e+00 -32.01820124 36.63538 1.0000000

> TukeyHSD(d,which=c("factor(Group)","factor(Group):contrasts"),ordered=TRUE)

Tukey multiple comparisons of means

95% family-wise confidence level

factor levels have been ordered

Fit: aov(formula = repdat ~ factor(Group) \* contrasts, data = mydata.pulse)

$`factor(Group)`

diff lwr upr p adj

1-2 5.16087 -4.163599 14.48534 0.2757873

$`factor(Group):contrasts`

diff lwr upr p adj

2:T4-1:T2 2.952381e+00 -62.1264435 68.03121 1.0000000

1:T3-1:T2 3.333333e+00 -64.2021545 70.86882 1.0000000

2:T5-1:T2 4.095238e+00 -60.9835864 69.17406 1.0000000

2:T3-1:T2 4.095238e+00 -60.9835864 69.17406 1.0000000

2:T6-1:T2 4.095238e+00 -60.9835864 69.17406 1.0000000

1:T5-1:T2 4.666667e+00 -62.8688212 72.20215 1.0000000

1:T8-1:T2 5.333333e+00 -62.2021545 72.86882 1.0000000

1:T6-1:T2 6.000000e+00 -61.5354878 73.53549 1.0000000

1:T4-1:T2 6.000000e+00 -61.5354878 73.53549 1.0000000

1:T7-1:T2 6.000000e+00 -61.5354878 73.53549 1.0000000

2:T7-1:T2 6.095238e+00 -58.9835864 71.17406 1.0000000

2:T2-1:T2 6.380952e+00 -58.6978721 71.45978 1.0000000

2:T8-1:T2 8.000000e+00 -59.5354878 75.53549 1.0000000

1:T12-1:T2 8.666667e+00 -58.8688212 76.20215 1.0000000

2:T10-1:T2 9.809524e+00 -55.2693006 74.88835 1.0000000

2:T11-1:T2 1.038095e+01 -54.6978721 75.45978 1.0000000

1:T1-1:T2 1.133333e+01 -56.2021545 78.86882 1.0000000

2:T12-1:T2 1.209524e+01 -52.9835864 77.17406 1.0000000

2:T13-1:T2 1.266667e+01 -52.4121578 77.74549 1.0000000

2:T14-1:T2 1.323810e+01 -51.8407292 78.31692 1.0000000

1:T10-1:T2 1.333333e+01 -54.2021545 80.86882 1.0000000

2:T1-1:T2 1.352381e+01 -51.5550149 78.60263 1.0000000

1:T11-1:T2 1.400000e+01 -53.5354878 81.53549 1.0000000

1:T9-1:T2 1.466667e+01 -80.8429362 110.17627 1.0000000

2:T9-1:T2 1.466667e+01 -80.8429362 110.17627 1.0000000

1:T14-1:T2 1.733333e+01 -50.2021545 84.86882 0.9999999

1:T13-1:T2 8.000000e+01 12.4645122 147.53549 0.0043325

1:T3-2:T4 3.809524e-01 -64.6978721 65.45978 1.0000000

2:T5-2:T4 1.142857e+00 -61.3828549 63.66857 1.0000000

2:T3-2:T4 1.142857e+00 -61.3828549 63.66857 1.0000000

2:T6-2:T4 1.142857e+00 -61.3828549 63.66857 1.0000000

1:T5-2:T4 1.714286e+00 -63.3645387 66.79311 1.0000000

1:T8-2:T4 2.380952e+00 -62.6978721 67.45978 1.0000000

1:T6-2:T4 3.047619e+00 -62.0312054 68.12644 1.0000000

1:T4-2:T4 3.047619e+00 -62.0312054 68.12644 1.0000000

1:T7-2:T4 3.047619e+00 -62.0312054 68.12644 1.0000000

2:T7-2:T4 3.142857e+00 -59.3828549 65.66857 1.0000000

2:T2-2:T4 3.428571e+00 -59.0971406 65.95428 1.0000000

2:T8-2:T4 5.047619e+00 -60.0312054 70.12644 1.0000000

1:T12-2:T4 5.714286e+00 -59.3645387 70.79311 1.0000000

2:T10-2:T4 6.857143e+00 -55.6685692 69.38285 1.0000000

2:T11-2:T4 7.428571e+00 -55.0971406 69.95428 1.0000000

1:T1-2:T4 8.380952e+00 -56.6978721 73.45978 1.0000000

2:T12-2:T4 9.142857e+00 -53.3828549 71.66857 1.0000000

2:T13-2:T4 9.714286e+00 -52.8114264 72.24000 1.0000000

2:T14-2:T4 1.028571e+01 -52.2399978 72.81143 1.0000000

1:T10-2:T4 1.038095e+01 -54.6978721 75.45978 1.0000000

2:T1-2:T4 1.057143e+01 -51.9542835 73.09714 1.0000000

1:T11-2:T4 1.104762e+01 -54.0312054 76.12644 1.0000000

1:T9-2:T4 1.171429e+01 -82.0742824 105.50285 1.0000000

2:T9-2:T4 1.171429e+01 -82.0742824 105.50285 1.0000000

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1:T13-2:T4 7.704762e+01 11.9687946 142.12644 0.0043738

2:T5-1:T3 7.619048e-01 -64.3169197 65.84073 1.0000000

2:T3-1:T3 7.619048e-01 -64.3169197 65.84073 1.0000000

2:T6-1:T3 7.619048e-01 -64.3169197 65.84073 1.0000000

1:T5-1:T3 1.333333e+00 -66.2021545 68.86882 1.0000000

1:T8-1:T3 2.000000e+00 -65.5354878 69.53549 1.0000000

1:T6-1:T3 2.666667e+00 -64.8688212 70.20215 1.0000000

1:T4-1:T3 2.666667e+00 -64.8688212 70.20215 1.0000000

1:T7-1:T3 2.666667e+00 -64.8688212 70.20215 1.0000000

2:T7-1:T3 2.761905e+00 -62.3169197 67.84073 1.0000000

2:T2-1:T3 3.047619e+00 -62.0312054 68.12644 1.0000000

2:T8-1:T3 4.666667e+00 -62.8688212 72.20215 1.0000000

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1:T11-1:T3 1.066667e+01 -56.8688212 78.20215 1.0000000

1:T9-1:T3 1.133333e+01 -84.1762695 106.84294 1.0000000

2:T9-1:T3 1.133333e+01 -84.1762695 106.84294 1.0000000

1:T14-1:T3 1.400000e+01 -53.5354878 81.53549 1.0000000

1:T13-1:T3 7.666667e+01 9.1311788 144.20215 0.0087594

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2:T6-2:T5 5.684342e-14 -62.5257121 62.52571 1.0000000

1:T5-2:T5 5.714286e-01 -64.5073959 65.65025 1.0000000

1:T8-2:T5 1.238095e+00 -63.8407292 66.31692 1.0000000

1:T6-2:T5 1.904762e+00 -63.1740626 66.98359 1.0000000

1:T4-2:T5 1.904762e+00 -63.1740626 66.98359 1.0000000

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2:T2-2:T5 2.285714e+00 -60.2399978 64.81143 1.0000000

2:T8-2:T5 3.904762e+00 -61.1740626 68.98359 1.0000000

1:T12-2:T5 4.571429e+00 -60.5073959 69.65025 1.0000000

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1:T10-2:T5 9.238095e+00 -55.8407292 74.31692 1.0000000

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1:T11-2:T5 9.904762e+00 -55.1740626 74.98359 1.0000000

1:T9-2:T5 1.057143e+01 -83.2171395 104.36000 1.0000000

2:T9-2:T5 1.057143e+01 -83.2171395 104.36000 1.0000000

1:T14-2:T5 1.323810e+01 -51.8407292 78.31692 1.0000000

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2:T6-2:T3 0.000000e+00 -62.5257121 62.52571 1.0000000

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1:T6-2:T3 1.904762e+00 -63.1740626 66.98359 1.0000000

1:T4-2:T3 1.904762e+00 -63.1740626 66.98359 1.0000000

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2:T9-2:T3 1.057143e+01 -83.2171395 104.36000 1.0000000

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2:T9-2:T6 1.057143e+01 -83.2171395 104.36000 1.0000000

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1:T8-1:T5 6.666667e-01 -66.8688212 68.20215 1.0000000

1:T6-1:T5 1.333333e+00 -66.2021545 68.86882 1.0000000

1:T4-1:T5 1.333333e+00 -66.2021545 68.86882 1.0000000

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1:T11-1:T5 9.333333e+00 -58.2021545 76.86882 1.0000000

1:T9-1:T5 1.000000e+01 -85.5096028 105.50960 1.0000000

2:T9-1:T5 1.000000e+01 -85.5096028 105.50960 1.0000000

1:T14-1:T5 1.266667e+01 -54.8688212 80.20215 1.0000000

1:T13-1:T5 7.533333e+01 7.7978455 142.86882 0.0114986

1:T6-1:T8 6.666667e-01 -66.8688212 68.20215 1.0000000

1:T4-1:T8 6.666667e-01 -66.8688212 68.20215 1.0000000

1:T7-1:T8 6.666667e-01 -66.8688212 68.20215 1.0000000

2:T7-1:T8 7.619048e-01 -64.3169197 65.84073 1.0000000

2:T2-1:T8 1.047619e+00 -64.0312054 66.12644 1.0000000

2:T8-1:T8 2.666667e+00 -64.8688212 70.20215 1.0000000

1:T12-1:T8 3.333333e+00 -64.2021545 70.86882 1.0000000

2:T10-1:T8 4.476190e+00 -60.6026340 69.55501 1.0000000

2:T11-1:T8 5.047619e+00 -60.0312054 70.12644 1.0000000

1:T1-1:T8 6.000000e+00 -61.5354878 73.53549 1.0000000

2:T12-1:T8 6.761905e+00 -58.3169197 71.84073 1.0000000

2:T13-1:T8 7.333333e+00 -57.7454911 72.41216 1.0000000

2:T14-1:T8 7.904762e+00 -57.1740626 72.98359 1.0000000

1:T10-1:T8 8.000000e+00 -59.5354878 75.53549 1.0000000

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1:T11-1:T8 8.666667e+00 -58.8688212 76.20215 1.0000000

1:T9-1:T8 9.333333e+00 -86.1762695 104.84294 1.0000000

2:T9-1:T8 9.333333e+00 -86.1762695 104.84294 1.0000000

1:T14-1:T8 1.200000e+01 -55.5354878 79.53549 1.0000000

1:T13-1:T8 7.466667e+01 7.1311788 142.20215 0.0131463

1:T4-1:T6 3.552714e-14 -67.5354878 67.53549 1.0000000

1:T7-1:T6 3.552714e-14 -67.5354878 67.53549 1.0000000

2:T7-1:T6 9.523810e-02 -64.9835864 65.17406 1.0000000

2:T2-1:T6 3.809524e-01 -64.6978721 65.45978 1.0000000

2:T8-1:T6 2.000000e+00 -65.5354878 69.53549 1.0000000

1:T12-1:T6 2.666667e+00 -64.8688212 70.20215 1.0000000

2:T10-1:T6 3.809524e+00 -61.2693006 68.88835 1.0000000

2:T11-1:T6 4.380952e+00 -60.6978721 69.45978 1.0000000

1:T1-1:T6 5.333333e+00 -62.2021545 72.86882 1.0000000

2:T12-1:T6 6.095238e+00 -58.9835864 71.17406 1.0000000

2:T13-1:T6 6.666667e+00 -58.4121578 71.74549 1.0000000

2:T14-1:T6 7.238095e+00 -57.8407292 72.31692 1.0000000

1:T10-1:T6 7.333333e+00 -60.2021545 74.86882 1.0000000

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1:T11-1:T6 8.000000e+00 -59.5354878 75.53549 1.0000000

1:T9-1:T6 8.666667e+00 -86.8429362 104.17627 1.0000000

2:T9-1:T6 8.666667e+00 -86.8429362 104.17627 1.0000000

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1:T13-1:T6 7.400000e+01 6.4645122 141.53549 0.0150082

1:T7-1:T4 0.000000e+00 -67.5354878 67.53549 1.0000000

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1:T9-1:T4 8.666667e+00 -86.8429362 104.17627 1.0000000

2:T9-1:T4 8.666667e+00 -86.8429362 104.17627 1.0000000

1:T14-1:T4 1.133333e+01 -56.2021545 78.86882 1.0000000

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2:T7-1:T7 9.523810e-02 -64.9835864 65.17406 1.0000000

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2:T8-1:T7 2.000000e+00 -65.5354878 69.53549 1.0000000

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2:T10-1:T7 3.809524e+00 -61.2693006 68.88835 1.0000000

2:T11-1:T7 4.380952e+00 -60.6978721 69.45978 1.0000000

1:T1-1:T7 5.333333e+00 -62.2021545 72.86882 1.0000000

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1:T9-1:T7 8.666667e+00 -86.8429362 104.17627 1.0000000

2:T9-1:T7 8.666667e+00 -86.8429362 104.17627 1.0000000

1:T14-1:T7 1.133333e+01 -56.2021545 78.86882 1.0000000

1:T13-1:T7 7.400000e+01 6.4645122 141.53549 0.0150082

2:T2-2:T7 2.857143e-01 -62.2399978 62.81143 1.0000000

2:T8-2:T7 1.904762e+00 -63.1740626 66.98359 1.0000000

1:T12-2:T7 2.571429e+00 -62.5073959 67.65025 1.0000000

2:T10-2:T7 3.714286e+00 -58.8114264 66.24000 1.0000000

2:T11-2:T7 4.285714e+00 -58.2399978 66.81143 1.0000000

1:T1-2:T7 5.238095e+00 -59.8407292 70.31692 1.0000000

2:T12-2:T7 6.000000e+00 -56.5257121 68.52571 1.0000000

2:T13-2:T7 6.571429e+00 -55.9542835 69.09714 1.0000000

2:T14-2:T7 7.142857e+00 -55.3828549 69.66857 1.0000000

1:T10-2:T7 7.238095e+00 -57.8407292 72.31692 1.0000000

2:T1-2:T7 7.428571e+00 -55.0971406 69.95428 1.0000000

1:T11-2:T7 7.904762e+00 -57.1740626 72.98359 1.0000000

1:T9-2:T7 8.571429e+00 -85.2171395 102.36000 1.0000000

2:T9-2:T7 8.571429e+00 -85.2171395 102.36000 1.0000000

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2:T8-2:T2 1.619048e+00 -63.4597768 66.69787 1.0000000

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1:T1-2:T2 4.952381e+00 -60.1264435 70.03121 1.0000000

2:T12-2:T2 5.714286e+00 -56.8114264 68.24000 1.0000000

2:T13-2:T2 6.285714e+00 -56.2399978 68.81143 1.0000000

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1:T10-2:T2 6.952381e+00 -58.1264435 72.03121 1.0000000

2:T1-2:T2 7.142857e+00 -55.3828549 69.66857 1.0000000

1:T11-2:T2 7.619048e+00 -57.4597768 72.69787 1.0000000

1:T9-2:T2 8.285714e+00 -85.5028538 102.07428 1.0000000

2:T9-2:T2 8.285714e+00 -85.5028538 102.07428 1.0000000

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2:T10-2:T8 1.809524e+00 -63.2693006 66.88835 1.0000000

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1:T1-2:T8 3.333333e+00 -64.2021545 70.86882 1.0000000

2:T12-2:T8 4.095238e+00 -60.9835864 69.17406 1.0000000

2:T13-2:T8 4.666667e+00 -60.4121578 69.74549 1.0000000

2:T14-2:T8 5.238095e+00 -59.8407292 70.31692 1.0000000

1:T10-2:T8 5.333333e+00 -62.2021545 72.86882 1.0000000

2:T1-2:T8 5.523810e+00 -59.5550149 70.60263 1.0000000

1:T11-2:T8 6.000000e+00 -61.5354878 73.53549 1.0000000

1:T9-2:T8 6.666667e+00 -88.8429362 102.17627 1.0000000

2:T9-2:T8 6.666667e+00 -88.8429362 102.17627 1.0000000

1:T14-2:T8 9.333333e+00 -58.2021545 76.86882 1.0000000

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2:T10-1:T12 1.142857e+00 -63.9359673 66.22168 1.0000000

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1:T1-1:T12 2.666667e+00 -64.8688212 70.20215 1.0000000

2:T12-1:T12 3.428571e+00 -61.6502530 68.50740 1.0000000

2:T13-1:T12 4.000000e+00 -61.0788245 69.07882 1.0000000

2:T14-1:T12 4.571429e+00 -60.5073959 69.65025 1.0000000

1:T10-1:T12 4.666667e+00 -62.8688212 72.20215 1.0000000

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1:T9-1:T12 6.000000e+00 -89.5096028 101.50960 1.0000000

2:T9-1:T12 6.000000e+00 -89.5096028 101.50960 1.0000000

1:T14-1:T12 8.666667e+00 -58.8688212 76.20215 1.0000000

1:T13-1:T12 7.133333e+01 3.7978455 138.86882 0.0251124

2:T11-2:T10 5.714286e-01 -61.9542835 63.09714 1.0000000

1:T1-2:T10 1.523810e+00 -63.5550149 66.60263 1.0000000

2:T12-2:T10 2.285714e+00 -60.2399978 64.81143 1.0000000

2:T13-2:T10 2.857143e+00 -59.6685692 65.38285 1.0000000

2:T14-2:T10 3.428571e+00 -59.0971406 65.95428 1.0000000

1:T10-2:T10 3.523810e+00 -61.5550149 68.60263 1.0000000

2:T1-2:T10 3.714286e+00 -58.8114264 66.24000 1.0000000

1:T11-2:T10 4.190476e+00 -60.8883483 69.26930 1.0000000

1:T9-2:T10 4.857143e+00 -88.9314253 98.64571 1.0000000

2:T9-2:T10 4.857143e+00 -88.9314253 98.64571 1.0000000

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1:T1-2:T11 9.523810e-01 -64.1264435 66.03121 1.0000000

2:T12-2:T11 1.714286e+00 -60.8114264 64.24000 1.0000000

2:T13-2:T11 2.285714e+00 -60.2399978 64.81143 1.0000000

2:T14-2:T11 2.857143e+00 -59.6685692 65.38285 1.0000000

1:T10-2:T11 2.952381e+00 -62.1264435 68.03121 1.0000000

2:T1-2:T11 3.142857e+00 -59.3828549 65.66857 1.0000000

1:T11-2:T11 3.619048e+00 -61.4597768 68.69787 1.0000000

1:T9-2:T11 4.285714e+00 -89.5028538 98.07428 1.0000000

2:T9-2:T11 4.285714e+00 -89.5028538 98.07428 1.0000000

1:T14-2:T11 6.952381e+00 -58.1264435 72.03121 1.0000000

1:T13-2:T11 6.961905e+01 4.5402232 134.69787 0.0211100

2:T12-1:T1 7.619048e-01 -64.3169197 65.84073 1.0000000

2:T13-1:T1 1.333333e+00 -63.7454911 66.41216 1.0000000

2:T14-1:T1 1.904762e+00 -63.1740626 66.98359 1.0000000

1:T10-1:T1 2.000000e+00 -65.5354878 69.53549 1.0000000

2:T1-1:T1 2.190476e+00 -62.8883483 67.26930 1.0000000

1:T11-1:T1 2.666667e+00 -64.8688212 70.20215 1.0000000

1:T9-1:T1 3.333333e+00 -92.1762695 98.84294 1.0000000

2:T9-1:T1 3.333333e+00 -92.1762695 98.84294 1.0000000

1:T14-1:T1 6.000000e+00 -61.5354878 73.53549 1.0000000

1:T13-1:T1 6.866667e+01 1.1311788 136.20215 0.0409620

2:T13-2:T12 5.714286e-01 -61.9542835 63.09714 1.0000000

2:T14-2:T12 1.142857e+00 -61.3828549 63.66857 1.0000000

1:T10-2:T12 1.238095e+00 -63.8407292 66.31692 1.0000000

2:T1-2:T12 1.428571e+00 -61.0971406 63.95428 1.0000000

1:T11-2:T12 1.904762e+00 -63.1740626 66.98359 1.0000000

1:T9-2:T12 2.571429e+00 -91.2171395 96.36000 1.0000000

2:T9-2:T12 2.571429e+00 -91.2171395 96.36000 1.0000000

1:T14-2:T12 5.238095e+00 -59.8407292 70.31692 1.0000000

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1:T10-2:T13 6.666667e-01 -64.4121578 65.74549 1.0000000

2:T1-2:T13 8.571429e-01 -61.6685692 63.38285 1.0000000

1:T11-2:T13 1.333333e+00 -63.7454911 66.41216 1.0000000

1:T9-2:T13 2.000000e+00 -91.7885681 95.78857 1.0000000

2:T9-2:T13 2.000000e+00 -91.7885681 95.78857 1.0000000

1:T14-2:T13 4.666667e+00 -60.4121578 69.74549 1.0000000

1:T13-2:T13 6.733333e+01 2.2545089 132.41216 0.0329239

1:T10-2:T14 9.523810e-02 -64.9835864 65.17406 1.0000000

2:T1-2:T14 2.857143e-01 -62.2399978 62.81143 1.0000000

1:T11-2:T14 7.619048e-01 -64.3169197 65.84073 1.0000000

1:T9-2:T14 1.428571e+00 -92.3599967 95.21714 1.0000000

2:T9-2:T14 1.428571e+00 -92.3599967 95.21714 1.0000000

1:T14-2:T14 4.095238e+00 -60.9835864 69.17406 1.0000000

1:T13-2:T14 6.676190e+01 1.6830803 131.84073 0.0366746

2:T1-1:T10 1.904762e-01 -64.8883483 65.26930 1.0000000

1:T11-1:T10 6.666667e-01 -66.8688212 68.20215 1.0000000

1:T9-1:T10 1.333333e+00 -94.1762695 96.84294 1.0000000

2:T9-1:T10 1.333333e+00 -94.1762695 96.84294 1.0000000

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1:T11-2:T1 4.761905e-01 -64.6026340 65.55501 1.0000000

1:T9-2:T1 1.142857e+00 -92.6457110 94.93143 1.0000000

2:T9-2:T1 1.142857e+00 -92.6457110 94.93143 1.0000000

1:T14-2:T1 3.809524e+00 -61.2693006 68.88835 1.0000000

1:T13-2:T1 6.647619e+01 1.3973660 131.55501 0.0386880

1:T9-1:T11 6.666667e-01 -94.8429362 96.17627 1.0000000

2:T9-1:T11 6.666667e-01 -94.8429362 96.17627 1.0000000

1:T14-1:T11 3.333333e+00 -64.2021545 70.86882 1.0000000

1:T13-1:T11 6.600000e+01 -1.5354878 133.53549 0.0650058

2:T9-1:T9 7.105427e-15 -116.9748962 116.97490 1.0000000

1:T14-1:T9 2.666667e+00 -92.8429362 98.17627 1.0000000

1:T13-1:T9 6.533333e+01 -30.1762695 160.84294 0.6773409

1:T14-2:T9 2.666667e+00 -92.8429362 98.17627 1.0000000

1:T13-2:T9 6.533333e+01 -30.1762695 160.84294 0.6773409

1:T13-1:T14 6.266667e+01 -4.8688212 130.20215 0.1110364

> TukeyHSD(e,which=c("factor(Group)","factor(Group):contrasts"),ordered=TRUE)

Tukey multiple comparisons of means

95% family-wise confidence level

factor levels have been ordered

Fit: aov(formula = repdat ~ factor(Group) \* contrasts, data = mydata.sap)

$`factor(Group)`

diff lwr upr p adj

1-2 9.895439 2.517238 17.27364 0.0091441

$`factor(Group):contrasts`

diff lwr upr p adj

2:T6-2:T9 1.5714286 -53.64361 56.78647 1.0000000

2:T4-2:T9 4.2857143 -50.92932 59.50075 1.0000000

2:T7-2:T9 5.0000000 -50.21504 60.21504 1.0000000

2:T8-2:T9 7.0000000 -49.22824 63.22824 1.0000000

2:T3-2:T9 10.4285714 -44.78647 65.64361 0.9999997

2:T5-2:T9 10.4285714 -44.78647 65.64361 0.9999997

1:T7-2:T9 11.5000000 -44.72824 67.72824 0.9999990

1:T8-2:T9 13.3333333 -42.89491 69.56158 0.9999912

2:T2-2:T9 14.1428571 -41.07218 69.35790 0.9999734

1:T5-2:T9 15.6666667 -40.56158 71.89491 0.9999145

1:T3-2:T9 16.6666667 -39.56158 72.89491 0.9998037

1:T4-2:T9 21.5000000 -34.72824 77.72824 0.9955307

1:T2-2:T9 23.8333333 -32.39491 80.06158 0.9865639

1:T6-2:T9 24.3333333 -31.89491 80.56158 0.9834489

1:T1-2:T9 26.1666667 -30.06158 82.39491 0.9669379

2:T1-2:T9 28.1428571 -27.07218 83.35790 0.9279126

1:T9-2:T9 34.0000000 -34.86525 102.86525 0.9444946

2:T4-2:T6 2.7142857 -34.09574 39.52431 1.0000000

2:T7-2:T6 3.4285714 -33.38145 40.23860 1.0000000

2:T8-2:T6 5.4285714 -32.88452 43.74166 1.0000000

2:T3-2:T6 8.8571429 -27.95288 45.66717 0.9999891

2:T5-2:T6 8.8571429 -27.95288 45.66717 0.9999891

1:T7-2:T6 9.9285714 -28.38452 48.24166 0.9999686

1:T8-2:T6 11.7619048 -26.55118 50.07499 0.9996890

2:T2-2:T6 12.5714286 -24.23860 49.38145 0.9988085

1:T5-2:T6 14.0952381 -24.21785 52.40833 0.9971181

1:T3-2:T6 15.0952381 -23.21785 53.40833 0.9937775

1:T4-2:T6 19.9285714 -18.38452 58.24166 0.9154014

1:T2-2:T6 22.2619048 -16.05118 60.57499 0.8155737

1:T6-2:T6 22.7619048 -15.55118 61.07499 0.7885108

1:T1-2:T6 24.5952381 -13.71785 62.90833 0.6761771

2:T1-2:T6 26.5714286 -10.23860 63.38145 0.4690445

1:T9-2:T6 32.4285714 -22.78647 87.64361 0.8028137

2:T7-2:T4 0.7142857 -36.09574 37.52431 1.0000000

2:T8-2:T4 2.7142857 -35.59880 41.02738 1.0000000

2:T3-2:T4 6.1428571 -30.66717 42.95288 1.0000000

2:T5-2:T4 6.1428571 -30.66717 42.95288 1.0000000

1:T7-2:T4 7.2142857 -31.09880 45.52738 0.9999997

1:T8-2:T4 9.0476190 -29.26547 47.36071 0.9999917

2:T2-2:T4 9.8571429 -26.95288 46.66717 0.9999505

1:T5-2:T4 11.3809524 -26.93214 49.69404 0.9997980

1:T3-2:T4 12.3809524 -25.93214 50.69404 0.9994000

1:T4-2:T4 17.2142857 -21.09880 55.52738 0.9761617

1:T2-2:T4 19.5476190 -18.76547 57.86071 0.9273312

1:T6-2:T4 20.0476190 -18.26547 58.36071 0.9114229

1:T1-2:T4 21.8809524 -16.43214 60.19404 0.8349378

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1:T9-2:T4 29.7142857 -25.50075 84.92932 0.8906681

2:T8-2:T7 2.0000000 -36.31309 40.31309 1.0000000

2:T3-2:T7 5.4285714 -31.38145 42.23860 1.0000000

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1:T7-2:T7 6.5000000 -31.81309 44.81309 0.9999999

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1:T7-2:T3 1.0714286 -37.24166 39.38452 1.0000000

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1:T8-1:T7 1.8333333 -37.92604 41.59271 1.0000000

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1:T9-1:T4 12.5000000 -43.72824 68.72824 0.9999966

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1:T1-1:T6 1.8333333 -37.92604 41.59271 1.0000000

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2:T1-1:T1 1.9761905 -36.33690 40.28928 1.0000000

1:T9-1:T1 7.8333333 -48.39491 64.06158 1.0000000

1:T9-2:T1 5.8571429 -49.35790 61.07218 1.0000000

> TukeyHSD(f,which=c("factor(Group)","factor(Group):contrasts"),ordered=TRUE)

Tukey multiple comparisons of means

95% family-wise confidence level

factor levels have been ordered

Fit: aov(formula = repdat ~ factor(Group) \* contrasts, data = mydata.resp)

$`factor(Group)`

diff lwr upr p adj

2-1 1.001087 -1.296513 3.298687 0.3905523

$`factor(Group):contrasts`

diff lwr upr p adj

2:T8-2:T9 1.333333e+00 -22.20075125 24.86742 1.0000000

2:T7-2:T9 1.714286e+00 -21.39572657 24.82430 1.0000000

1:T9-2:T9 2.000000e+00 -26.82324939 30.82325 1.0000000

1:T6-2:T9 2.166667e+00 -21.36741791 25.70075 1.0000000

1:T8-2:T9 2.166667e+00 -21.36741791 25.70075 1.0000000

2:T4-2:T9 2.857143e+00 -20.25286943 25.96716 1.0000000

2:T6-2:T9 2.857143e+00 -20.25286943 25.96716 1.0000000

1:T7-2:T9 3.333333e+00 -20.20075125 26.86742 1.0000000

1:T4-2:T9 3.333333e+00 -20.20075125 26.86742 1.0000000

1:T5-2:T9 4.000000e+00 -19.53408458 27.53408 1.0000000

2:T5-2:T9 4.000000e+00 -19.11001229 27.11001 1.0000000

2:T3-2:T9 4.571429e+00 -18.53858371 27.68144 1.0000000

1:T3-2:T9 5.666667e+00 -17.86741791 29.20075 1.0000000

2:T2-2:T9 5.714286e+00 -17.39572657 28.82430 1.0000000

1:T10-2:T9 6.000000e+00 -17.53408458 29.53408 0.9999999

1:T1-2:T9 6.666667e+00 -16.86741791 30.20075 0.9999990

1:T2-2:T9 8.666667e+00 -14.86741791 32.20075 0.9998365

2:T1-2:T9 9.142857e+00 -13.96715514 32.25287 0.9994343

1:T11-2:T9 9.333333e+00 -14.20075125 32.86742 0.9994107

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2:T14-2:T9 1.257143e+01 -10.53858371 35.68144 0.9527499

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1:T13-2:T9 1.300000e+01 -10.53408458 36.53408 0.9443823

1:T12-2:T9 1.333333e+01 -10.20075125 36.86742 0.9279849

2:T12-2:T9 1.485714e+01 -8.25286943 37.96716 0.7862510

2:T10-2:T9 1.542857e+01 -7.68144086 38.53858 0.7228241

2:T13-2:T9 1.828571e+01 -4.82429800 41.39573 0.3693145

2:T7-2:T8 3.809524e-01 -15.65482323 16.41673 1.0000000

1:T9-2:T8 6.666667e-01 -22.86741791 24.20075 1.0000000

1:T6-2:T8 8.333333e-01 -15.80777746 17.47444 1.0000000

1:T8-2:T8 8.333333e-01 -15.80777746 17.47444 1.0000000

2:T4-2:T8 1.523810e+00 -14.51196608 17.55959 1.0000000

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1:T7-2:T8 2.000000e+00 -14.64111080 18.64111 1.0000000

1:T4-2:T8 2.000000e+00 -14.64111080 18.64111 1.0000000

1:T5-2:T8 2.666667e+00 -13.97444413 19.30778 1.0000000

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2:T3-2:T8 3.238095e+00 -12.79768037 19.27387 1.0000000

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2:T2-2:T8 4.380952e+00 -11.65482323 20.41673 0.9999996

1:T10-2:T8 4.666667e+00 -11.97444413 21.30778 0.9999992

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2:T13-2:T8 1.695238e+01 0.91660534 32.98816 0.0248184

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2:T4-2:T7 1.142857e+00 -14.26381771 16.54953 1.0000000

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1:T5-2:T7 2.285714e+00 -13.75006132 18.32149 1.0000000

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2:T10-2:T7 1.371429e+01 -1.69238914 29.12096 0.1616283

2:T13-2:T7 1.657143e+01 1.16475371 31.97810 0.0195694

1:T6-1:T9 1.666667e-01 -23.36741791 23.70075 1.0000000

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2:T10-1:T9 1.342857e+01 -9.68144086 36.53858 0.9080143

2:T13-1:T9 1.628571e+01 -6.82429800 39.39573 0.6176842

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2:T6-1:T6 6.904762e-01 -15.34529942 16.72625 1.0000000

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2:T2-1:T6 3.547619e+00 -12.48815656 19.58339 1.0000000

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1:T12-1:T6 1.116667e+01 -5.47444413 27.80778 0.7135610

2:T12-1:T6 1.269048e+01 -3.34529942 28.72625 0.3689498

2:T10-1:T6 1.326190e+01 -2.77387085 29.29768 0.2816248

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2:T12-1:T8 1.269048e+01 -3.34529942 28.72625 0.3689498

2:T10-1:T8 1.326190e+01 -2.77387085 29.29768 0.2816248

2:T13-1:T8 1.611905e+01 0.08327201 32.15482 0.0470281

2:T6-2:T4 5.329071e-15 -15.40667486 15.40667 1.0000000

1:T7-2:T4 4.761905e-01 -15.55958513 16.51197 1.0000000

1:T4-2:T4 4.761905e-01 -15.55958513 16.51197 1.0000000

1:T5-2:T4 1.142857e+00 -14.89291846 17.17863 1.0000000

2:T5-2:T4 1.142857e+00 -14.26381771 16.54953 1.0000000

2:T3-2:T4 1.714286e+00 -13.69238914 17.12096 1.0000000

1:T3-2:T4 2.809524e+00 -13.22625180 18.84530 1.0000000

2:T2-2:T4 2.857143e+00 -12.54953200 18.26382 1.0000000

1:T10-2:T4 3.142857e+00 -12.89291846 19.17863 1.0000000

1:T1-2:T4 3.809524e+00 -12.22625180 19.84530 1.0000000

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2:T1-2:T4 6.285714e+00 -9.12096057 21.69239 0.9990600

1:T11-2:T4 6.476190e+00 -9.55958513 22.51197 0.9992038

2:T11-2:T4 6.857143e+00 -8.54953200 22.26382 0.9963794

2:T14-2:T4 9.714286e+00 -5.69238914 25.12096 0.8151486

1:T14-2:T4 9.809524e+00 -6.22625180 25.84530 0.8549081

1:T13-2:T4 1.014286e+01 -5.89291846 26.17863 0.8106385

1:T12-2:T4 1.047619e+01 -5.55958513 26.51197 0.7603830

2:T12-2:T4 1.200000e+01 -3.40667486 27.40667 0.4024552

2:T10-2:T4 1.257143e+01 -2.83524629 27.97810 0.3072863

2:T13-2:T4 1.542857e+01 0.02189657 30.83525 0.0491708

1:T7-2:T6 4.761905e-01 -15.55958513 16.51197 1.0000000

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1:T5-2:T6 1.142857e+00 -14.89291846 17.17863 1.0000000

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2:T3-2:T6 1.714286e+00 -13.69238914 17.12096 1.0000000

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1:T11-2:T6 6.476190e+00 -9.55958513 22.51197 0.9992038

2:T11-2:T6 6.857143e+00 -8.54953200 22.26382 0.9963794

2:T14-2:T6 9.714286e+00 -5.69238914 25.12096 0.8151486

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1:T13-2:T6 1.014286e+01 -5.89291846 26.17863 0.8106385

1:T12-2:T6 1.047619e+01 -5.55958513 26.51197 0.7603830

2:T12-2:T6 1.200000e+01 -3.40667486 27.40667 0.4024552

2:T10-2:T6 1.257143e+01 -2.83524629 27.97810 0.3072863

2:T13-2:T6 1.542857e+01 0.02189657 30.83525 0.0491708

1:T4-1:T7 5.329071e-15 -16.64111080 16.64111 1.0000000

1:T5-1:T7 6.666667e-01 -15.97444413 17.30778 1.0000000

2:T5-1:T7 6.666667e-01 -15.36910894 16.70244 1.0000000

2:T3-1:T7 1.238095e+00 -14.79768037 17.27387 1.0000000

1:T3-1:T7 2.333333e+00 -14.30777746 18.97444 1.0000000

2:T2-1:T7 2.380952e+00 -13.65482323 18.41673 1.0000000

1:T10-1:T7 2.666667e+00 -13.97444413 19.30778 1.0000000

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1:T11-1:T7 6.000000e+00 -10.64111080 22.64111 0.9998883

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2:T14-1:T7 9.238095e+00 -6.79768037 25.27387 0.9152334

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1:T13-1:T7 9.666667e+00 -6.97444413 26.30778 0.9082834

1:T12-1:T7 1.000000e+01 -6.64111080 26.64111 0.8753252

2:T12-1:T7 1.152381e+01 -4.51196608 27.55959 0.5765881

2:T10-1:T7 1.209524e+01 -3.94053751 28.13101 0.4717702

2:T13-1:T7 1.495238e+01 -1.08339466 30.98816 0.1059271

1:T5-1:T4 6.666667e-01 -15.97444413 17.30778 1.0000000

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1:T11-1:T4 6.000000e+00 -10.64111080 22.64111 0.9998883

2:T11-1:T4 6.380952e+00 -9.65482323 22.41673 0.9993768

2:T14-1:T4 9.238095e+00 -6.79768037 25.27387 0.9152334

1:T14-1:T4 9.333333e+00 -7.30777746 25.97444 0.9349342

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1:T12-1:T4 1.000000e+01 -6.64111080 26.64111 0.8753252

2:T12-1:T4 1.152381e+01 -4.51196608 27.55959 0.5765881

2:T10-1:T4 1.209524e+01 -3.94053751 28.13101 0.4717702

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2:T5-1:T5 1.243450e-14 -16.03577561 16.03578 1.0000000

2:T3-1:T5 5.714286e-01 -15.46434704 16.60720 1.0000000

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1:T10-1:T5 2.000000e+00 -14.64111080 18.64111 1.0000000

1:T1-1:T5 2.666667e+00 -13.97444413 19.30778 1.0000000

1:T2-1:T5 4.666667e+00 -11.97444413 21.30778 0.9999992

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1:T11-1:T5 5.333333e+00 -11.30777746 21.97444 0.9999881

2:T11-1:T5 5.714286e+00 -10.32148989 21.75006 0.9999098

2:T14-1:T5 8.571429e+00 -7.46434704 24.60720 0.9610245

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1:T13-1:T5 9.000000e+00 -7.64111080 25.64111 0.9556375

1:T12-1:T5 9.333333e+00 -7.30777746 25.97444 0.9349342

2:T12-1:T5 1.085714e+01 -5.17863275 26.89292 0.6969576

2:T10-1:T5 1.142857e+01 -4.60720418 27.46435 0.5941590

2:T13-1:T5 1.428571e+01 -1.75006132 30.32149 0.1605328

2:T3-2:T5 5.714286e-01 -14.83524629 15.97810 1.0000000

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1:T11-2:T5 5.333333e+00 -10.70244227 21.36911 0.9999754

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2:T10-2:T5 1.142857e+01 -3.97810343 26.83525 0.5081129

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1:T11-2:T3 4.761905e+00 -11.27387085 20.79768 0.9999974

2:T11-2:T3 5.142857e+00 -10.26381771 20.54953 0.9999736

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2:T13-2:T3 1.371429e+01 -1.69238914 29.12096 0.1616283

2:T2-1:T3 4.761905e-02 -15.98815656 16.08339 1.0000000

1:T10-1:T3 3.333333e-01 -16.30777746 16.97444 1.0000000

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1:T2-1:T3 3.000000e+00 -13.64111080 19.64111 1.0000000

2:T1-1:T3 3.476190e+00 -12.55958513 19.51197 1.0000000

1:T11-1:T3 3.666667e+00 -12.97444413 20.30778 1.0000000

2:T11-1:T3 4.047619e+00 -11.98815656 20.08339 0.9999999

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1:T12-1:T3 7.666667e+00 -8.97444413 24.30778 0.9940463

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2:T10-1:T3 9.761905e+00 -6.27387085 25.79768 0.8607007

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1:T10-2:T2 2.857143e-01 -15.75006132 16.32149 1.0000000

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1:T2-2:T2 2.952381e+00 -13.08339466 18.98816 1.0000000

2:T1-2:T2 3.428571e+00 -11.97810343 18.83525 1.0000000

1:T11-2:T2 3.619048e+00 -12.41672799 19.65482 1.0000000

2:T11-2:T2 4.000000e+00 -11.40667486 19.40667 0.9999999

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1:T12-2:T2 7.619048e+00 -8.41672799 23.65482 0.9908907

2:T12-2:T2 9.142857e+00 -6.26381771 24.54953 0.8883904

2:T10-2:T2 9.714286e+00 -5.69238914 25.12096 0.8151486

2:T13-2:T2 1.257143e+01 -2.83524629 27.97810 0.3072863

1:T1-1:T10 6.666667e-01 -15.97444413 17.30778 1.0000000

1:T2-1:T10 2.666667e+00 -13.97444413 19.30778 1.0000000

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2:T11-1:T10 3.714286e+00 -12.32148989 19.75006 1.0000000

2:T14-1:T10 6.571429e+00 -9.46434704 22.60720 0.9989900

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1:T12-1:T10 7.333333e+00 -9.30777746 23.97444 0.9968750

2:T12-1:T10 8.857143e+00 -7.17863275 24.89292 0.9444390

2:T10-1:T10 9.428571e+00 -6.60720418 25.46435 0.8973626

2:T13-1:T10 1.228571e+01 -3.75006132 28.32149 0.4378440

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2:T1-1:T1 2.476190e+00 -13.55958513 18.51197 1.0000000

1:T11-1:T1 2.666667e+00 -13.97444413 19.30778 1.0000000

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1:T12-1:T1 6.666667e+00 -9.97444413 23.30778 0.9993029

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2:T10-1:T1 8.761905e+00 -7.27387085 24.79768 0.9504466

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2:T1-1:T2 4.761905e-01 -15.55958513 16.51197 1.0000000

1:T11-1:T2 6.666667e-01 -15.97444413 17.30778 1.0000000

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2:T10-1:T2 6.761905e+00 -9.27387085 22.79768 0.9984077

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2:T14-2:T1 3.428571e+00 -11.97810343 18.83525 1.0000000

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1:T13-2:T1 3.857143e+00 -12.17863275 19.89292 1.0000000

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2:T12-2:T1 5.714286e+00 -9.69238914 21.12096 0.9998143

2:T10-2:T1 6.285714e+00 -9.12096057 21.69239 0.9990600

2:T13-2:T1 9.142857e+00 -6.26381771 24.54953 0.8883904

2:T11-1:T11 3.809524e-01 -15.65482323 16.41673 1.0000000

2:T14-1:T11 3.238095e+00 -12.79768037 19.27387 1.0000000

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2:T10-1:T11 6.095238e+00 -9.94053751 22.13101 0.9997143

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2:T14-2:T11 2.857143e+00 -12.54953200 18.26382 1.0000000

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1:T14-2:T14 9.523810e-02 -15.94053751 16.13101 1.0000000

1:T13-2:T14 4.285714e-01 -15.60720418 16.46435 1.0000000

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2:T12-2:T14 2.285714e+00 -13.12096057 17.69239 1.0000000

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1:T13-1:T14 3.333333e-01 -16.30777746 16.97444 1.0000000

1:T12-1:T14 6.666667e-01 -15.97444413 17.30778 1.0000000

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2:T10-1:T14 2.761905e+00 -13.27387085 18.79768 1.0000000

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1:T12-1:T13 3.333333e-01 -16.30777746 16.97444 1.0000000

2:T12-1:T13 1.857143e+00 -14.17863275 17.89292 1.0000000

2:T10-1:T13 2.428571e+00 -13.60720418 18.46435 1.0000000

2:T13-1:T13 5.285714e+00 -10.75006132 21.32149 0.9999793

2:T12-1:T12 1.523810e+00 -14.51196608 17.55959 1.0000000

2:T10-1:T12 2.095238e+00 -13.94053751 18.13101 1.0000000

2:T13-1:T12 4.952381e+00 -11.08339466 20.98816 0.9999943

2:T10-2:T12 5.714286e-01 -14.83524629 15.97810 1.0000000

2:T13-2:T12 3.428571e+00 -11.97810343 18.83525 1.0000000

2:T13-2:T10 2.857143e+00 -12.54953200 18.26382 1.0000000

> TukeyHSD(g,which=c("factor(Group)","factor(Group):contrasts"),ordered=TRUE)

Tukey multiple comparisons of means

95% family-wise confidence level

factor levels have been ordered

Fit: aov(formula = repdat ~ factor(Group) \* contrasts, data = mydata.temp)

$`factor(Group)`

diff lwr upr p adj

1-2 0.4719565 0.2132502 0.7306629 0.0004281

$`factor(Group):contrasts`

diff lwr upr p adj

1:T14-2:T14 2.404762e-01 -1.565128606 2.046081 1.0000000

2:T11-2:T14 3.714286e-01 -1.363340404 2.106198 1.0000000

2:T12-2:T14 4.000000e-01 -1.334768976 2.134769 1.0000000

2:T1-2:T14 7.714286e-01 -0.963340404 2.506198 0.9964258

2:T13-2:T14 9.714286e-01 -0.763340404 2.706198 0.9359698

2:T8-2:T14 1.023810e+00 -0.781795273 2.829414 0.9273979

2:T10-2:T14 1.028571e+00 -0.706197547 2.763340 0.8892636

1:T1-2:T14 1.040476e+00 -0.765128606 2.846081 0.9150142

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2:T2-2:T14 1.242857e+00 -0.491911833 2.977626 0.5830775

2:T4-2:T14 1.271429e+00 -0.463340404 3.006198 0.5342968

2:T7-2:T14 1.271429e+00 -0.463340404 3.006198 0.5342968

2:T6-2:T14 1.314286e+00 -0.420483262 3.049055 0.4621286

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