% latex table generated in R 3.4.3 by xtable 1.8-2 package

% Thu May 03 01:19:20 2018

\begin{table}[ht]

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\begin{tabular}{rrrrr}

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& Estimate & Std. Error & t value & Pr($>$$|$t$|$)& \\

\hline

(Intercept) & 12.5397 & 4.0914 & 3.06 & 0.0024 \\

TaskSuturing & -0.7256 & 0.4176 & -1.74 & 0.0834 & .\\

Session2 & 5.4362 & 1.1104 & 4.90 & 1.64e-06 & \*\*\*\\

Session3 & 6.3456 & 1.1122 & 5.71 & 2.90e-08 & \*\*\* \\

Session4 & 7.2477 & 1.1243 & 6.45 & 4.86e-08 & \*\*\* \\

Session5 & 7.3739 & 1.1256 & 6.55 & 2.65e-10& \*\*\* \\

Scorer2 & 0.1667 & 0.3948 & 0.42 & 0.6732 &\\

Age & 0.3593 & 0.1631 & 2.20 & 0.0284 & \*\\

SexMale & 1.1418 & 0.9655 & 1.18 & 0.2380& \\

Time2SqrtMs & -0.2434 & 0.0468 & -5.20 & 3.81e-07&\*\*\*\\

Session2:SexMale & -4.2822 & 1.3254 & -3.23 & 0.0014 & \*\* \\

Session3:SexMale & -3.1344 & 1.3318 & -2.35 & 0.0193 & \*\\

Session4:SexMale & -3.3338 & 1.3377 & -2.49 & 0.0133 & \* \\

Session5:SexMale & -3.5572 & 1.3377 & -2.66 & 0.0083 &\*\*\\

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

Residual standard error: 3.419 on 286 degrees of freedom

Multiple R-squared: 0.4984, Adjusted R-squared: 0.4756

F-statistic: 21.86 on 13 and 286 DF, p-value: < 2.2e-16

After testing several combination of linear regressions for estimating score, we came up with this mode:

lm(formula = Score ~ Task + Session + Scorer + Age + Sex + Time2SqrtMs +

Session \* Sex

In this model, the score of the subjects is the response variable (dependent variable) which is estimated by task, session, scorer, age, sex and time as independent variables plus interaction between session and sex.

Here is the analysis of the result of this model:

The task in this model has no significant effect on the accuracy score, the reason is that we used a new defined parameter as suture quality. Session of microsurgery has a very strong significant effect on the accuracy score of the subject, as you can see on the linear regression model result, there is a positive increasing effect of session. It means that in each session, the accuracy score of the subject is increased significantly. We can see that if we make the 1st session as the baseline (No added point considered for session 1 to the result), in session 2 the subject will get about 5.4 points more than session 1, in session 3 compared to session 1, subject will get 6.34 more points (0.9 points more compared to the last session). And 7.24 points for session 4 and 7.37 for session 5. The jump in accuracy score from session 2 to 3 and 3 to 4 is higher than the increase of score from session 4 to 5, it means that the performance in session 4 slightly the same as the performance in the last session.

There will be no significant effect in accuracy score if the scorer 1 or scorer 2 grade the subject (Actually scorer 2 gives about 0.1 points more than scorer 1 but it’s not significant different to consider).

The age makes significant difference in accuracy score, and this effect is positive. We can infer that the older subject, or we can call them more experienced subjects get significantly more accuracy score compared to younger ones. The difference of score is about 0.35 score for increasing each year in age.

The task performance time plays an important role in accuracy of the subjects. The negative coefficient of the time shows that each seconds of delay in completing the task decreases 0.24 points from the accuracy score of the subject and this amount makes a significant effect on the overall accuracy score.

By looking at the coefficient of the interaction of gender and session, we can infer that overall performance of the male subject are lower than female subjects in each session. A male subject gets 4.2 lower score in the first session than a female subject (considering every other parameter is constant and same), this phenomenon is repeated for the other sessions, but the difference is slightly balanced for the latter sessions as you can check the difference of the coefficients.

We can conclude that the sessions, the age of the subject, the time he/she spends for the task and the interaction of gender and session make significant changes in accuracy score of the subject. This score will not be significantly affected by type of task, the person who grade them, and the gender of them.