Analysis of How Stress Patterns Define Human Experience and Performance in Dexterous Tasks

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Suchismitha Vedala

Lavanya Rao

Yashwanth Reddy Venati

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INTRODUCTION

The Microsurgery performance data represents the performance of 22 medical students in microsurgery activities. The 22 medical students or subjects in our analysis, participated in a longitudinal study regarding the relationship of sympathetic arousal and skill in learning micro-surgical tasks. The subjects had to pay five visits which we regard as sessions, lasting one hour each, in order to practice micro-surgical cutting and suturing in an inanimate simulator.A pre and post study questionnaire was also given to be completed by the subjects to know a little about their biography and anxiety.

During the main part of each session, the subjects underwent the following treatments:
1.Baseline: The subjects were relaxing for 5 min, listening to spa music. They were facially recorded by a thermal and visual camera.
2.Cutting: The subjects had to precision cutting in the inanimate simulator. They were facially recorded by a thermal and visual camera.
3.Suturing: The subjects had to perform suturing in the inanimate simulator. They were facially recorded by a thermal and visual camera.

Explicit accuracy scores per task is provided in the data. Hence, the cutting task has its own accuracy scores and so is the case with the suturing task. The perspiration values are recorded in all time frames for all subjects and sessions. The subjects were asked to fill out a NASA-TLX questionnaire after each task. he NASA-TLX instrument features five subscales measuring different aspects of the subjects' perceptions regarding task difficulty.We perform an analysis with this given data.
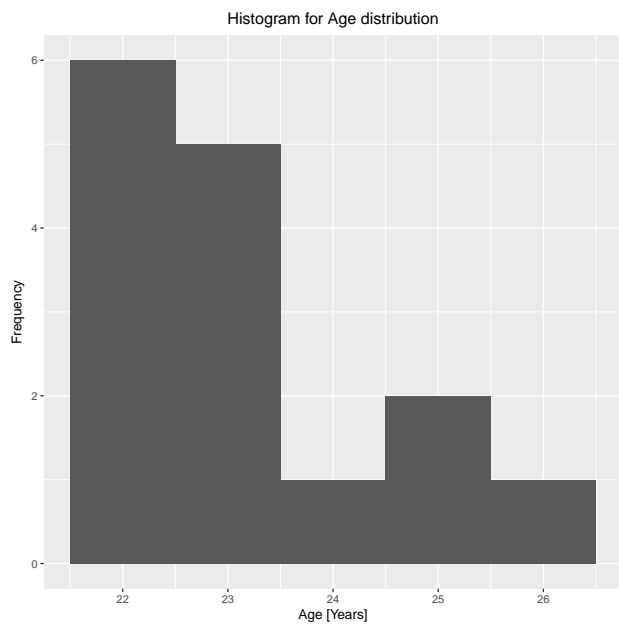
INITIAL ANALYSIS

Biographic Data

We draw a bar plot to see how gender defines data and histogram to see whether age has any effect on the data.
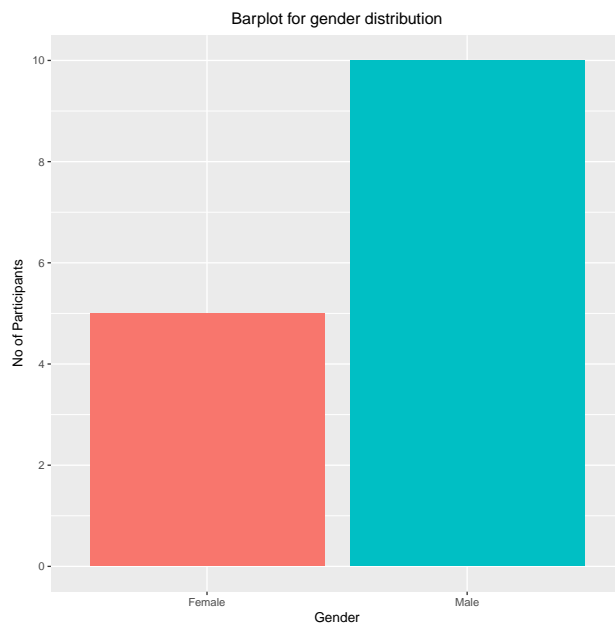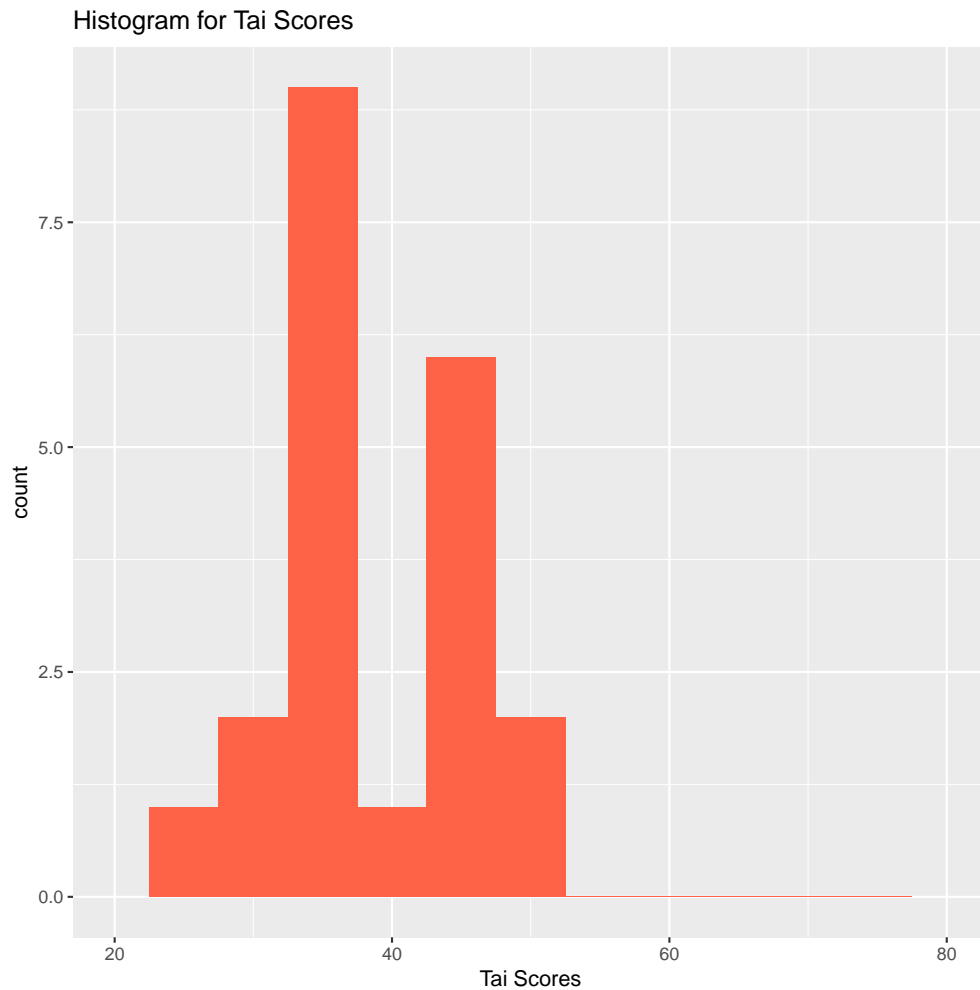

Figure 1: Barplot of Gender Distribution

Figure 2: Histogram of age distribution

Trait Psychometric Data

We draw the histogram for Trait Anxiety Inventory(TAI) scores

Figure 3: Histogram of Tai Scores

State Psychometric Data

For each subject draw the bar plots for all the NASA-TLX subscales per task. This will give two figures per subject per subscale, one for suturing and one for cutting, where the evolution of the scores from the initial to the final session will be evident.

Figure 4: Subject 1

Figure 5: Subject 2

Perinasal Perspiration (Stress) Signal Data

For each session of each subject we draw the perspiration values using black for baseline, green for cutting, and red for suturing.

Performance Data

We draw the accuracy and time bar plots of each subject for each session and each task.
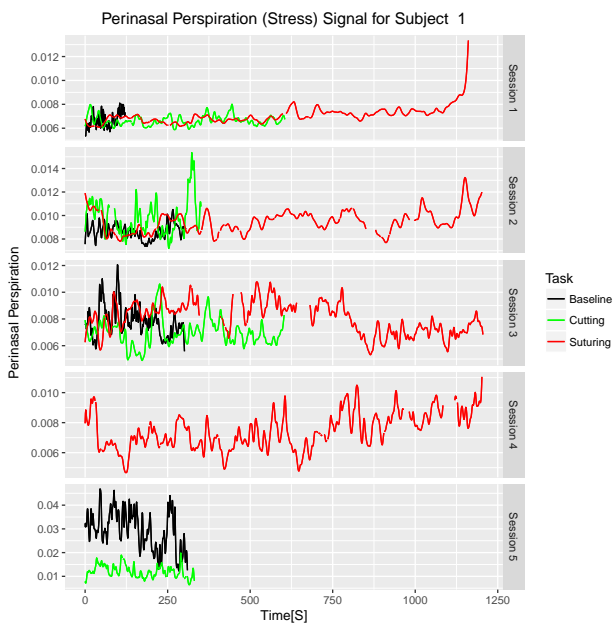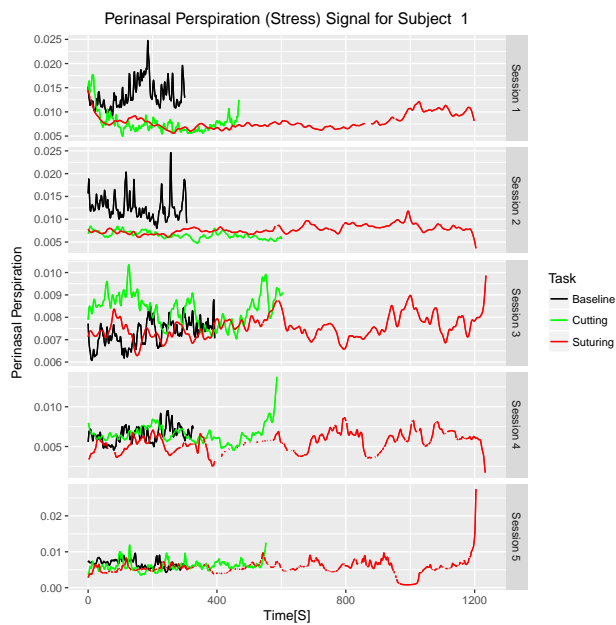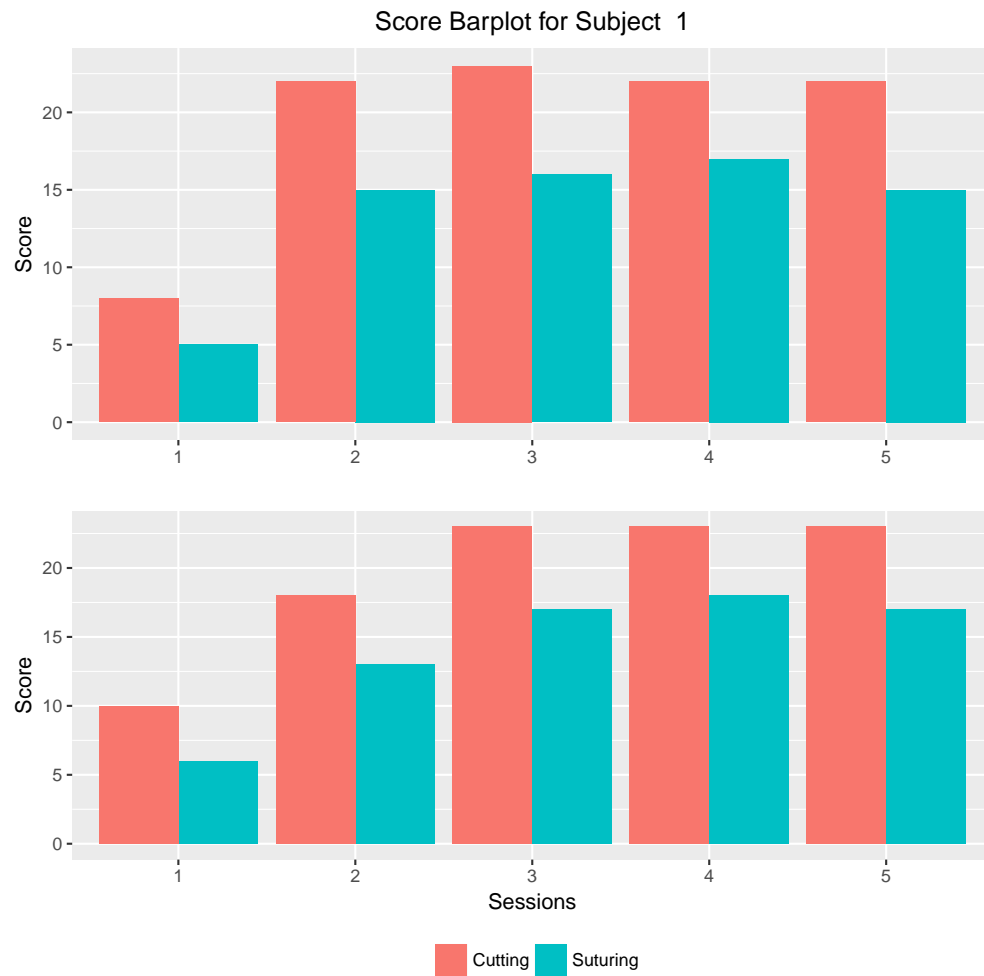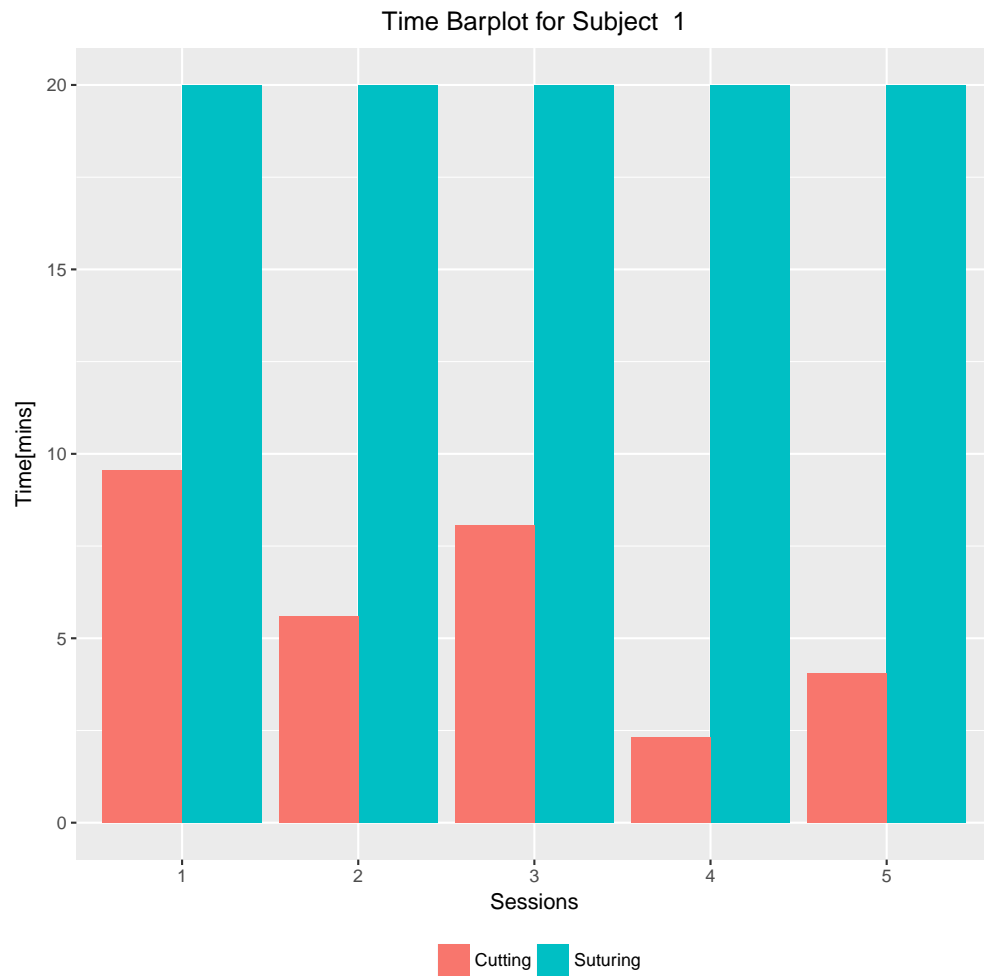
Figure 6: Subject 1

Figure 7: Subject 2

Figure 8: Subject 1 Score Barplot

Time Barplot for Subject 1

Figure 9: Subject 1 Time Barplot

CONCLUSION

APPENDIX

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