

1. OVERVIEW

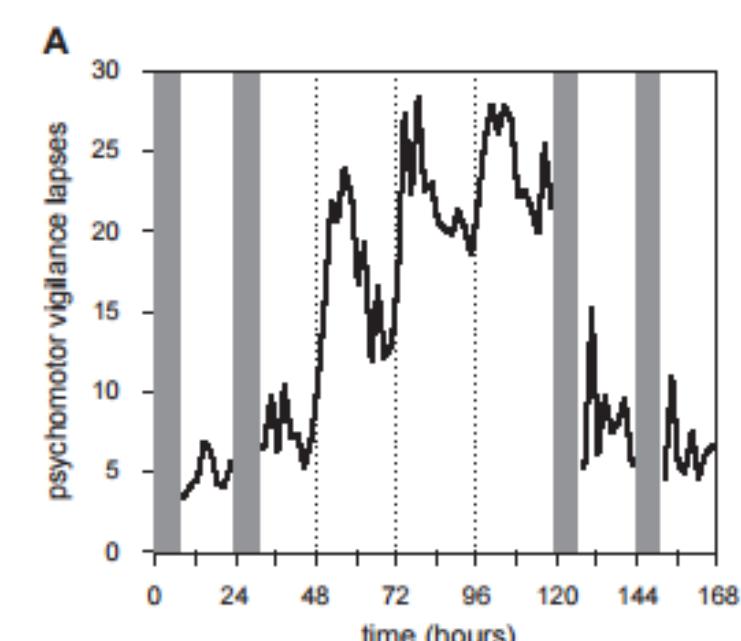
Low-cost carrier airlines reduce costs by optimizing flight crew schedules, however, changing flight rosters could have a negative impact on safety if pilot performance is compromised. Factors that affect pilot performance were studied through reviewing literature and it was found that the main two contributing causal factors to reduced performance were increased fatigue and workload. Variables that increased both these factors were chosen from the literature and predictions of their impacts on performance were made.

Using Psychomotor Vigilance Task (PVT) measurements as an indicator of performance, Generalized Linear Models (GLMs) were calibrated to assess impacts on performance. GLM calibration was conducted as an iterative process, with each new model building on findings from the previous model. 9 GLMs were calibrated, with the final model containing only statistically significant variables.

2. REVIEW ON PERFORMANCE

The Psychomotor Vigilance Task is a portable test that measures reaction time to a given auditory or visual stimulus, providing reliable assessments of psychomotor vigilance impairment. This was used as the indicator for performance.

An extensive literature review was conducted and several variables were chosen to be explored, based on previous research. These are listed below.



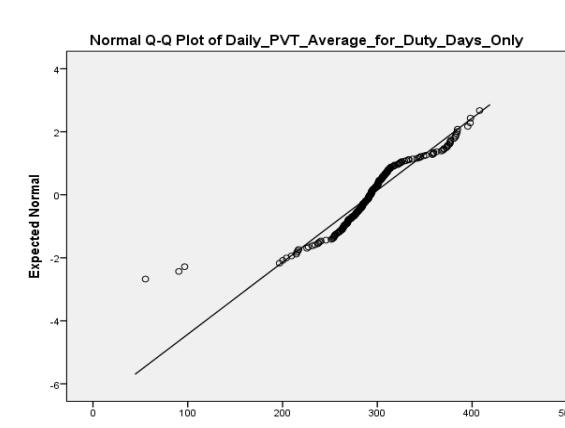
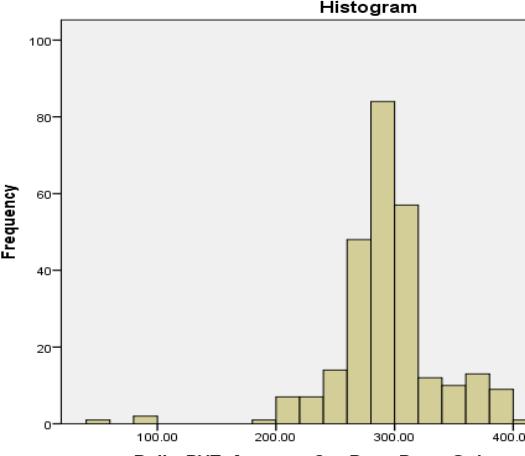
- Sleep duration
- Quality of sleep
- Start times of each day in relationship to natural circadian rhythms
- Finish times of the previous day
- Duty duration

- Duty duration of the previous day
- Sleep efficiency
- Number of sectors flown that day
- Number of sectors flown the previous day
- Number of consecutive days flown

3. DATA PREPARATION

Before any analysis could be conducted, the data had to be cleaned and prepared. This removing missing data so that it wouldn't be accounted for in aggregations and averages. The distributions of the variables also had to be checked in order to determine whether parametric or non-parametric tests would be suitable.

Using tests such as the Kolmogorov-Smirnov test and the Shapiro-Wilk test, and observing the kurtosis and skewness values of the data, along with visual observation using histograms and Q-Q plots, the normality of the dataset can be tested. Only after all this could the iterative GLM calibration process on IBM SPSS begin.



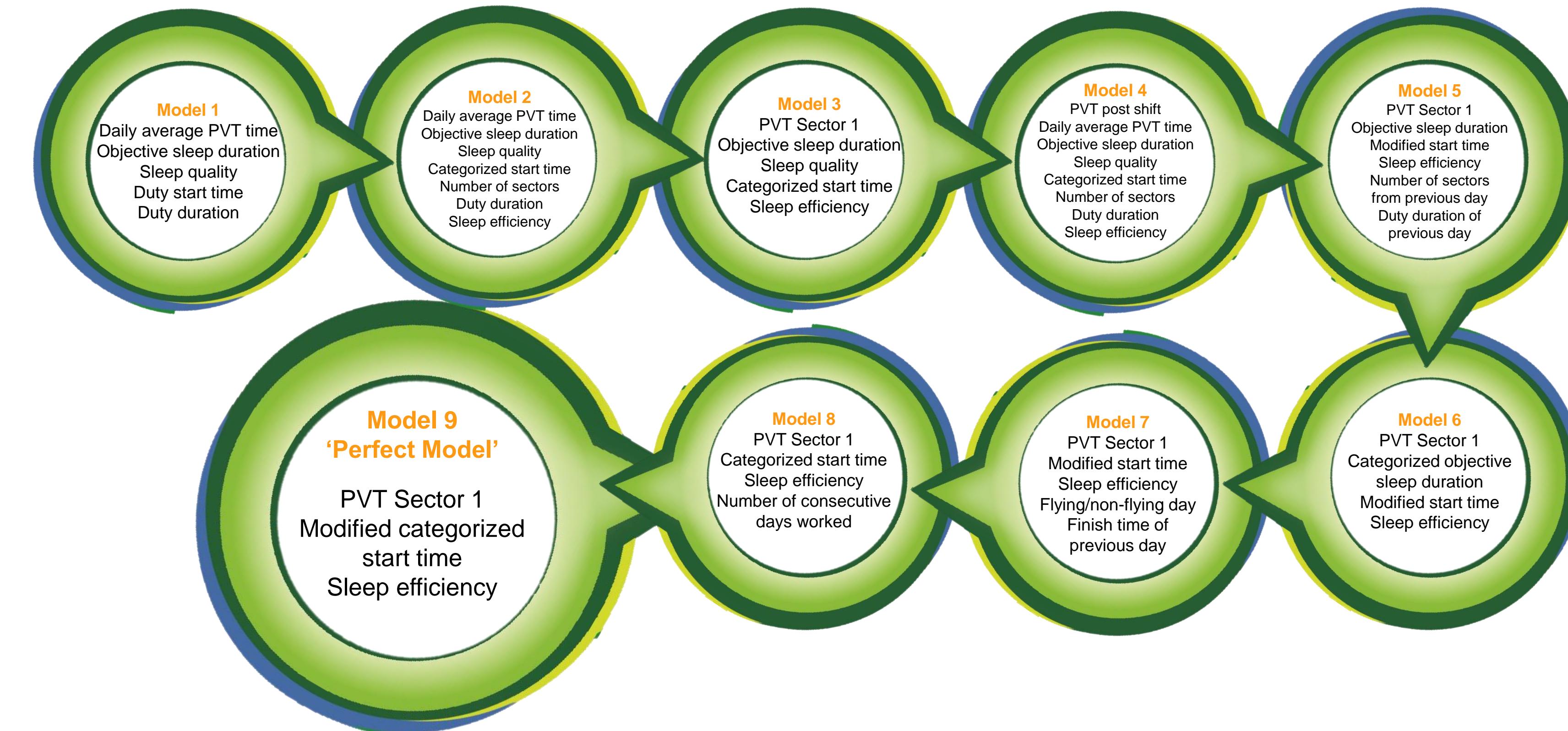
ACKNOWLEDGEMENTS

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4. GLM CALIBRATION



5. RESULTS

Factor	Prediction	Result
Sleep duration	Negative	Insignificant
Quality of sleep	Negative	Insignificant
Start time	Greater the disturbance to circadian rhythm, the higher the PVT time	After 16:00 - lowest PVT Before 08:00 – highest
Finish time of previous day	The later the finish the previous day, the higher the PVT time for current day	Insignificant
Duty duration	Positive	Insignificant
Duty duration p/d	Positive	Insignificant
Sleep efficiency	Negative	Positive – but extremely small parameter values
No. of sectors flown	Positive	Insignificant
No. of sectors p/d	Positive	Insignificant
No. of consecutive days worked	Positive	Insignificant

6. CONCLUSIONS AND RECOMMENDATIONS

Through the literature, it was found that pilot performance could be affected by a variety of different variables. However, based on the analysis of all the variables considered in this study, most of the variables have been returned as statistically insignificant. Furthermore, sleep efficiency can be ignored due to its extremely small parameter value and impact on pilot performance. However recommendations could be made to easyJet regarding start times. It could be advised to easyJet to design their flight roster to minimize very early duty start times (before 08:00), as it has been observed that PVT times tend to improve with later starts. Since PVT times have been regarded to indicate pilot performance, later start times can be correlated with improvements in performance.