```
##  Brand Temp Stirred emmean    SE df lower.CL upper.CL
##  name  6    yes       76.2 0.537 36     75.1     77.3
##  store 6    yes       77.3 0.537 36     76.2     78.4
##  name  23   yes       72.7 0.537 36     71.6     73.8
##  store 23   yes       66.2 0.537 36     65.1     67.3
##  name  40   yes       65.9 0.537 36     64.8     66.9
##  store 40   yes       59.1 0.537 36     58.0     60.2
##  name  6    no        79.0 0.537 36     77.9     80.1
##  store 6    no        79.5 0.537 36     78.4     80.6
##  name  23   no        76.4 0.537 36     75.3     77.5
##  store 23   no        67.5 0.537 36     66.4     68.6
##  name  40   no        70.6 0.537 36     69.5     71.6
##  store 40   no        59.0 0.537 36     57.9     60.1
##
## Confidence level used: 0.95
```

contrast	estimate	SE	df	lower.CL	upper.CL
stirred	-2.413294	0.3102781	36	-3.042567	-1.784021
branding	5.338595	0.3102781	36	4.709322	5.967868

contrast	estimate	SE	df	lower.CL	upper.CL
stirredbrand	-3.720646	0.4387996	36	-4.610573	-2.8307197
stirredstore	-1.105942	0.4387996	36	-1.995869	-0.2160151

contrast	estimate	SE	df	lower.CL	upper.CL
temp6_23	7.3151767	0.3800116	36	6.254195	8.3761584
temp6_40	14.3812861	0.3800116	36	13.320305	15.4422678
temp23_40	7.0661094	0.3800116	36	6.005128	8.1270910
temp6_rest	10.8482314	0.3290997	36	9.929394	11.7670685
temp23_rest	-0.1245337	0.3290997	36	-1.043371	0.7943034
temp40_rest	-10.7236978	0.3290997	36	-11.642535	-9.8048607

Conducting a linear contrast analysis on each of the explanatory variables reveals that there are significant differences between groups based on factors, see Appendix 1 Table 2, 3, 4, and 5 for full results.

In the first case, we contrasted the means of stirred versus not stirred. Here the difference in means is -2.41 with an upper 95% confidence limit of -3.04 and a lower 95% CI limit of -1.78. In other words, on average stirring medicine reduces dissolving time by between 3.04 and 1.78 minutes regardless of brand or temperature. When looking only at brand, name brand dissolving times were on average between 4.71 and 5.97 (95% CI) minutes slower than store brand. Since neither of the intervals contained zero we can conclude that there is a difference between brands and between the presence of stirring.

While significant for both store and name brands, stirring had more of an impact to dissolving times for name brand than it did for the store brand. Stirring reduced name brand dissolving times by 2.83 and 4.61 minutes whereas for the store brand that interval was 0.22 and 2 minutes.

A similar analysis was completed for the three levels of temperature. Completing a contrast analysis using a Bonferroni correction we found that in pairwise cases each level was significantly different from the other. The 95% confidence limits were (6.25, 8.38), (13.32, 15.44), and (6.00, 8.13) for the pair wise comparisons of $6°C$ *vs* $23°C$, $6°C$ *vs* $40°C$, and $23°C$ *vs* $40°C$, respectively. Zero did not fall in any of those ranges.

When comparing individual levels versus the remainder of the group, $23°C$ was found not to be significantly different from the rest of the levels. That confidence interval ranged from -1.04 to 0.80 minutes of dissolving time. Due to that, we do not have enough evidence to say $23°C$ is different from either $6°C$ or $40°C$.