

Utilization of deep learning to evaluate the measurement results of Forced Oscillation Technique

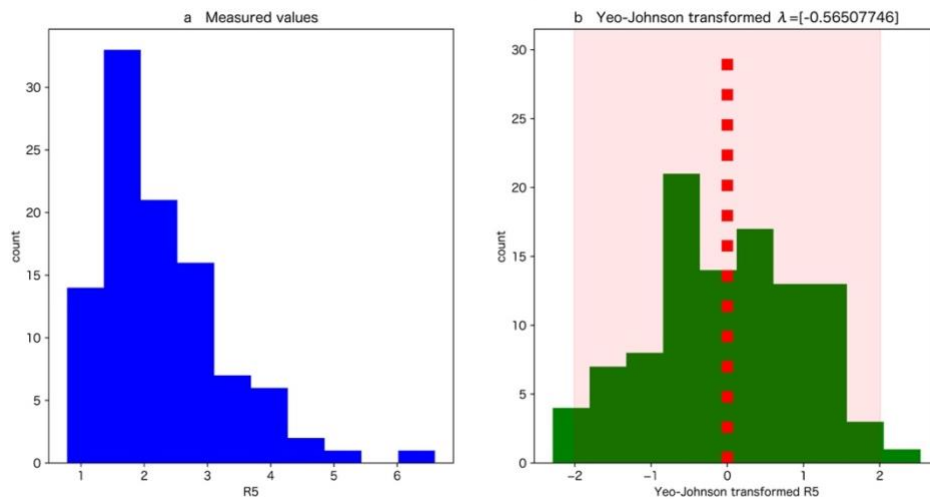
SUPPLEMENTARY MATERIAL

Supplementary Figure 1

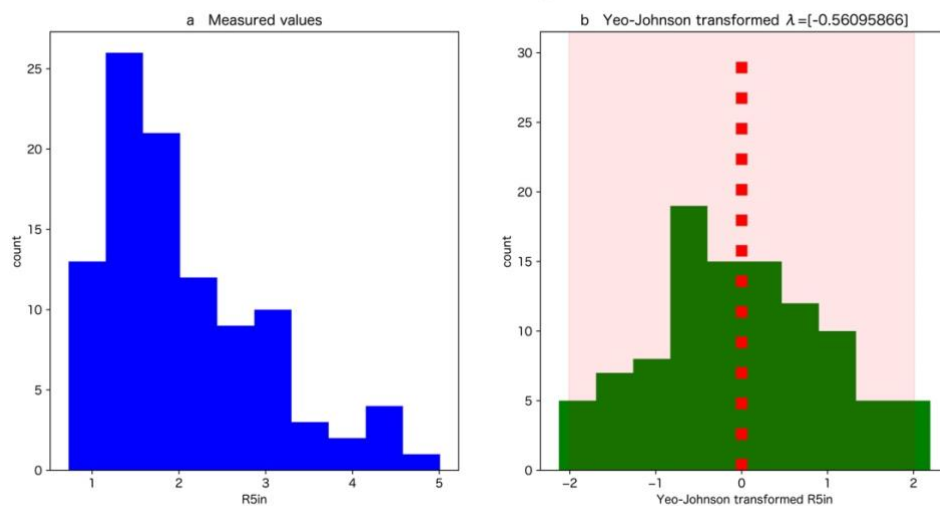
Histogram of MostGraph measurement values in healthy controls and histograms of the Yeo-Johnson power transformed values. These are supplementary histograms of Figure 2 showing all MostGraph measurement items.

Red dotted line indicates the mean and pink square indicates $\text{mean} \pm 2 \times \text{Standard Deviation}$ of the transformed value.

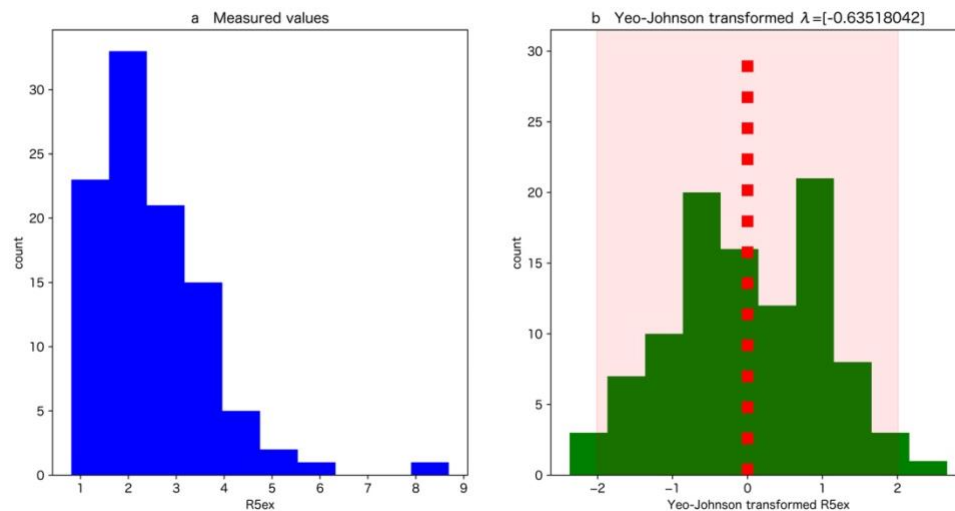
Male: R5 Histogram



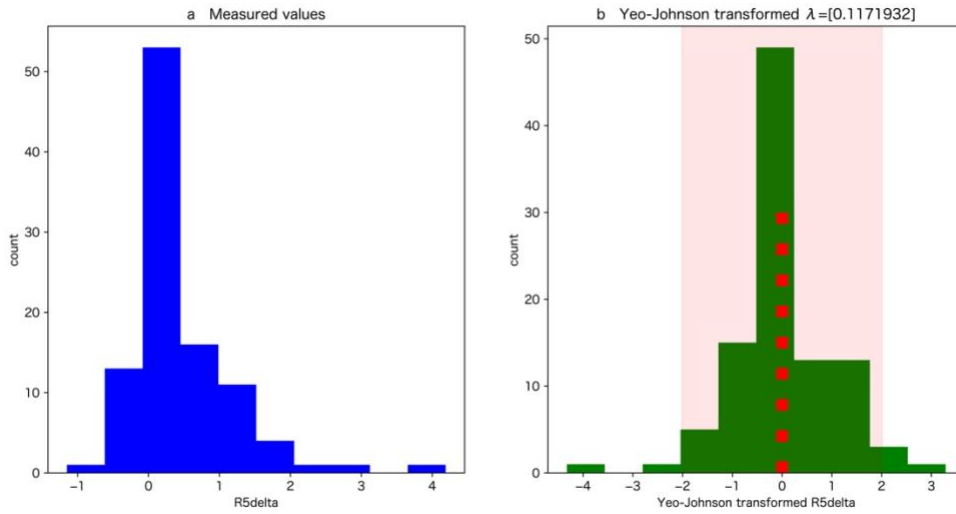
Male: R5in Histogram



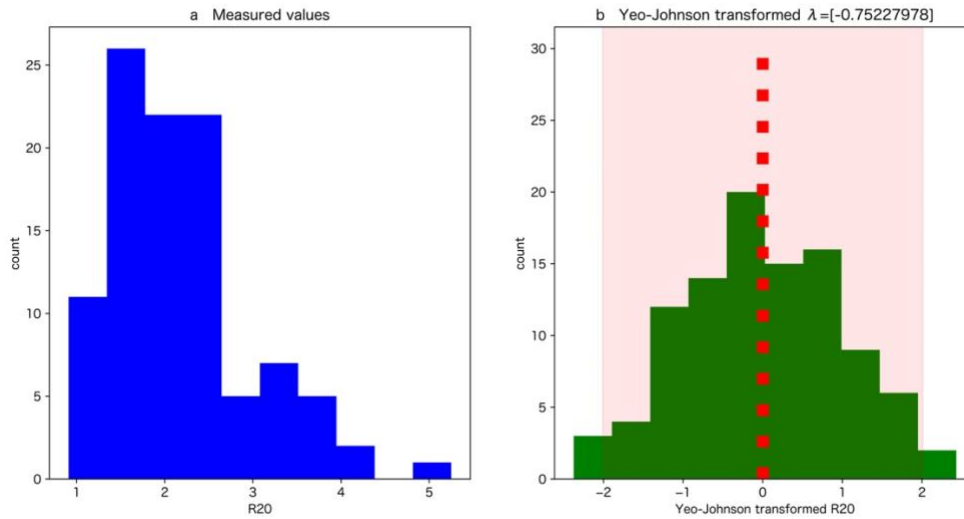
Male: R5ex Histogram



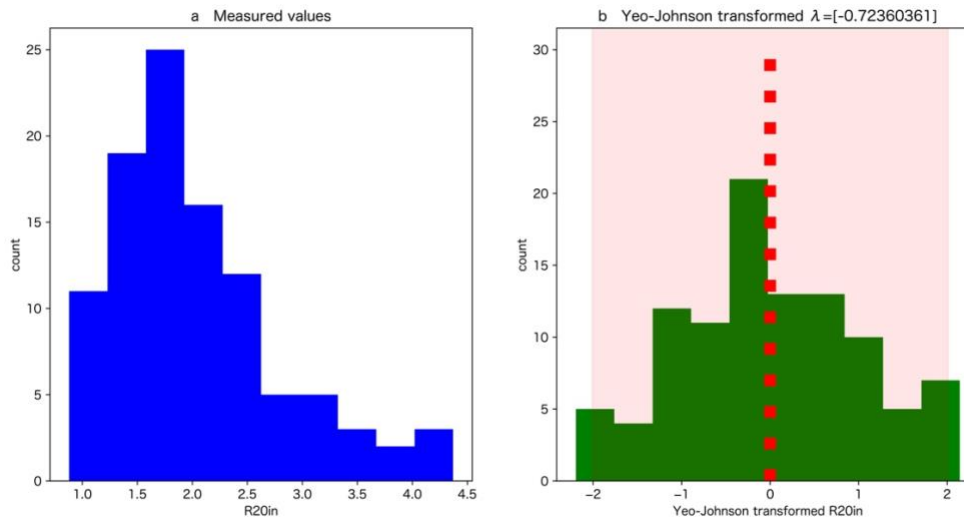
Male: R5delta Histogram



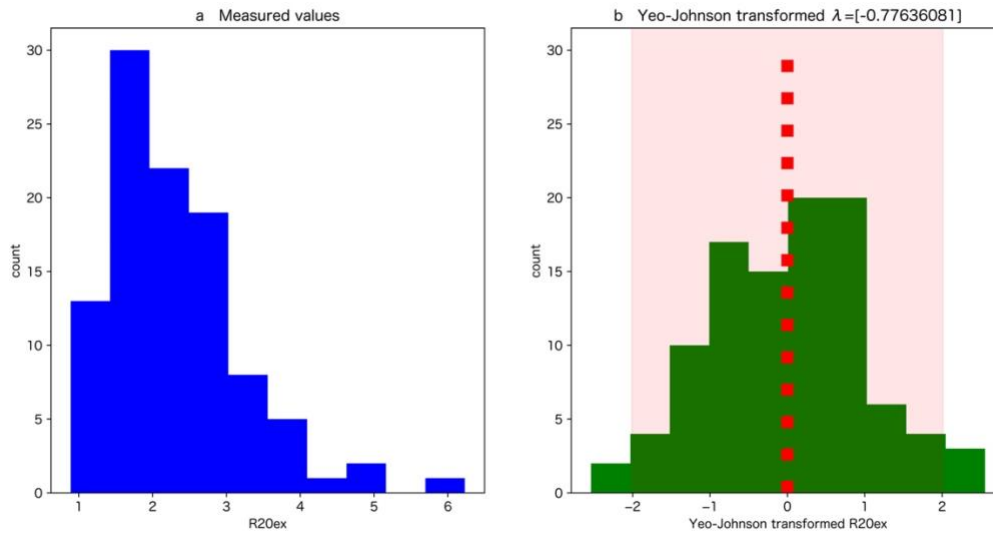
Male: R20 Histogram



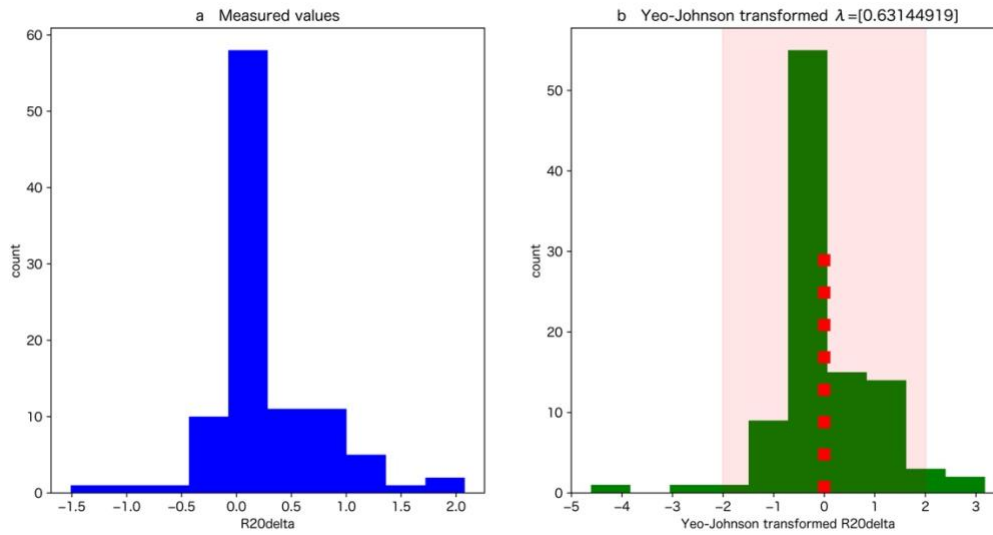
Male: R20in Histogram



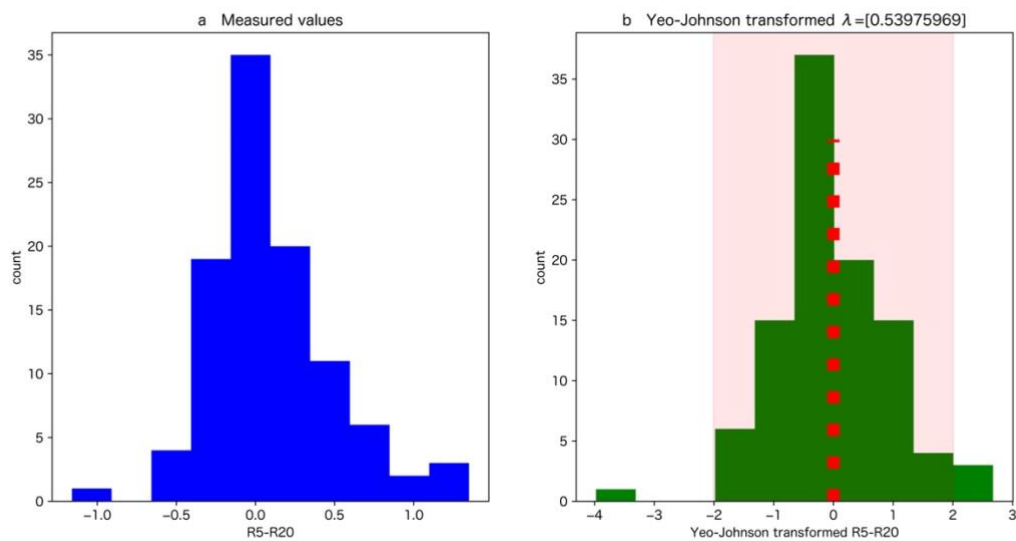
Male: R20ex Histogram



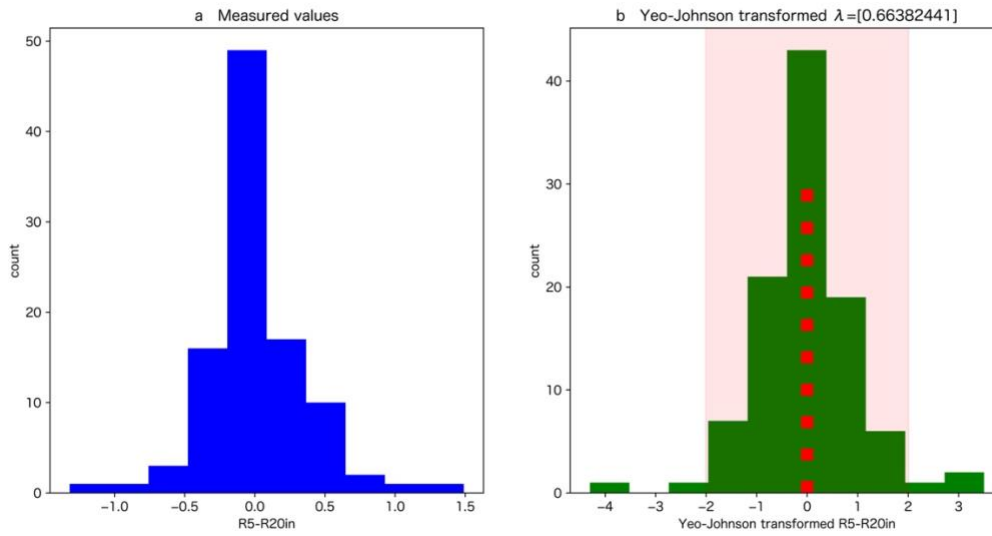
Male: R20delta Histogram



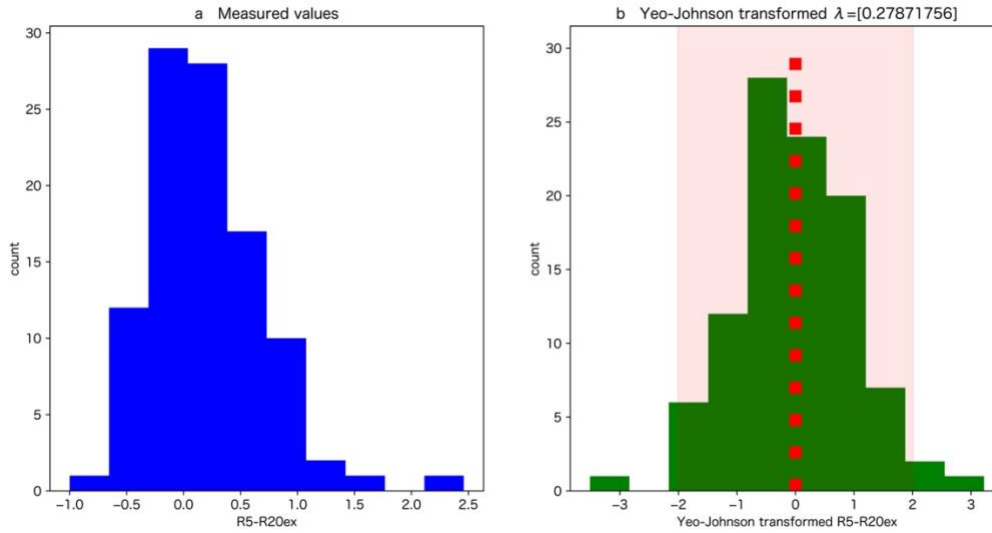
Male: R5-R20 Histogram



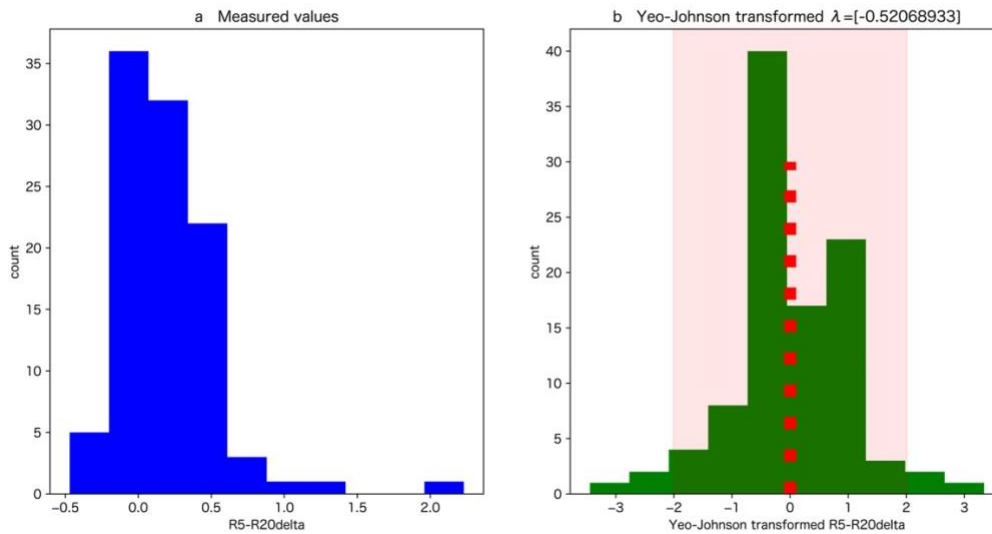
Male: R5-R20in Histogram



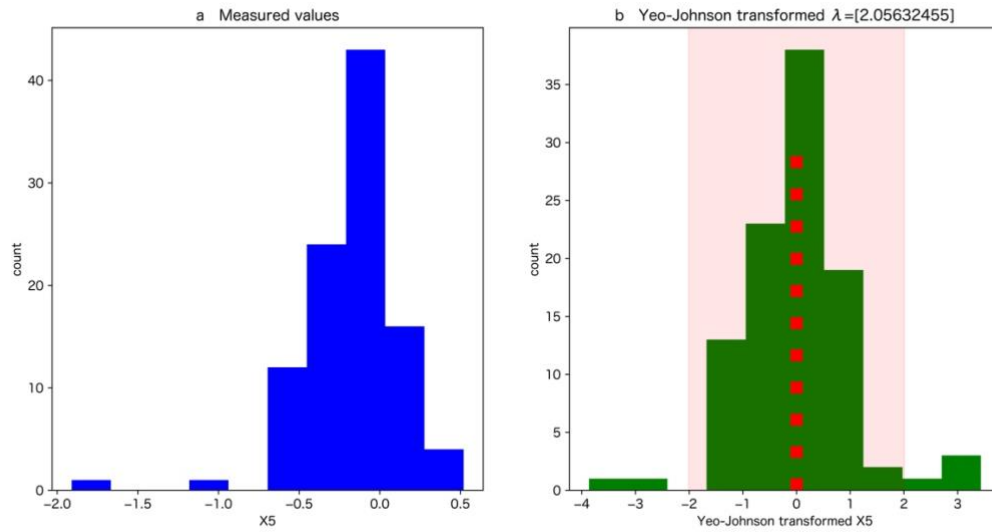
Male: R5-R20ex Histogram



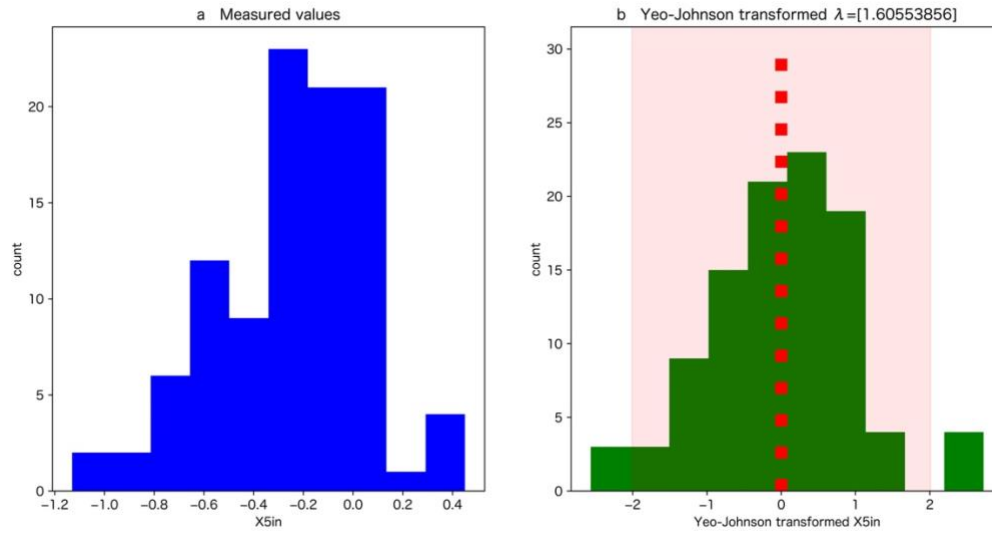
Male: R5-R20delta Histogram



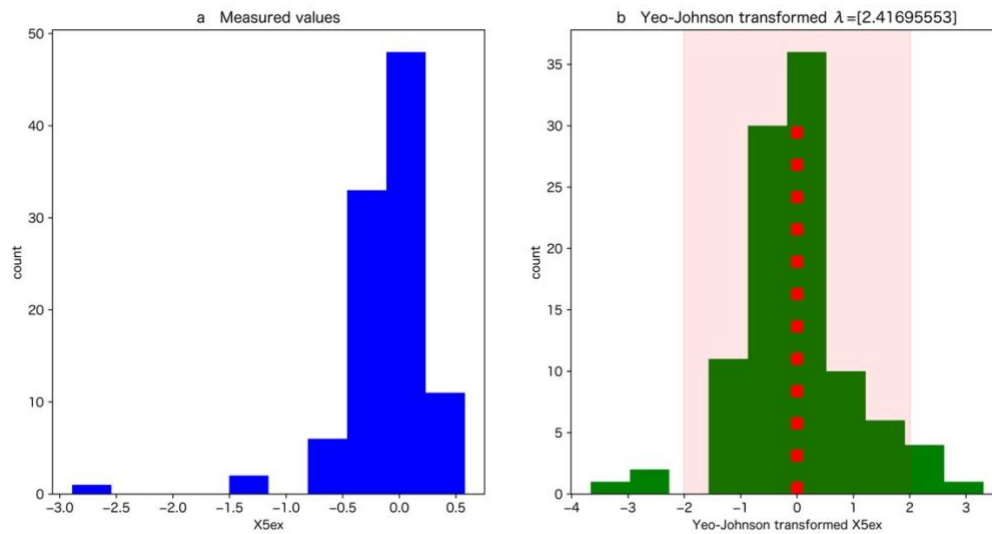
Male: X5 Histogram



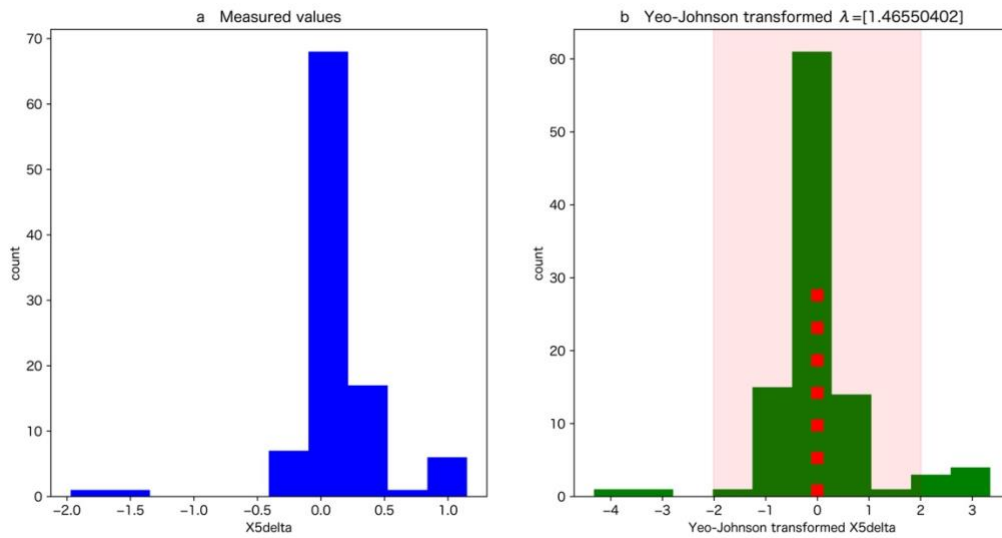
Male: X5in Histogram



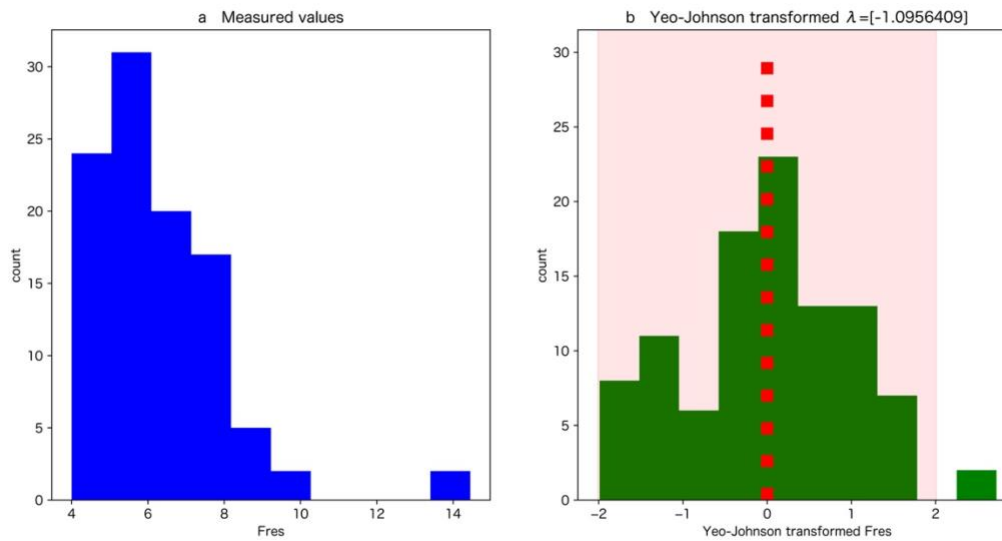
Male: X5ex Histogram



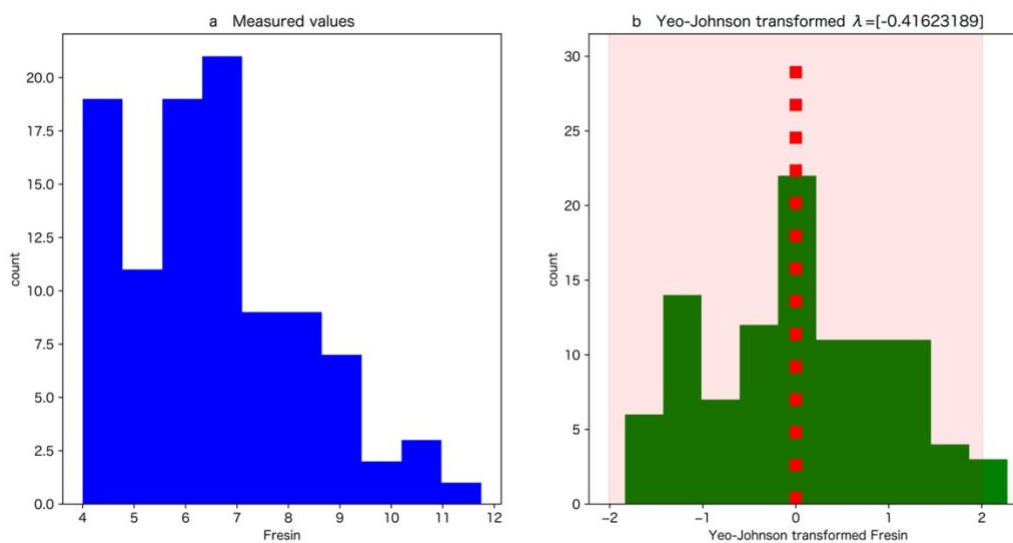
Male: X5delta Histogram



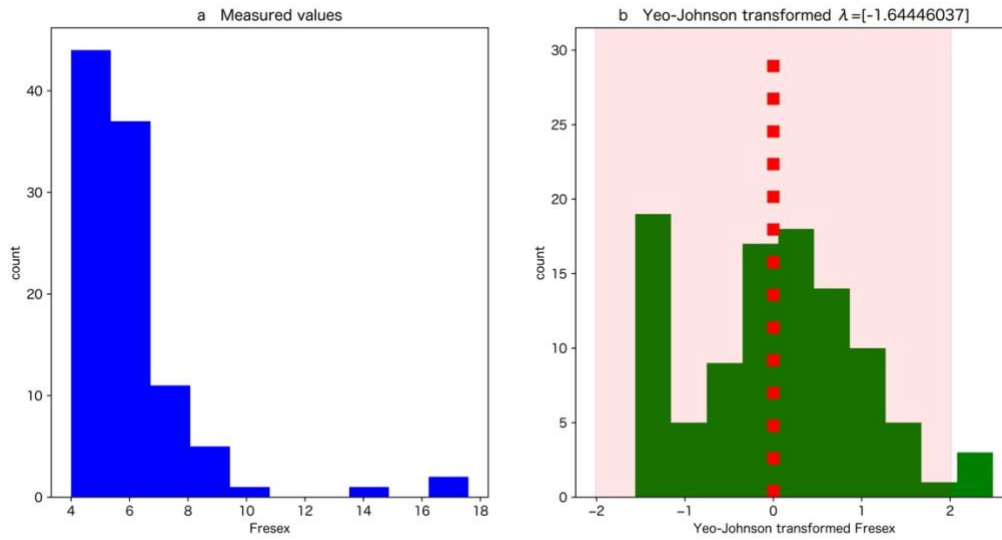
Male: Fres Histogram



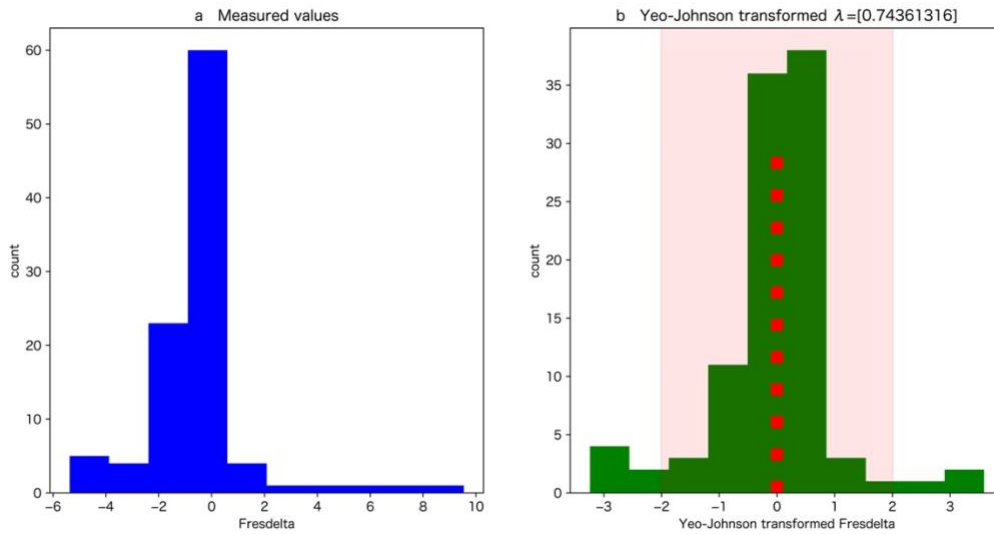
Male: Fresin Histogram



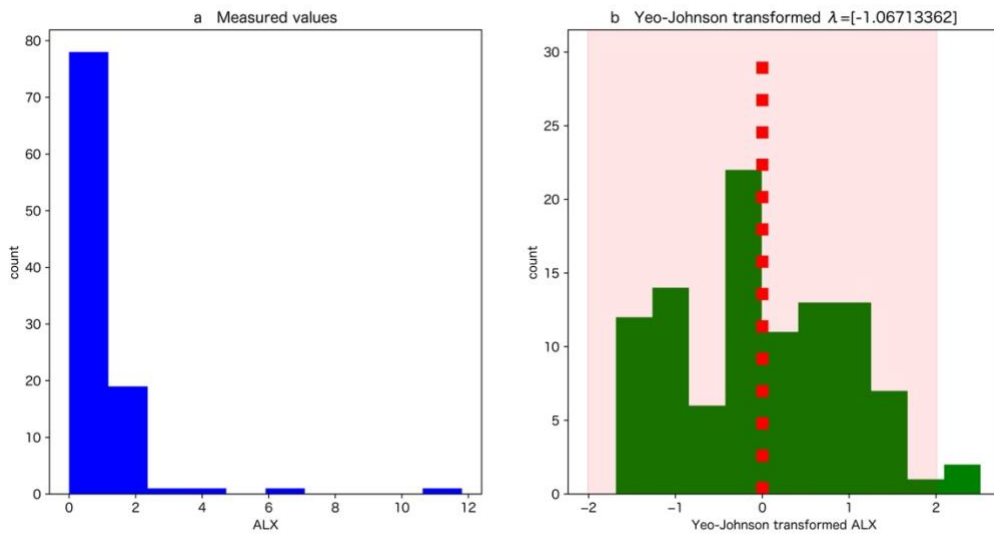
Male: Fresex Histogram



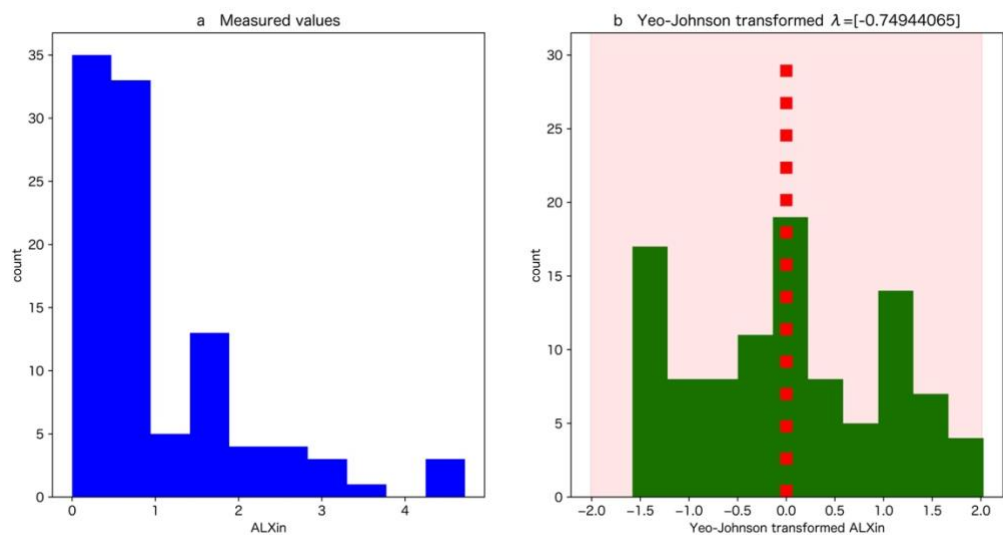
Male: Fresdelta Histogram



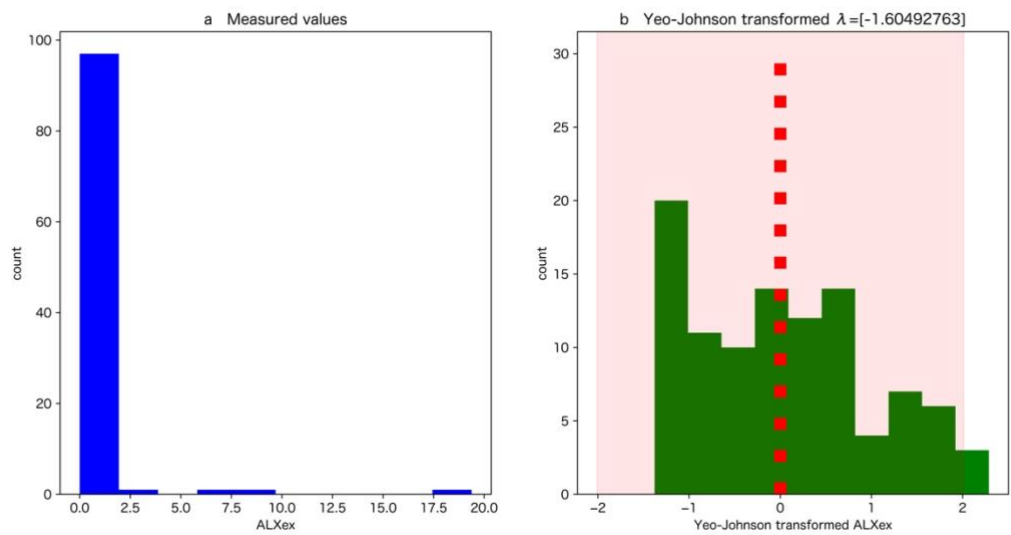
Male: ALX Histogram



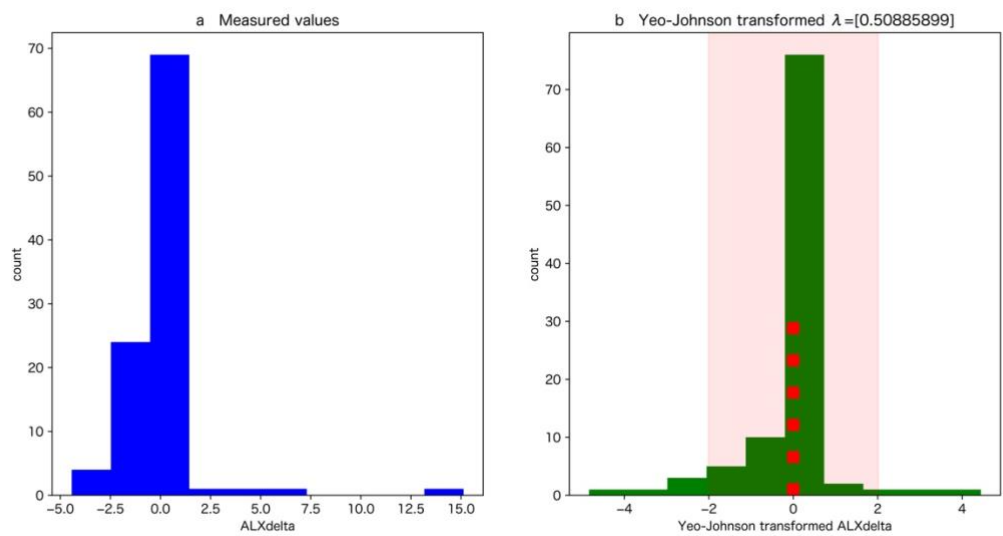
Male: ALXin Histogram



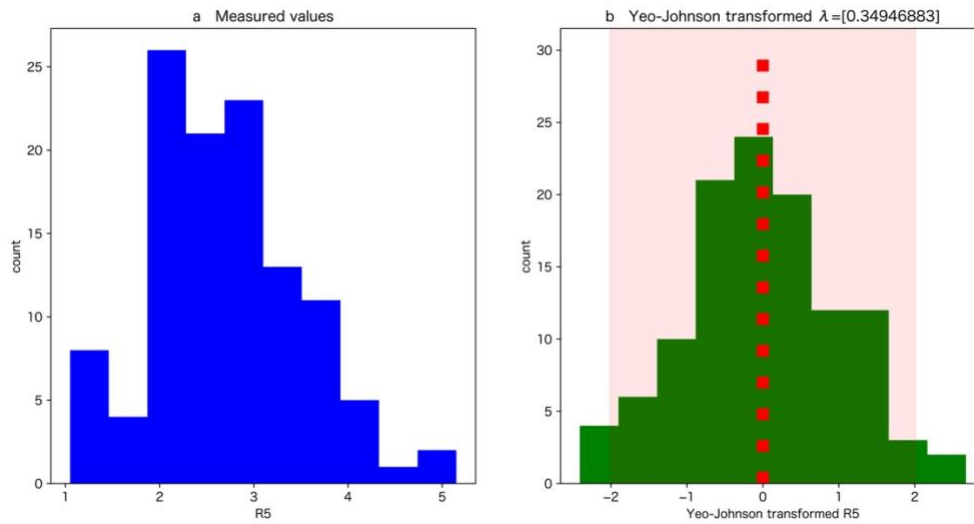
Male: ALXex Histogram



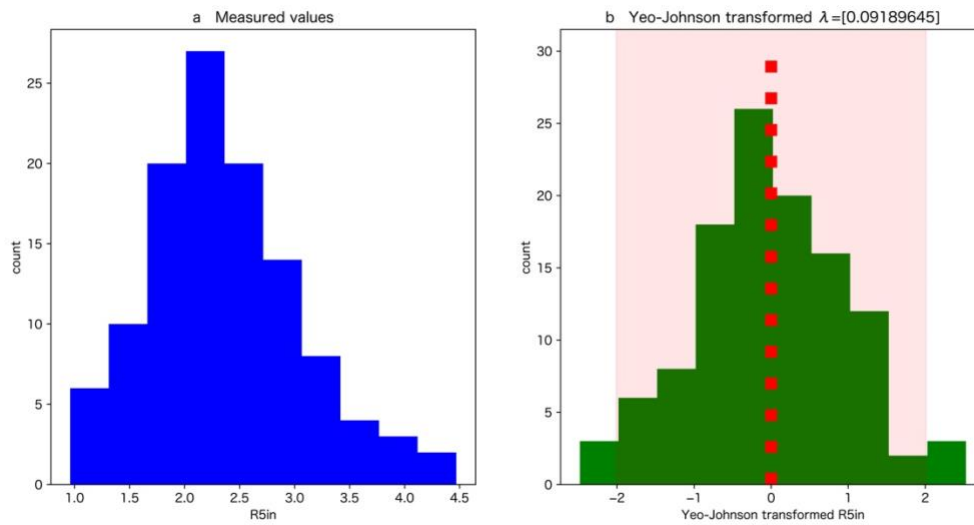
Male: ALXdelta Histogram



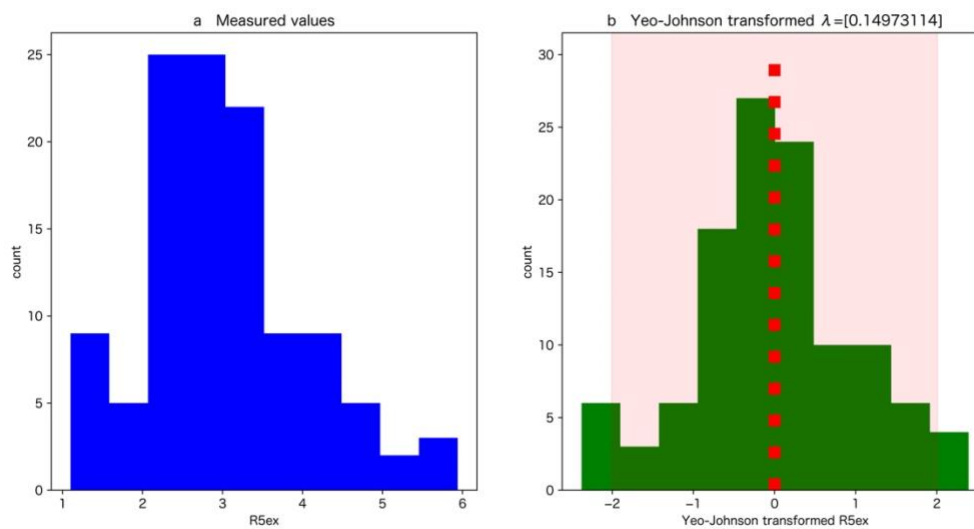
Female: R5 Histogram



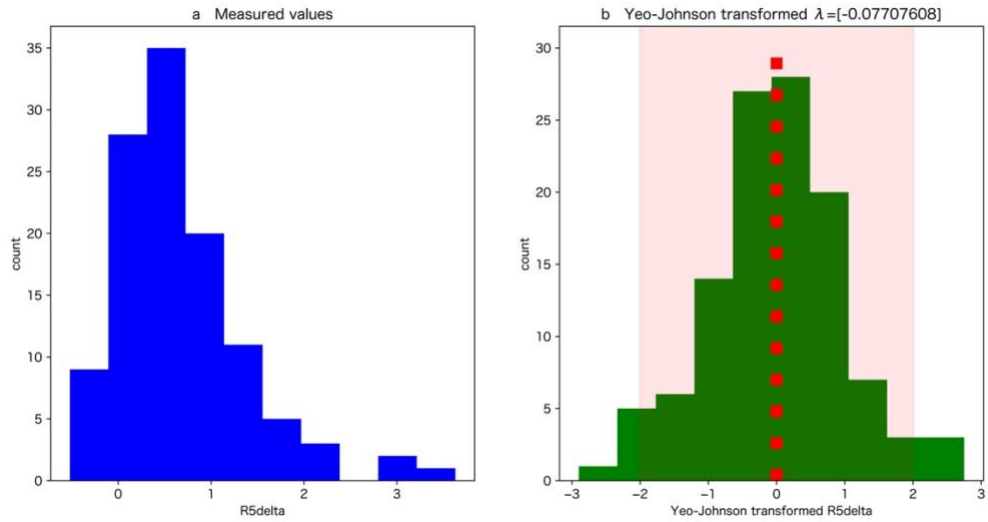
Female: R5in Histogram



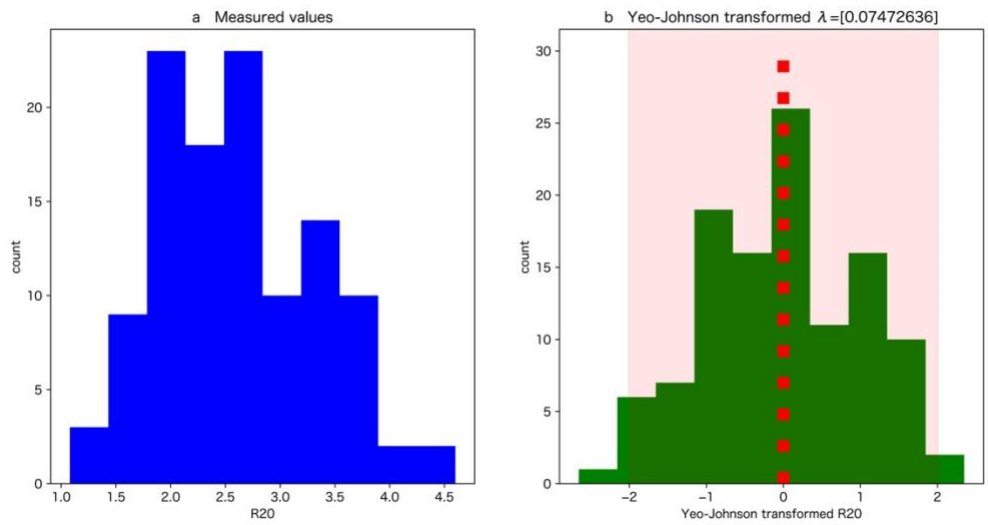
Female: R5ex Histogram



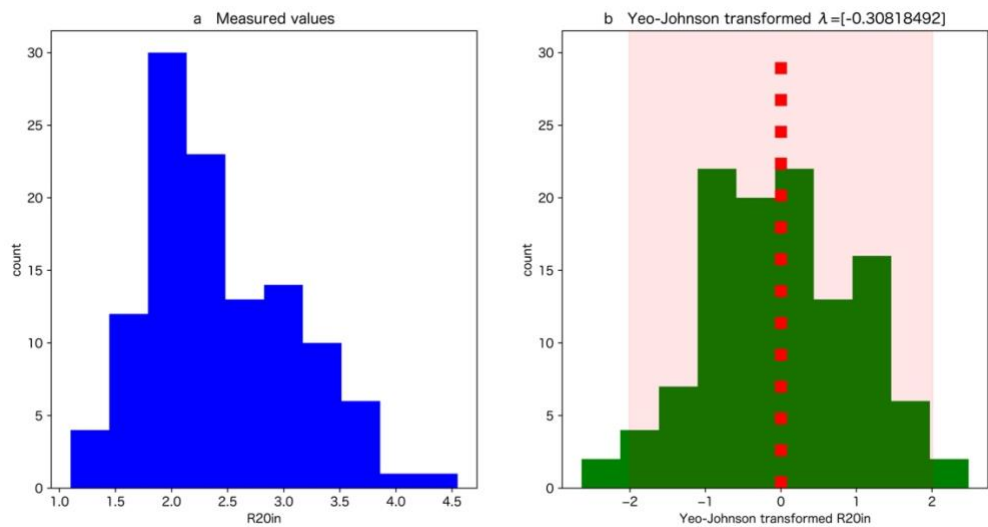
Female: R5delta Histogram



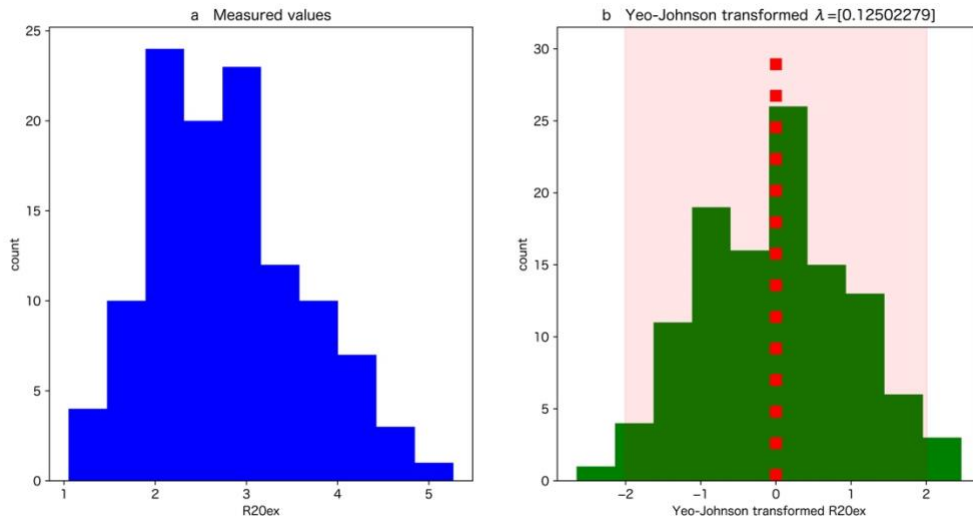
Female: R20 Histogram



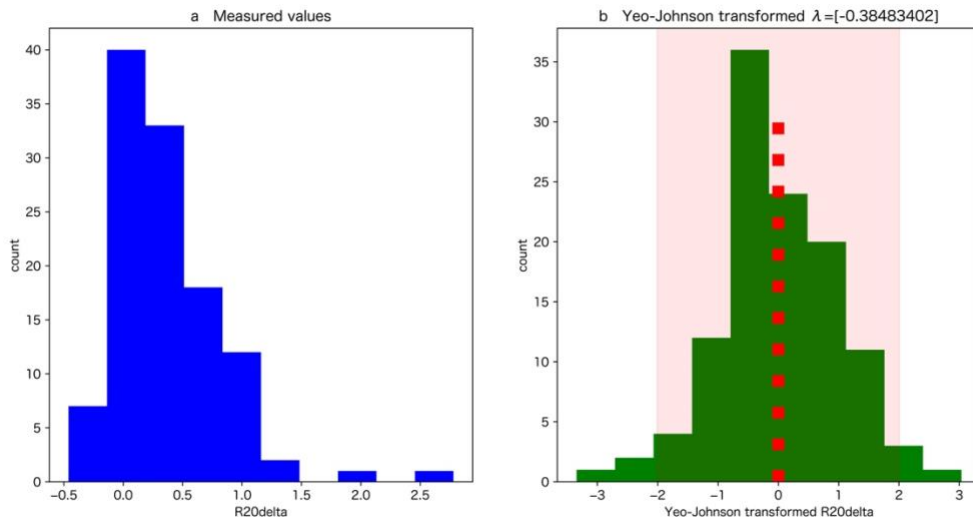
Female: R20in Histogram



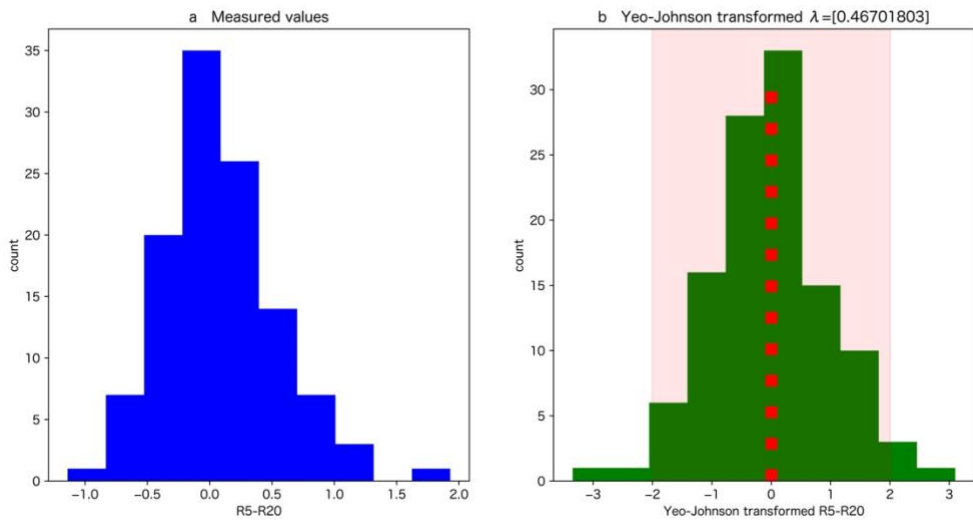
Female: R20ex Histogram



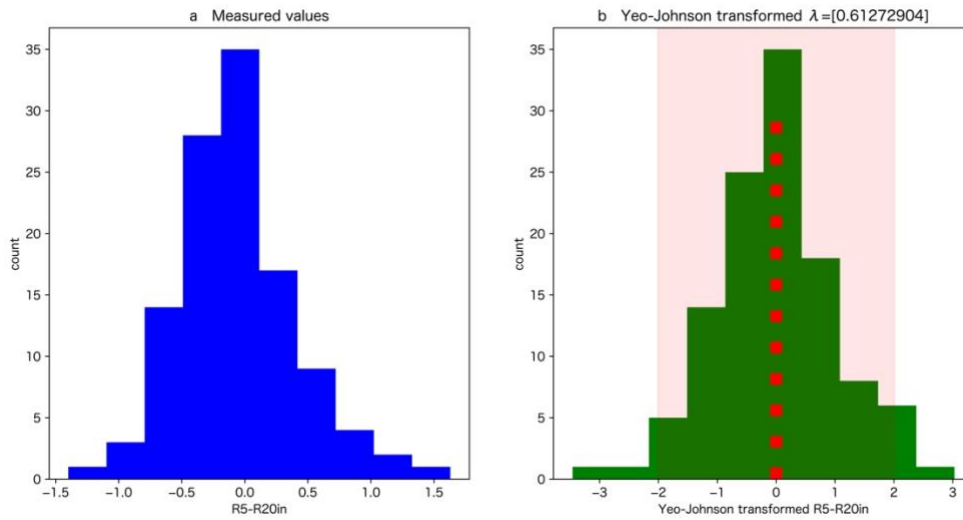
Female: R20delta Histogram



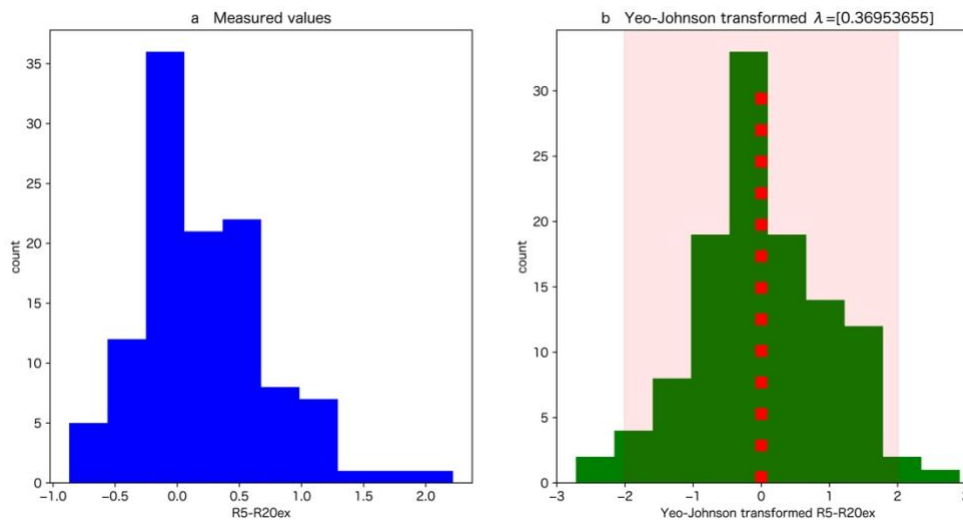
Female: R5-R20 Histogram



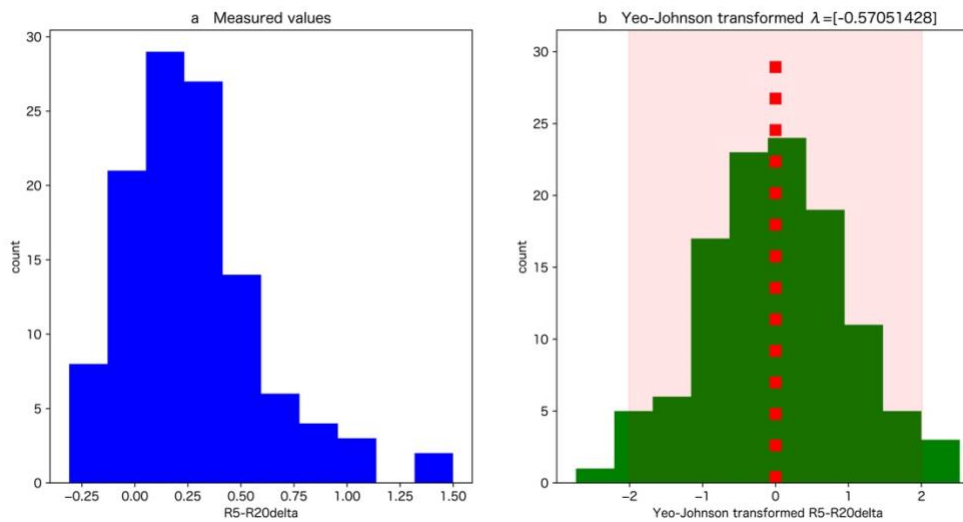
Female: R5-R20in Histogram



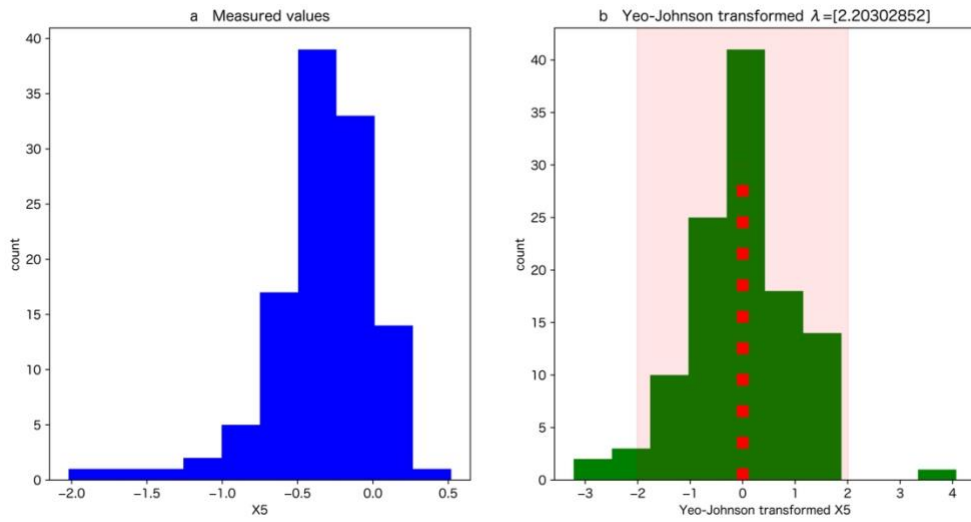
Female: R5-R20ex Histogram



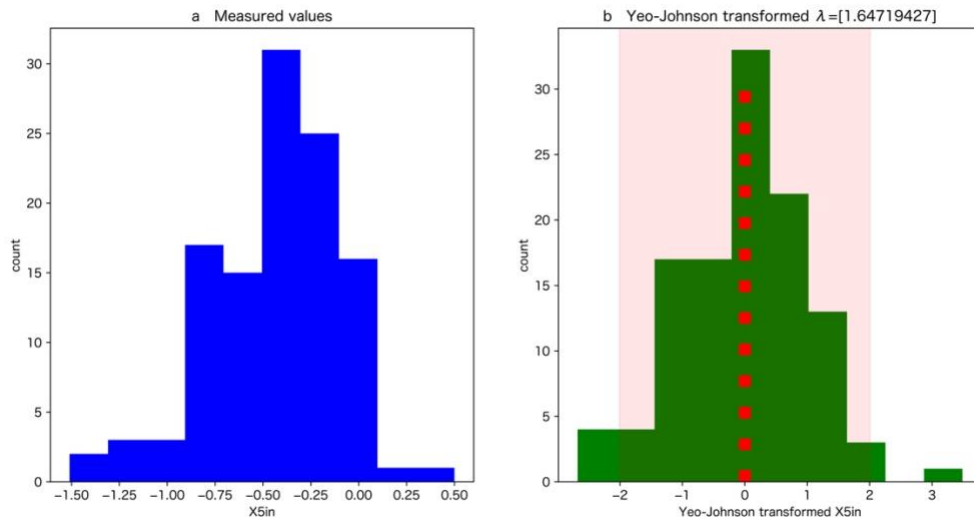
Female: R5-R20delta Histogram



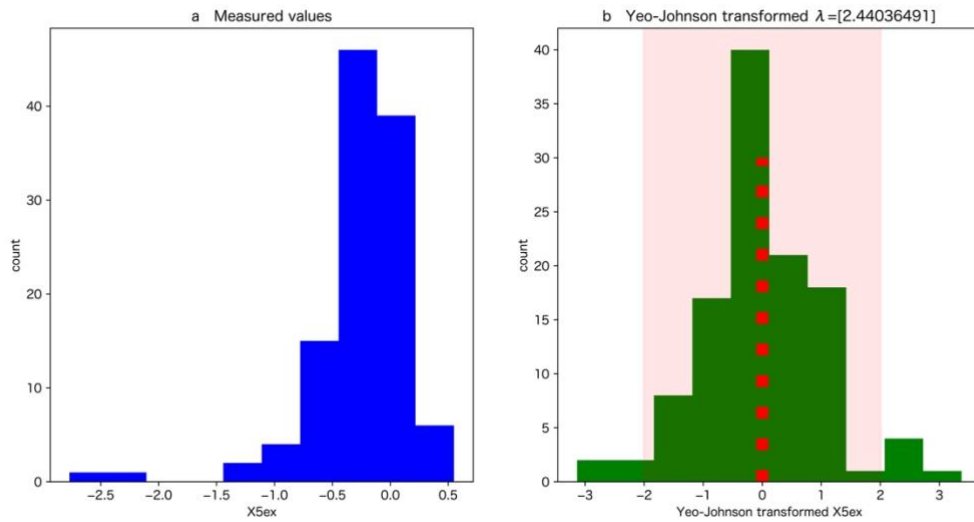
Female: X5 Histogram



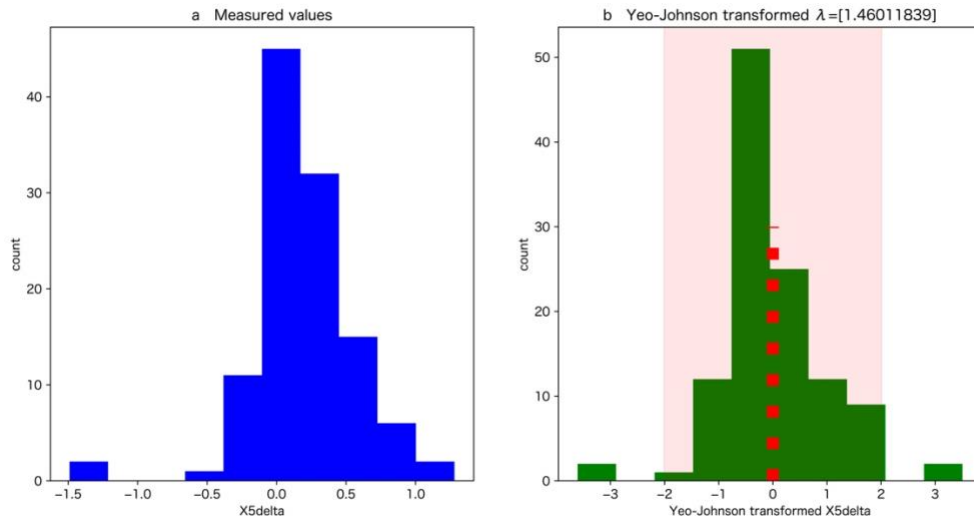
Female: X5in Histogram



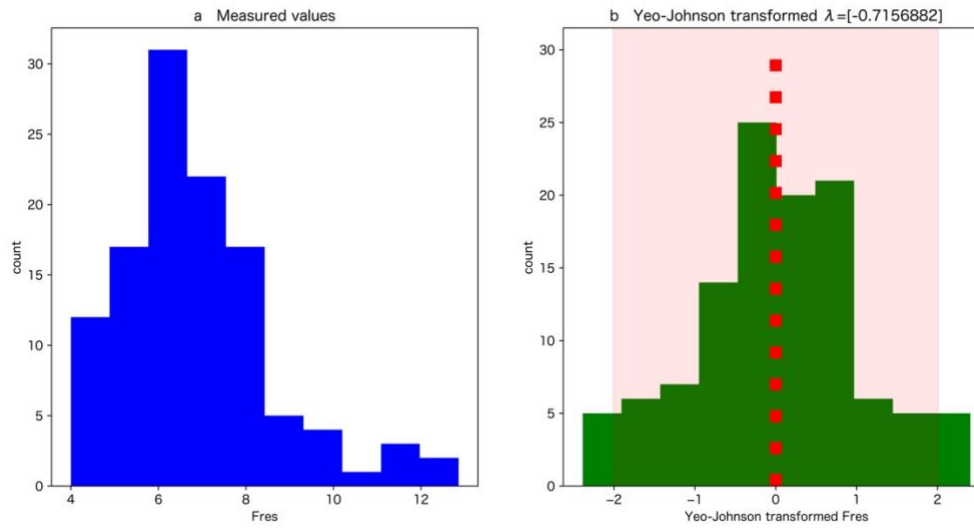
Female: X5ex Histogram



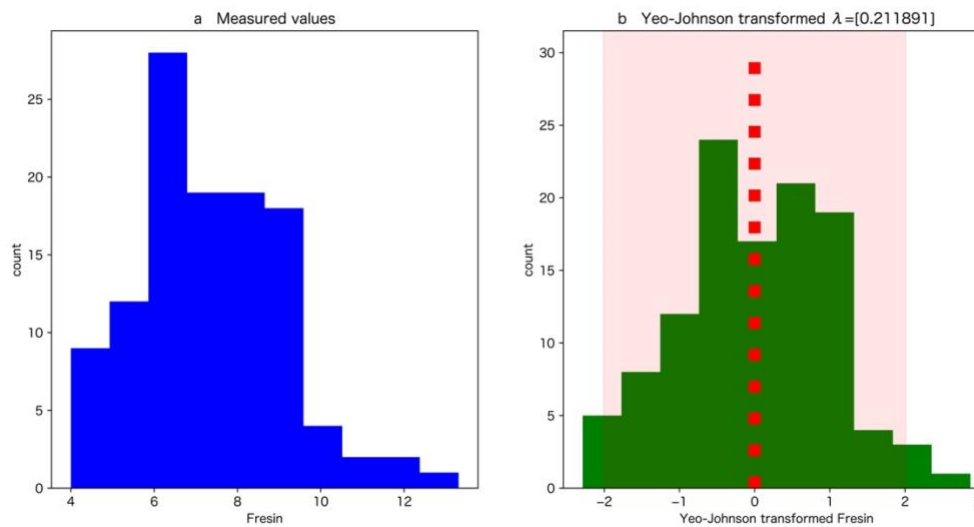
Female: X5delta Histogram



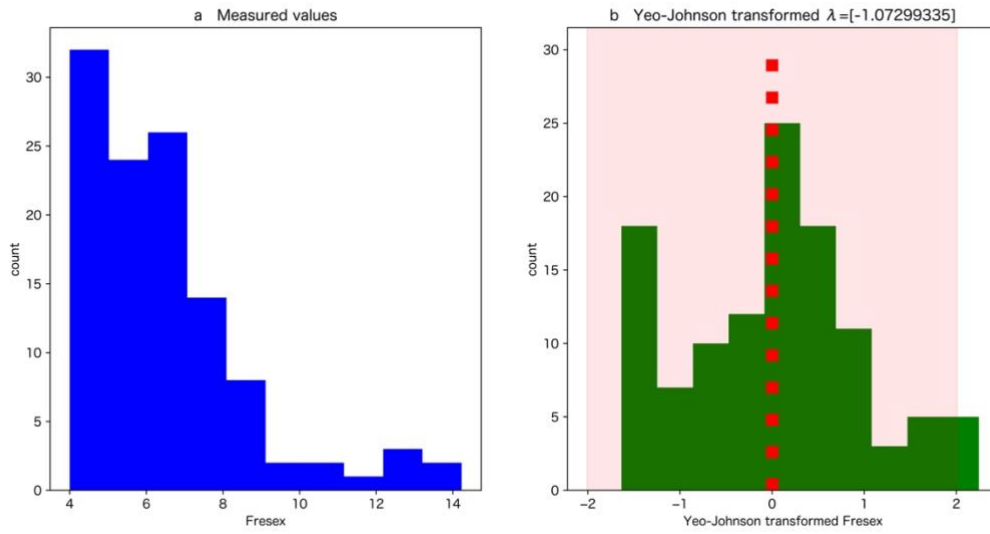
Female: Fres Histogram



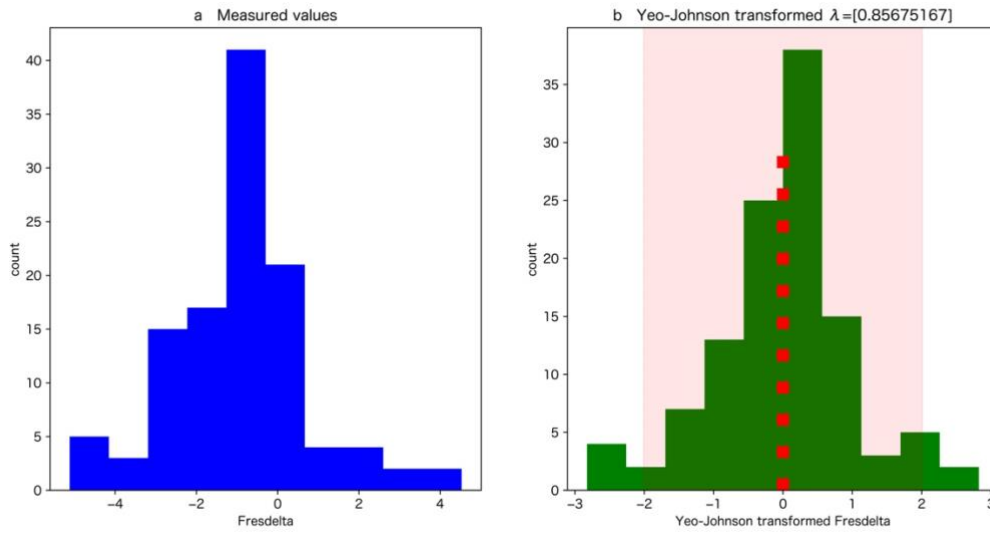
Female: Fresin Histogram



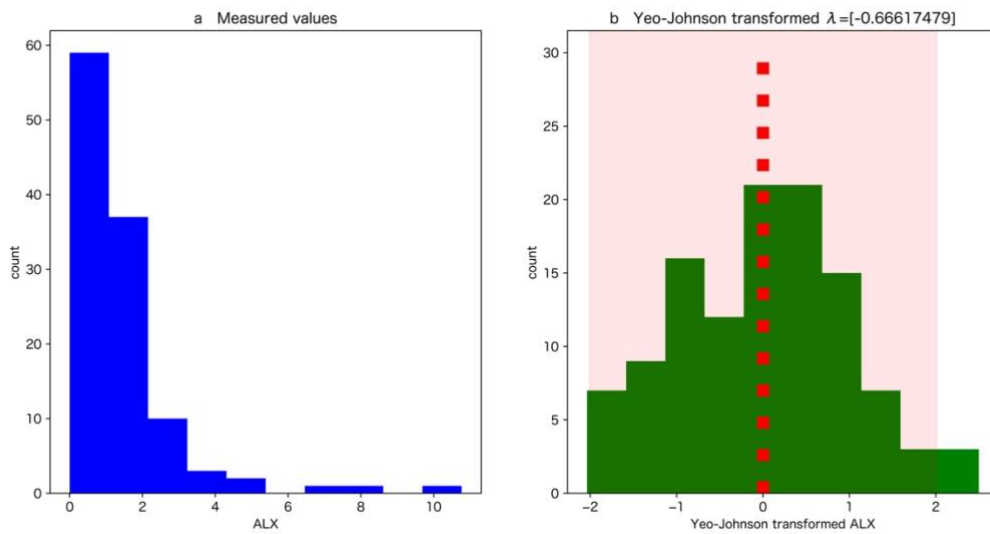
Female: Fresex Histogram



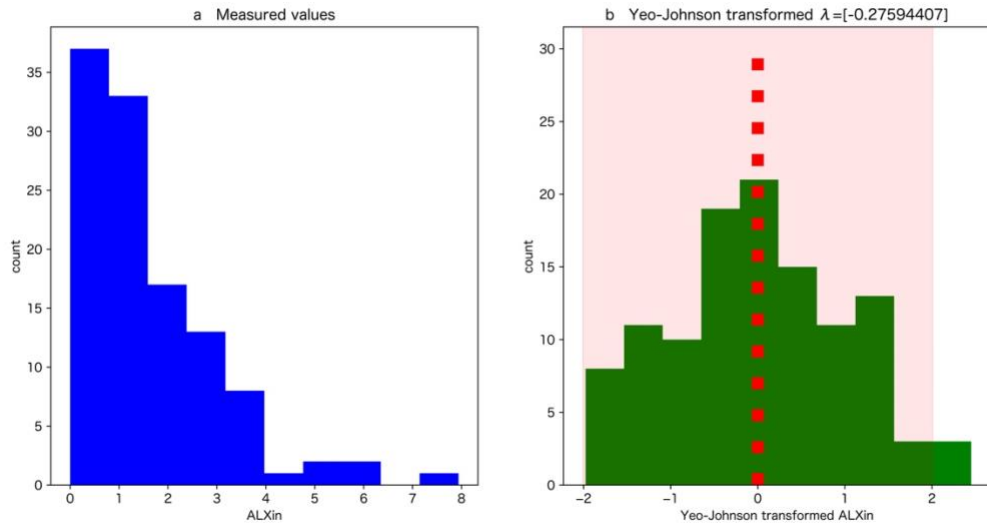
Female: Fresdelta Histogram



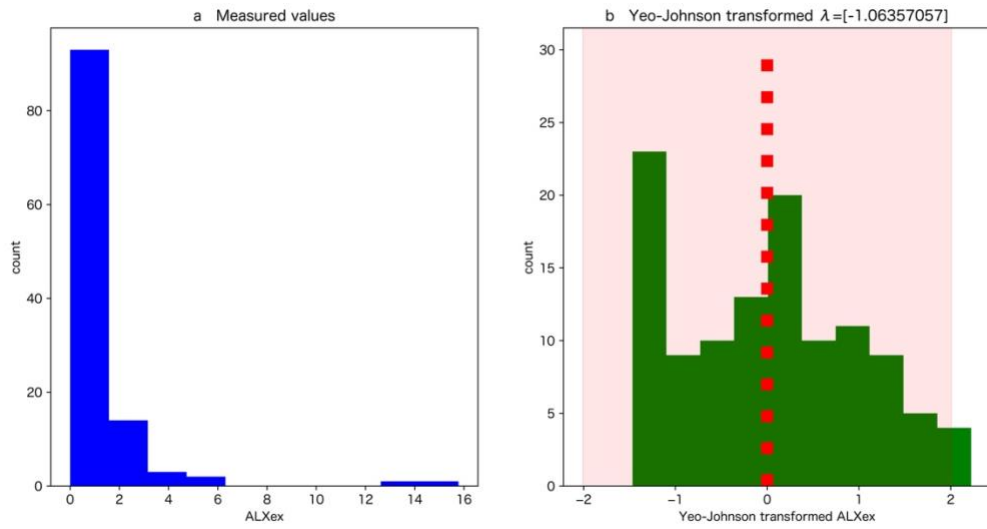
Female: ALX Histogram



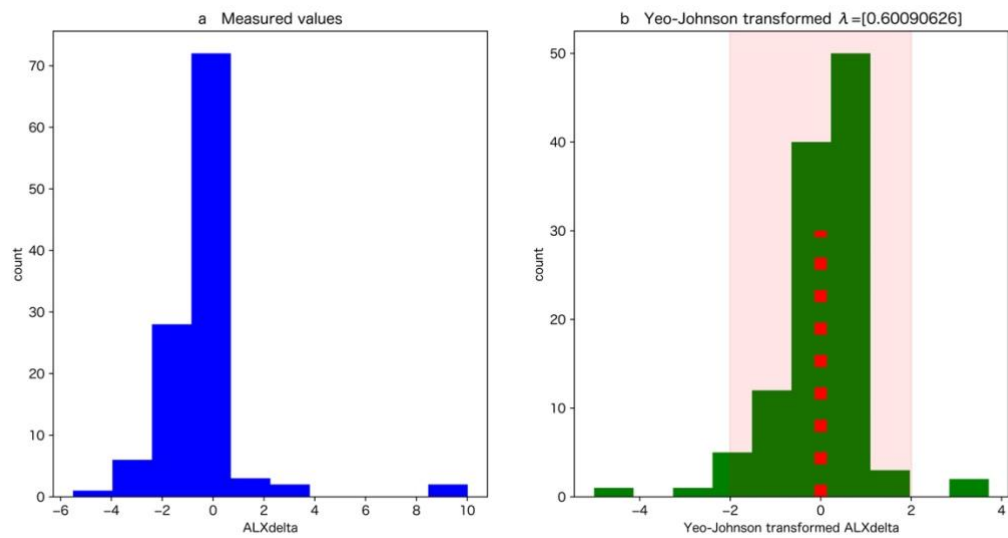
Female: ALXin Histogram



Female: ALXex Histogram



Female: ALXdelta Histogram



Supplementary Figure 2

Comparison of reference ranges established by $\text{mean} \pm 2 \times \text{Standard Deviation (SD)}$ of the Yeo-Johnson transformed values (pink square) to the multiple linear regression analysis using age, height, and weight as explanatory variables (green or blue line).

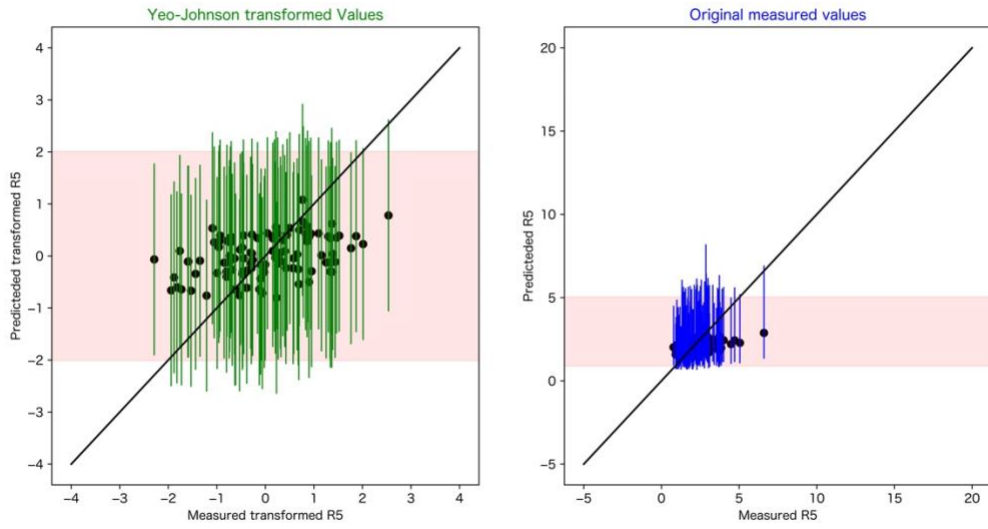
For multiple linear regression analysis, the differences between the Yeo-Johnson transformed measured values and predicted values were used to calculate the SD. The predicted values $\pm 2 \times \text{SD}$ were set for the reference ranges of the power transformed values.

The X-axis represents the measured values and the Y-axis represents the predicted values. The black dots indicate the predicted value of each healthy control calculated by sex, age, height, and weight, showing the relationship with the measured values. Ideally, these should be represented on the black lines. The green bars denote the reference ranges of the Yeo-Johnson transformed values, and the blue bars denote the reference ranges of the MostGraph measured values. Most of these lines intersect the black line, so we know that our predictions are correct; however, we were unable to narrow the ranges of the pink square.

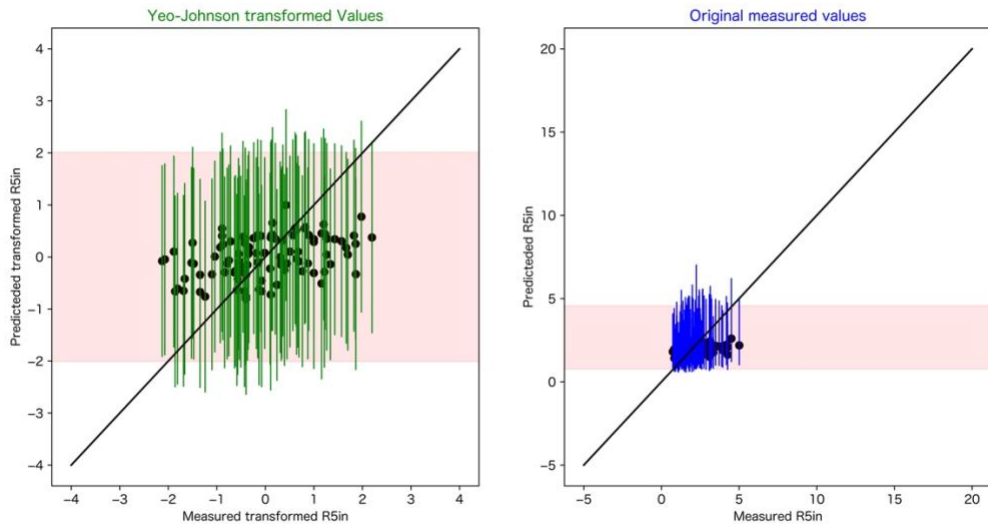
According to these results, setting references by multiple regression analysis did not show better predictions than using $\text{mean} \pm 2 \times \text{SD}$ of the Yeo-Johnson transformed values.

These values were calculated and displayed in Python. For male participants, "YeoJohnson-male-linearregression.py" available at <https://github.com/sumi-yuki/mostgraph/blob/main/YeoJohnson-male-linearregression.py> was used. For female participants, "YeoJohnson-female-linearregression.py" available at <https://github.com/sumi-yuki/mostgraph/blob/main/YeoJohnson-female-linearregression.py> was used.

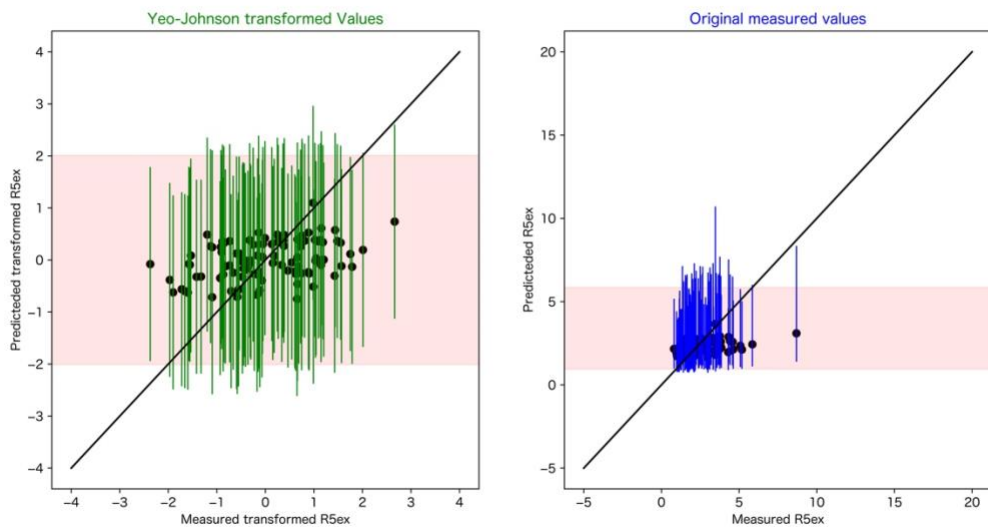
Male: Predicted vs Measured R5



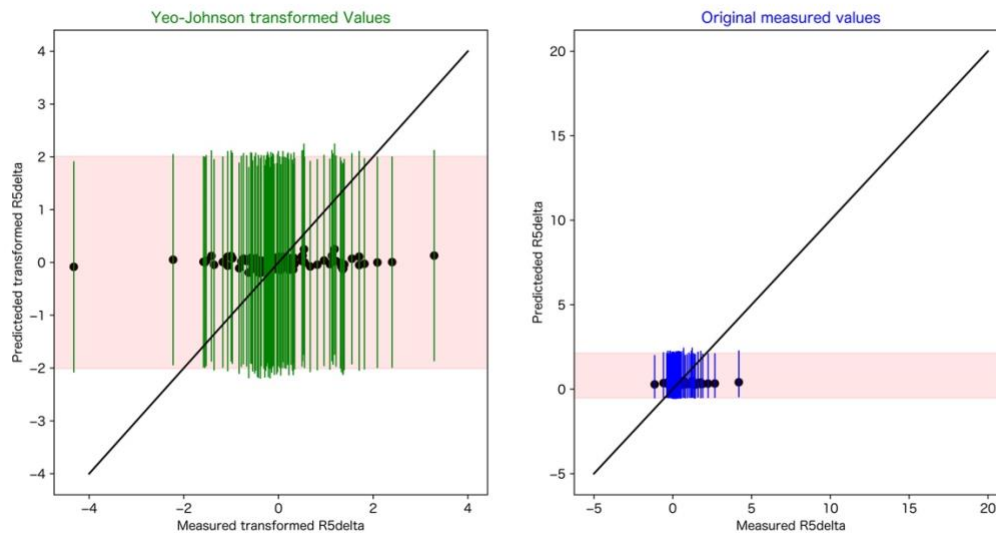
Male: Predicted vs Measured R5in



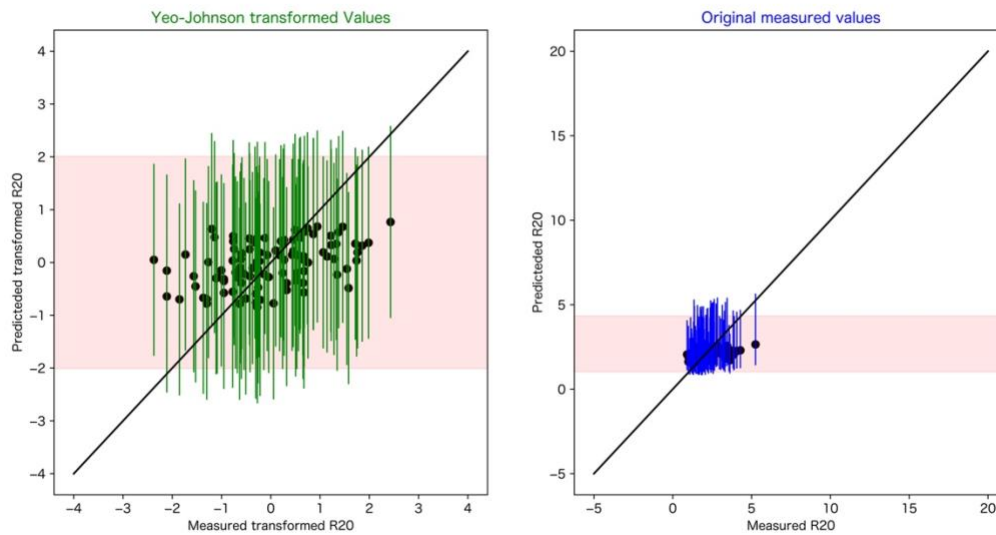
Male: Predicted vs Measured R5ex



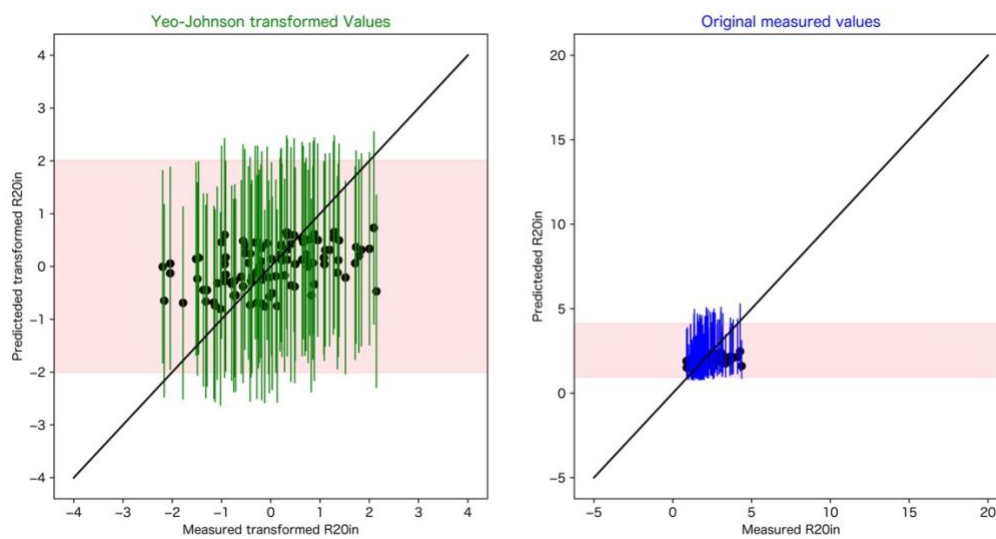
Male: Predicted vs Measured R5delta



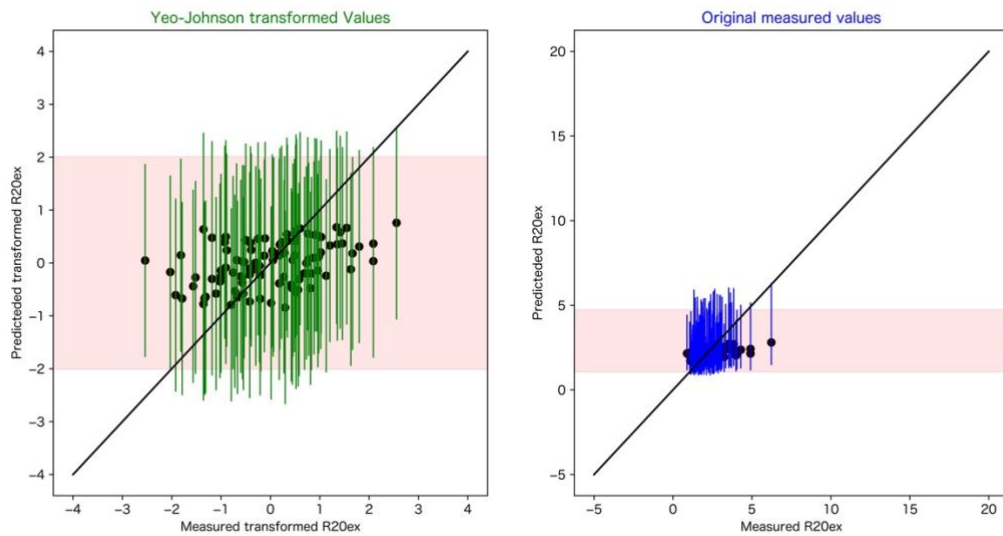
Male: Predicted vs Measured R20



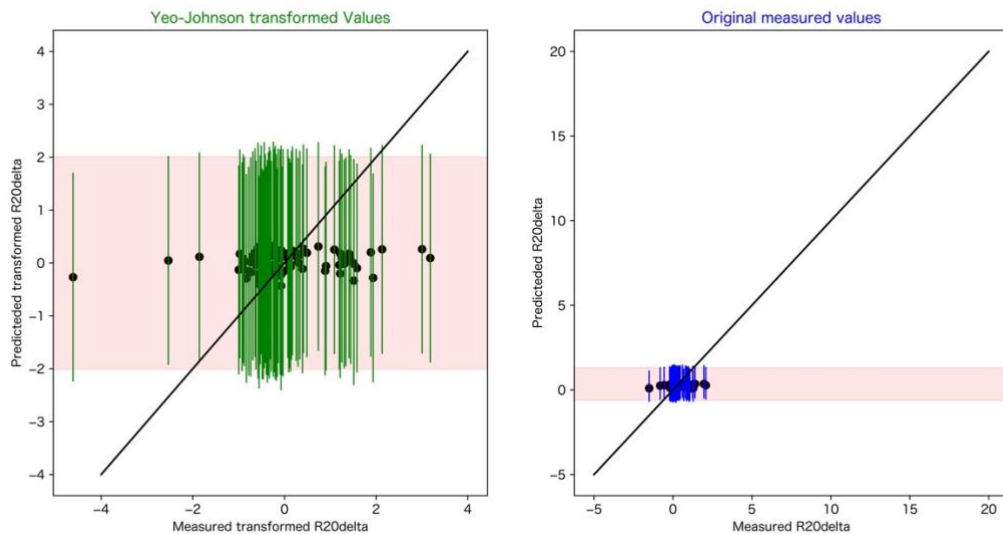
Male: Predicted vs Measured R20in



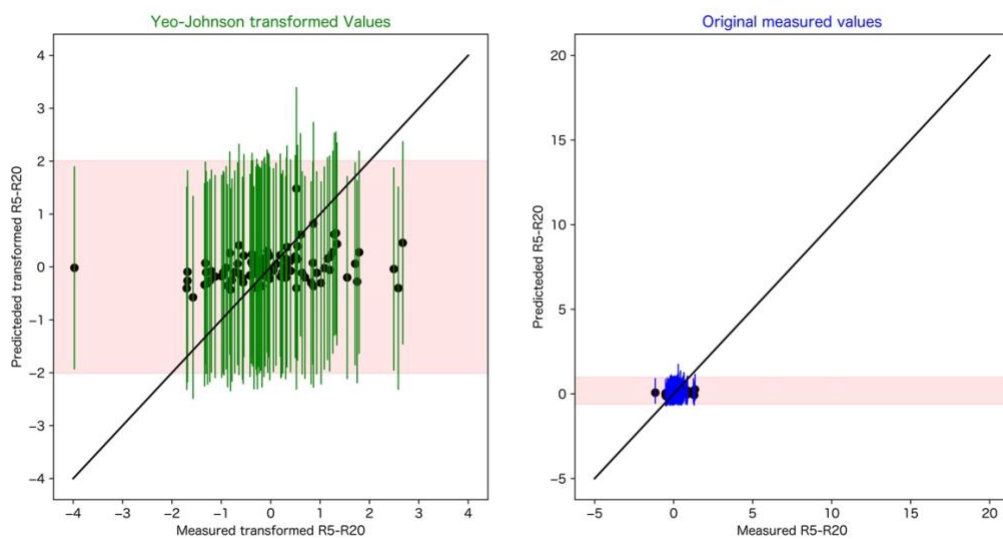
Male: Predicted vs Measured R20ex



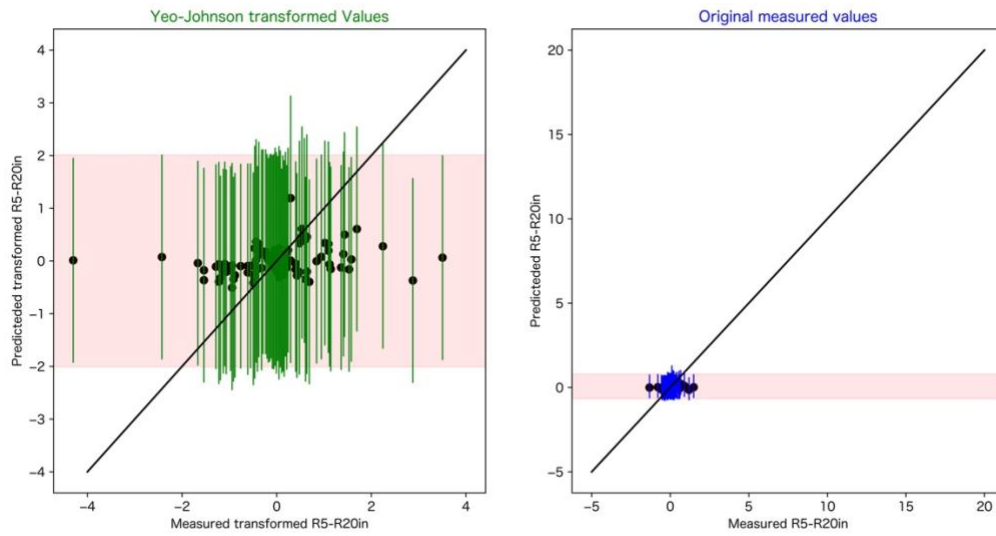
Male: Predicted vs Measured R20delta



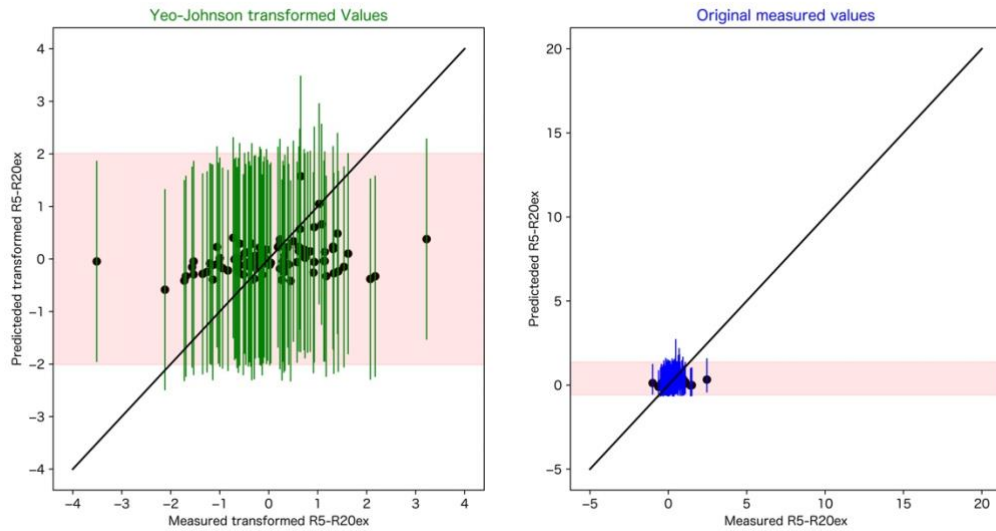
Male: Predicted vs Measured R5-R20



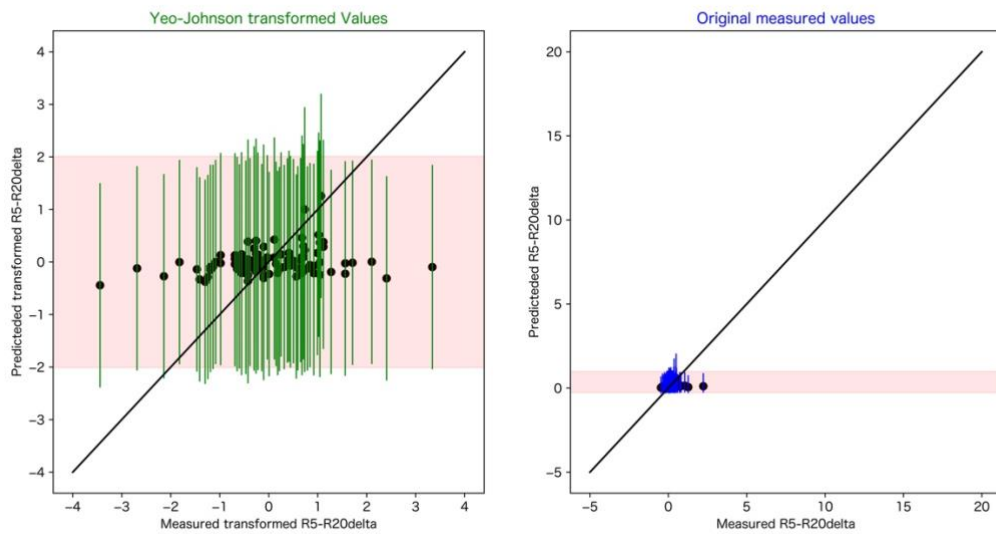
Male: Predicted vs Measured R5-R20in



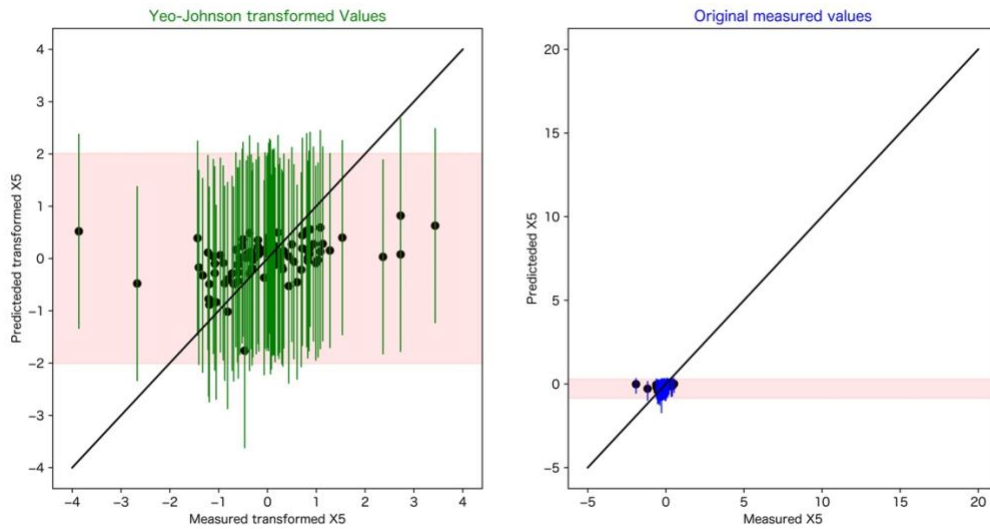
Male: Predicted vs Measured R5-R20ex



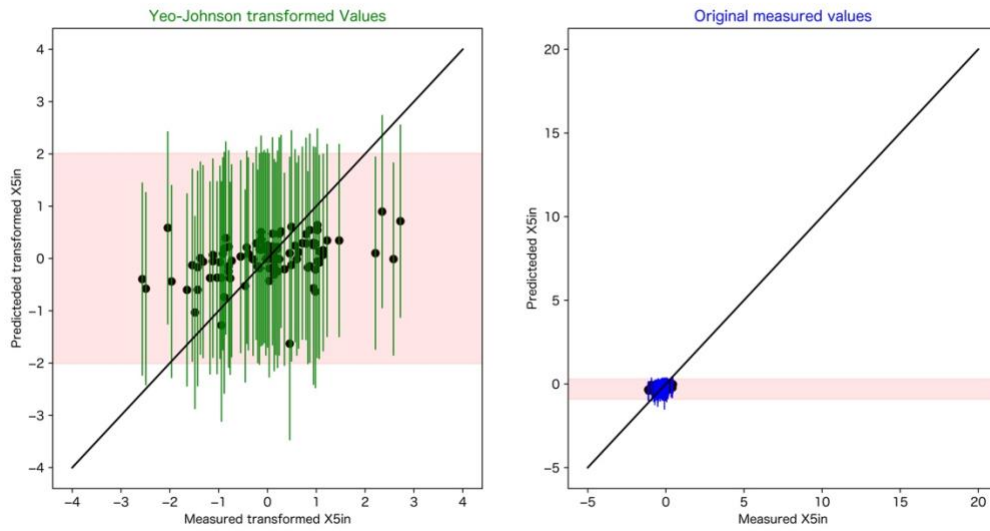
Male: Predicted vs Measured R5-R20delta



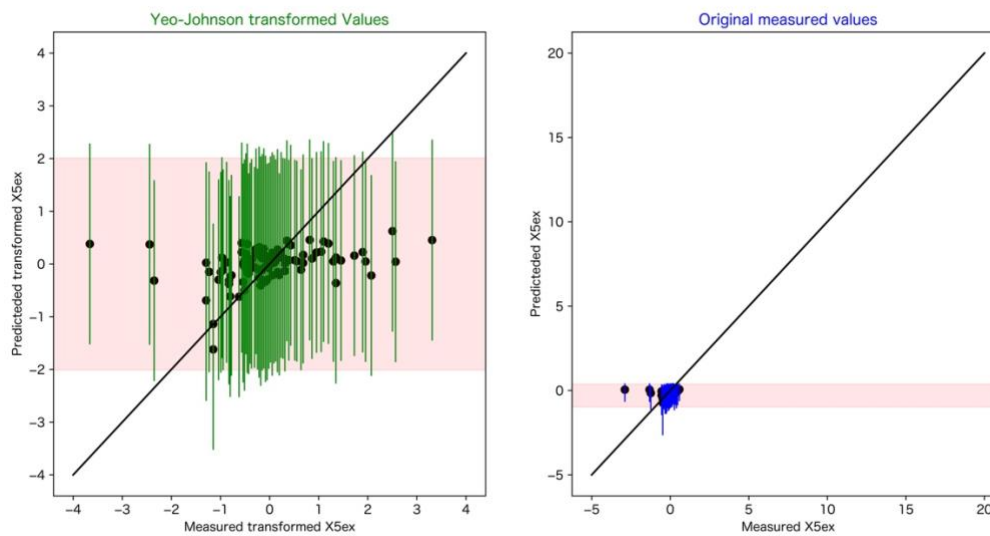
Male: Predicted vs Measured X5



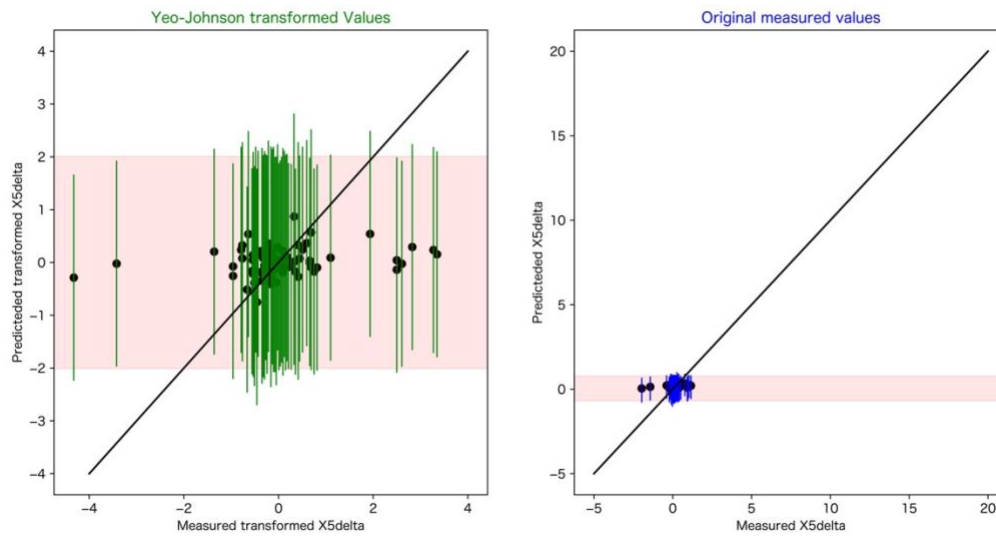
Male: Predicted vs Measured X5in



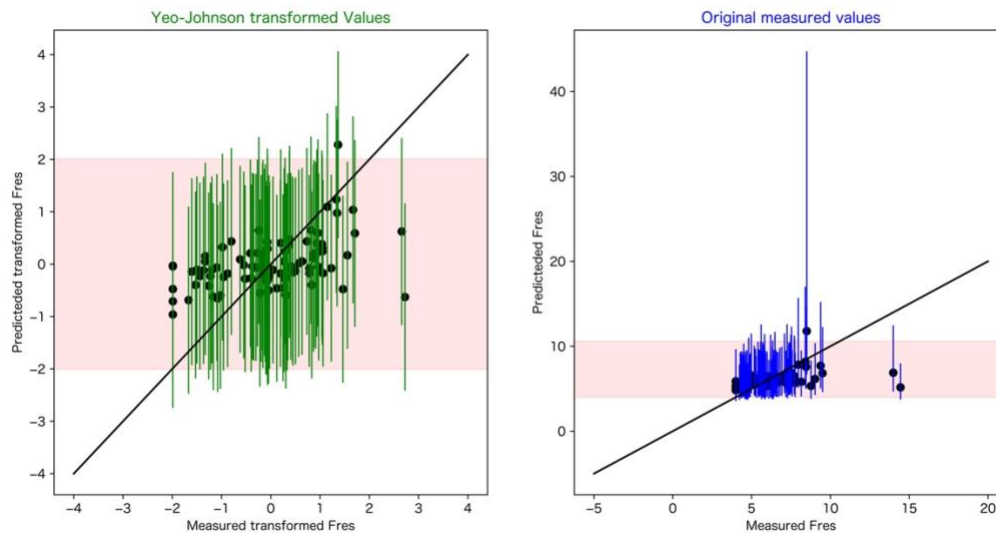
Male: Predicted vs Measured X5ex



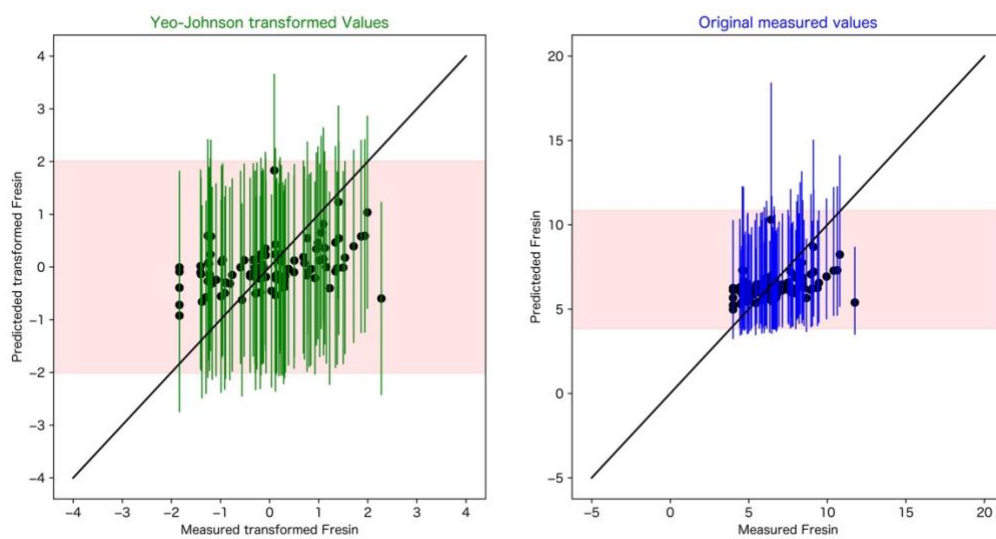
Male: Predicted vs Measured X5delta



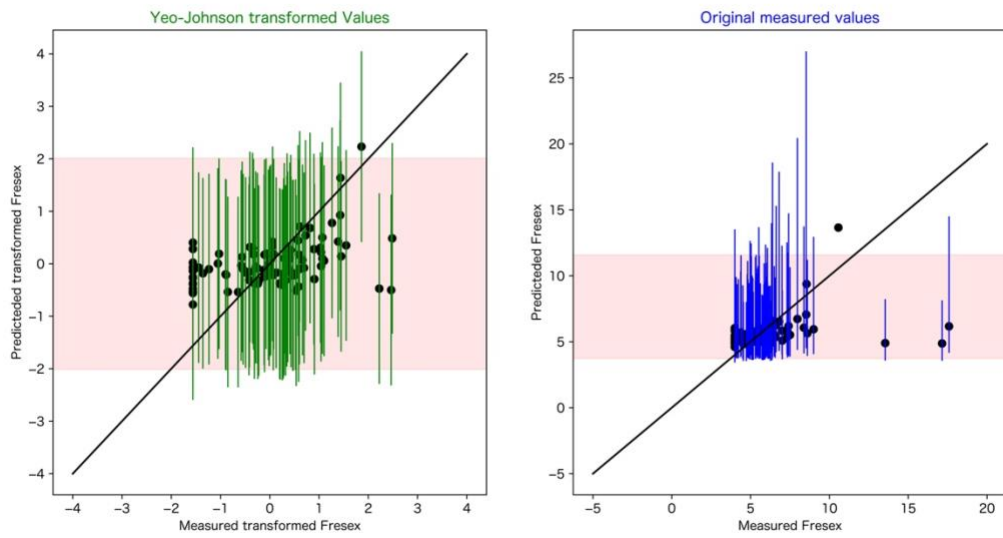
Male: Predicted vs Measured Fres



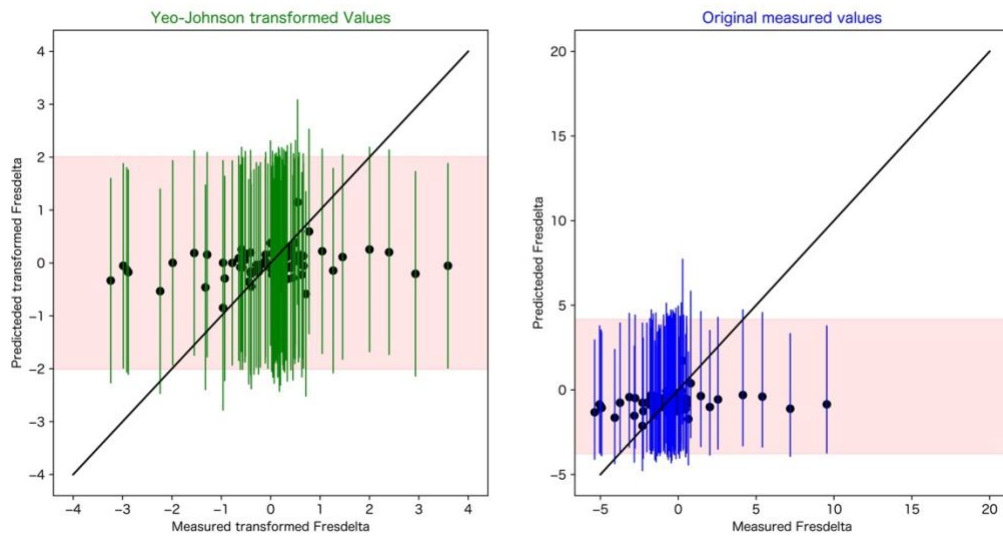
Male: Predicted vs Measured Fresin



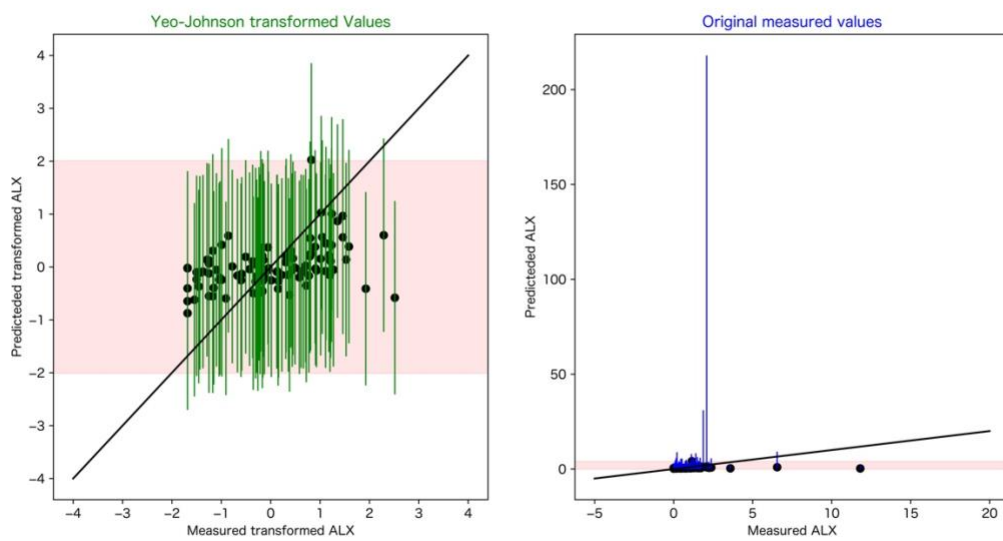
Male: Predicted vs Measured Fresex



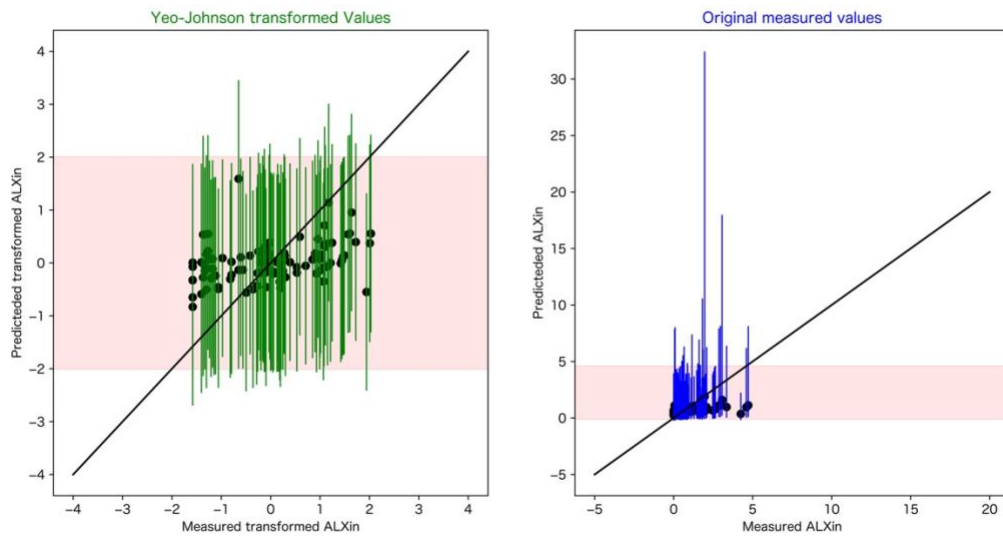
Male: Predicted vs Measured Fresdelta



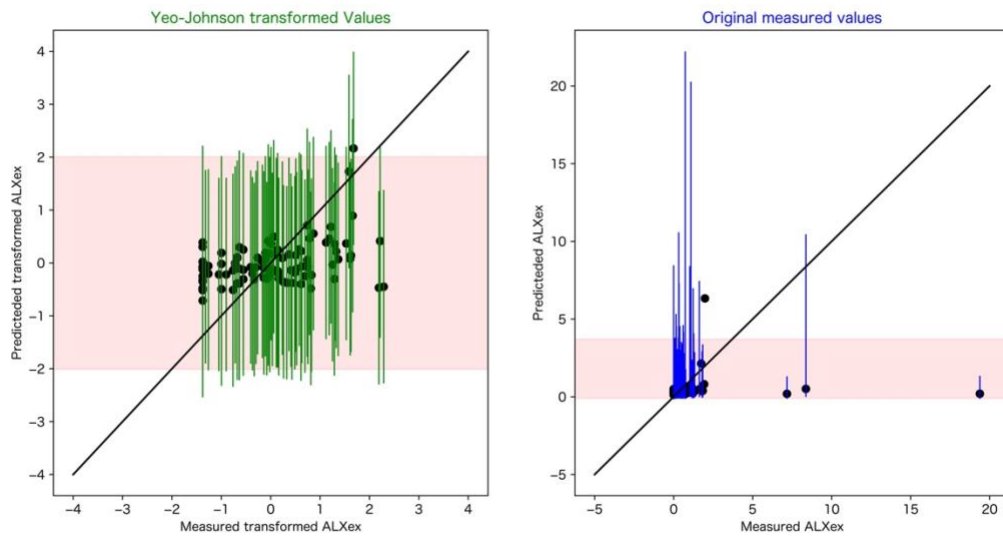
Male: Predicted vs Measured ALX



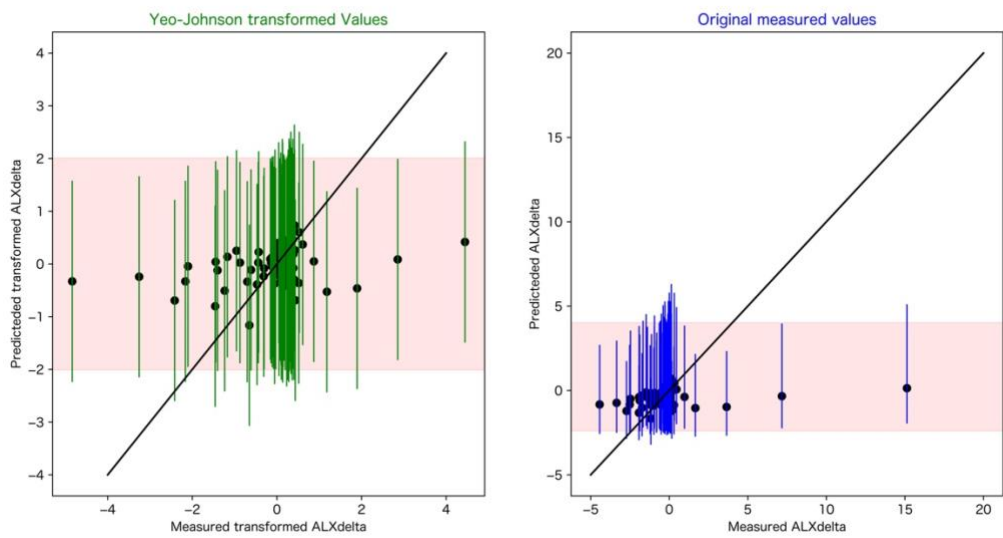
Male: Predicted vs Measured ALXin



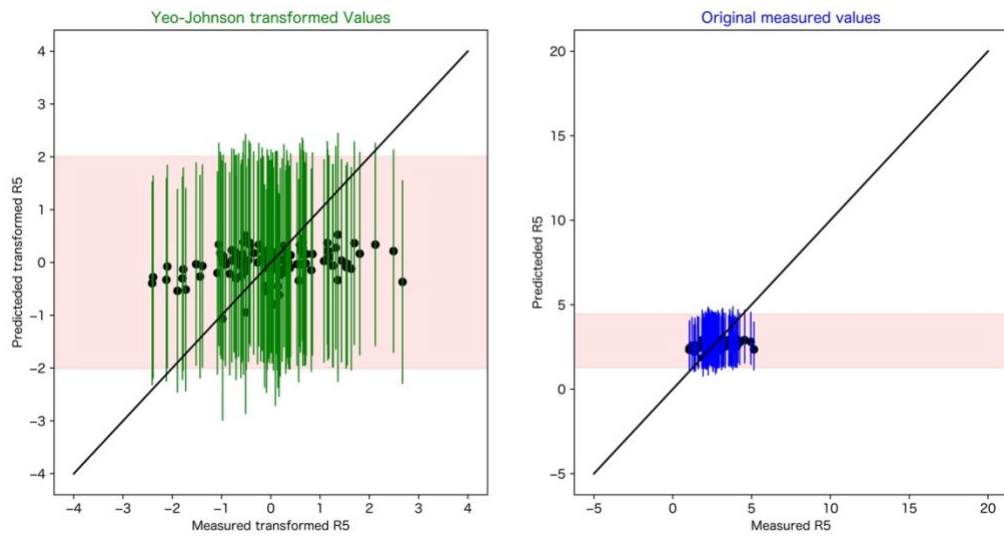
Male: Predicted vs Measured ALXex



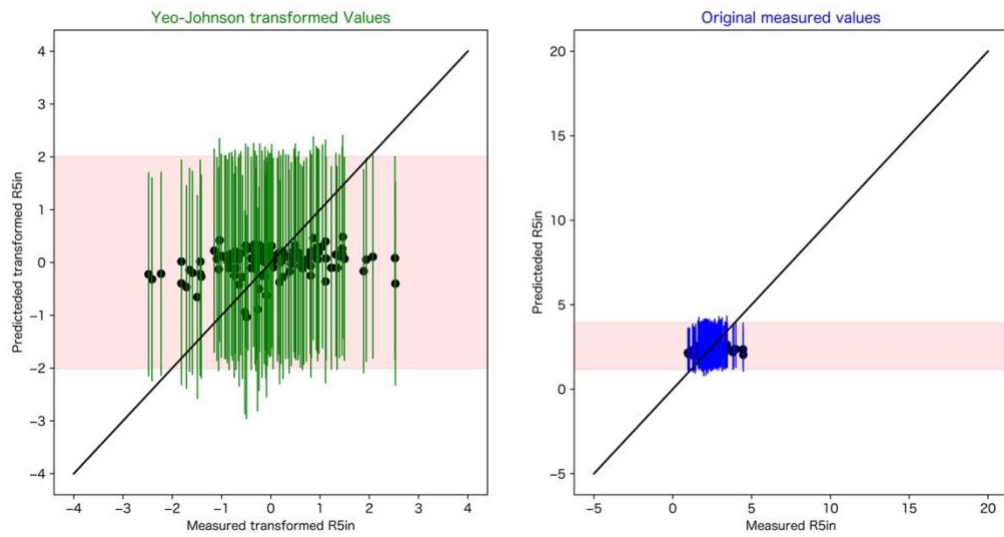
Male: Predicted vs Measured ALXdelta



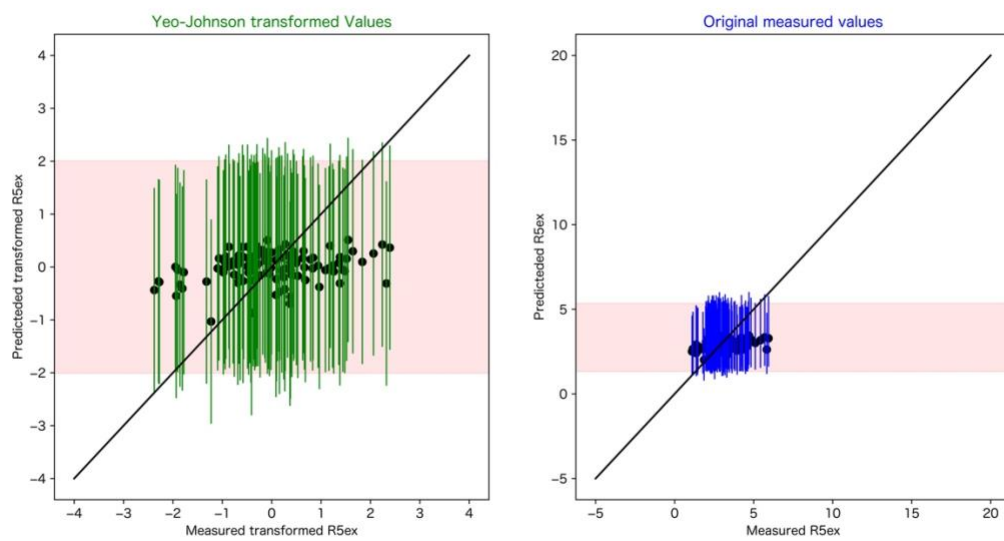
Female: Predicted vs Measured R5



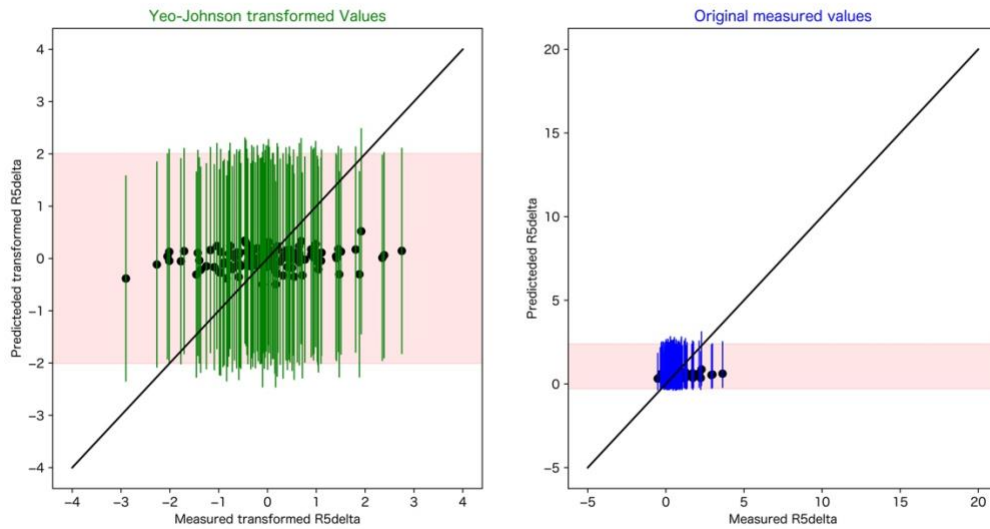
Female: Predicted vs Measured R5in



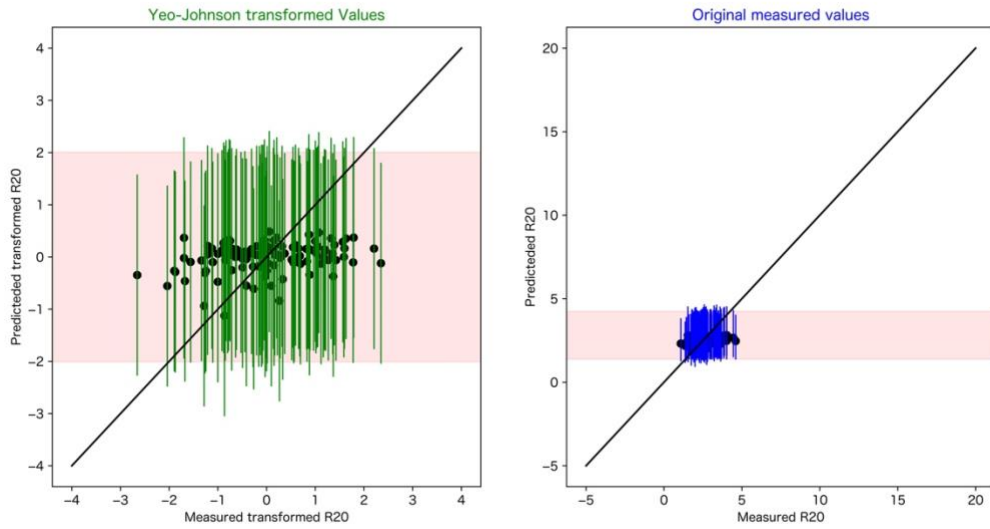
Female: Predicted vs Measured R5ex



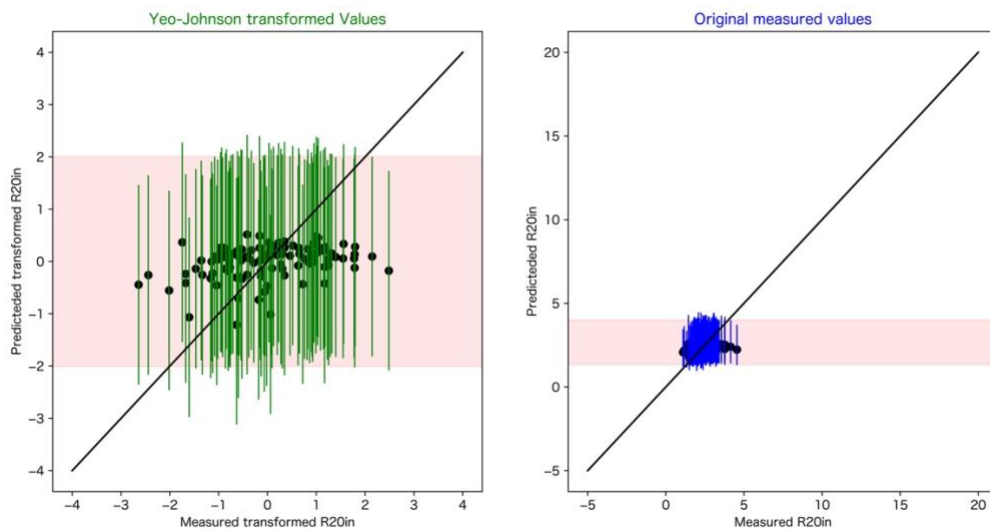
Female: Predicted vs Measured R5delta



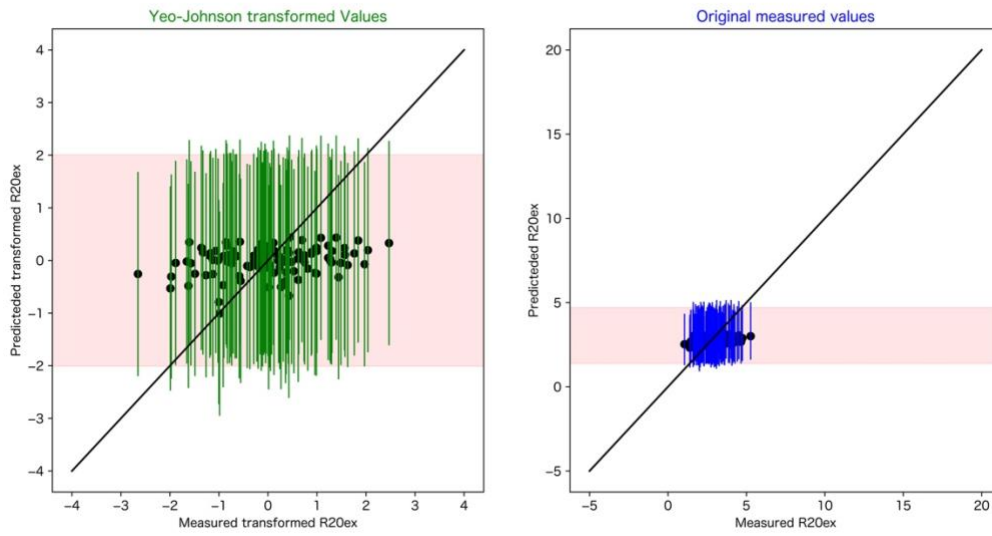
Female: Predicted vs Measured R20



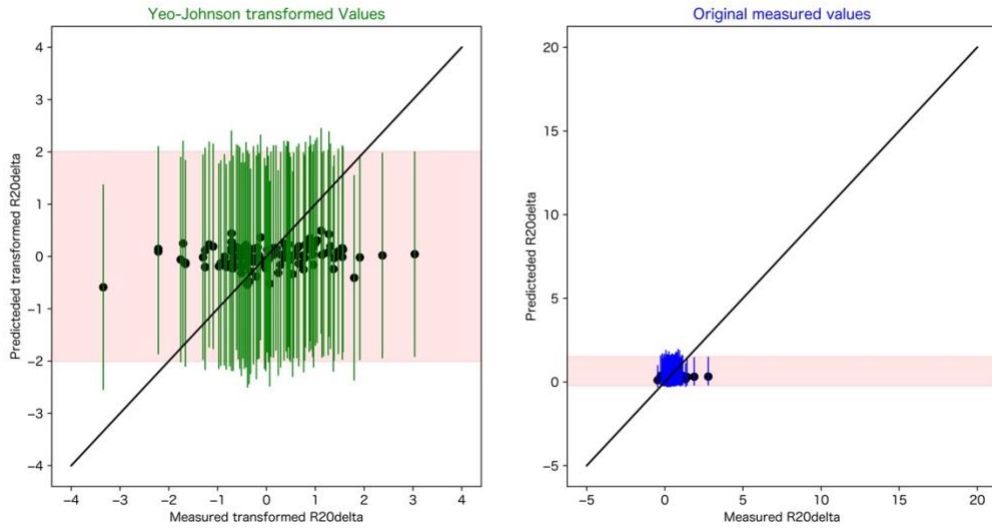
Female: Predicted vs Measured R20in



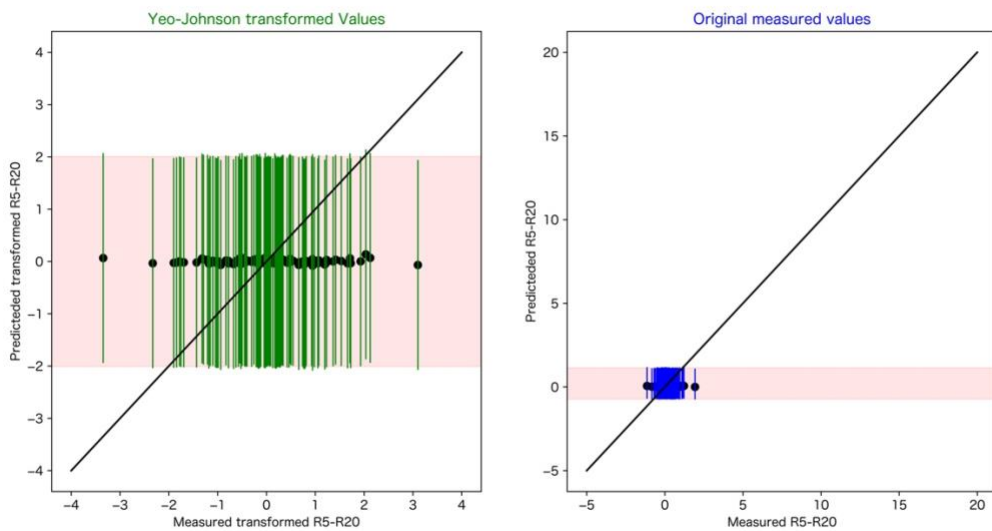
Female: Predicted vs Measured R20ex



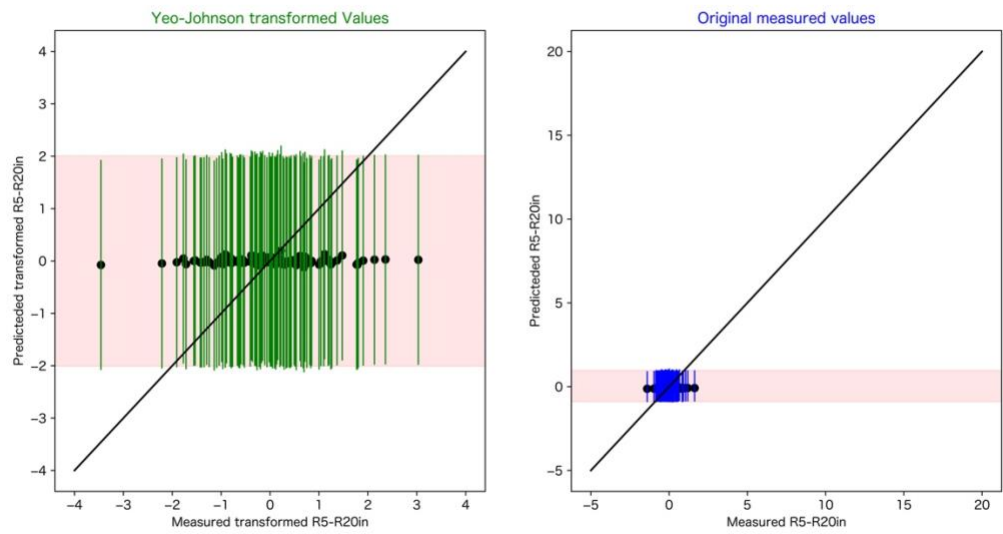
Female: Predicted vs Measured R20delta



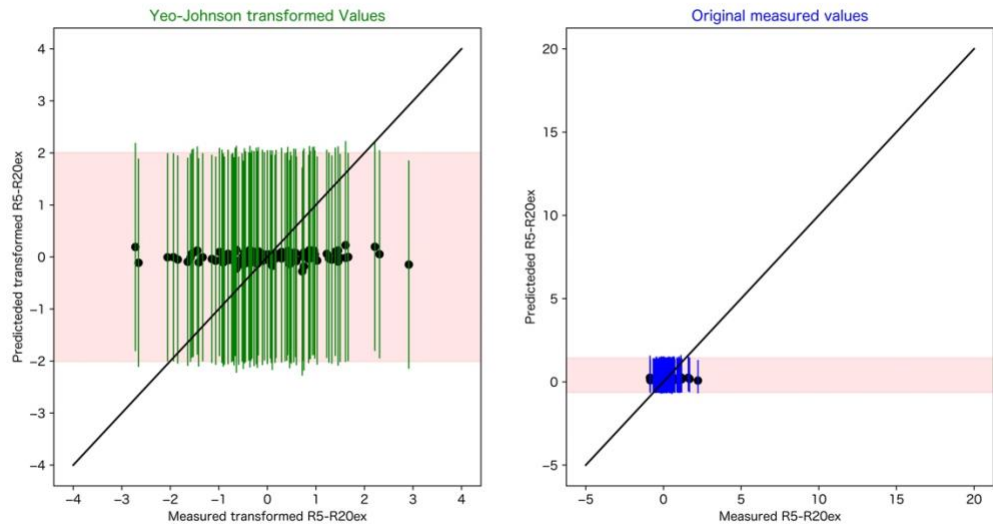
Female: Predicted vs Measured R5-R20



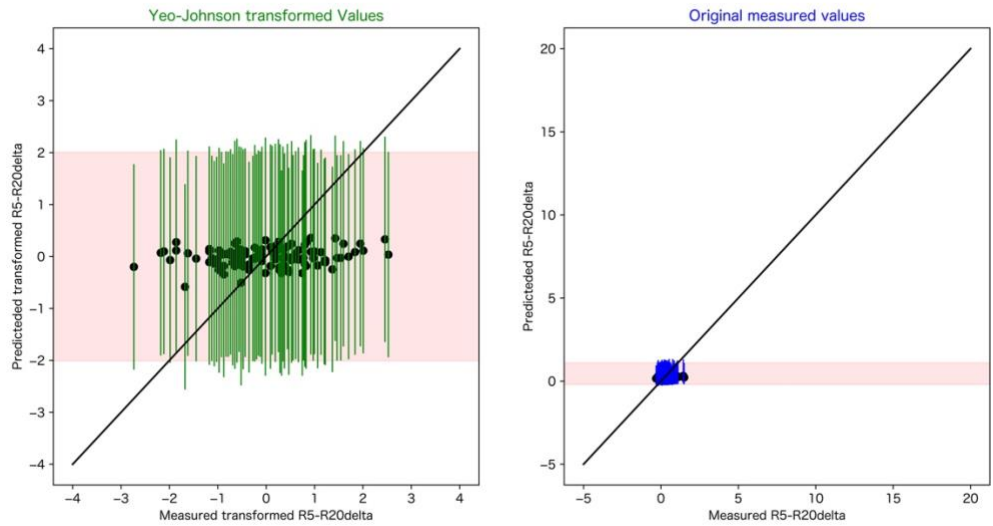
Female: Predicted vs Measured R5-R20in



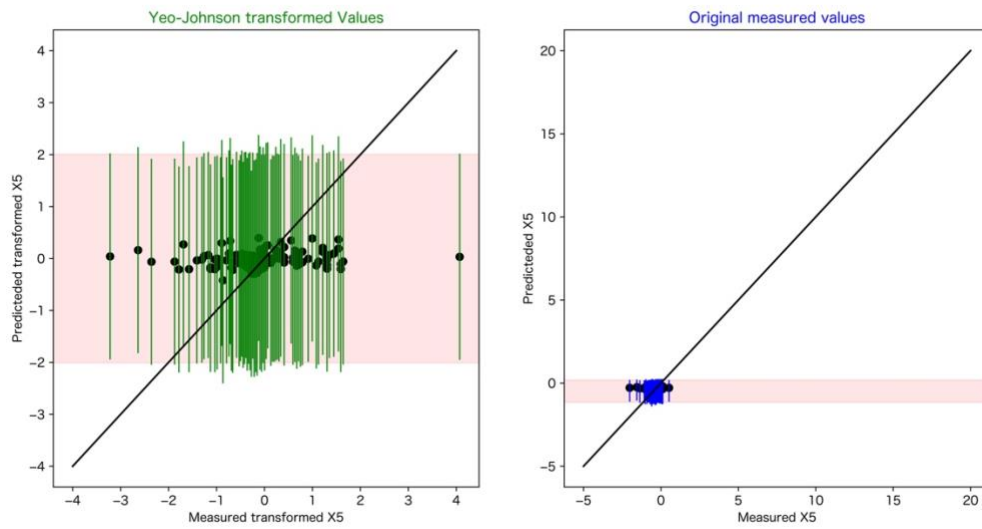
Female: Predicted vs Measured R5-R20ex



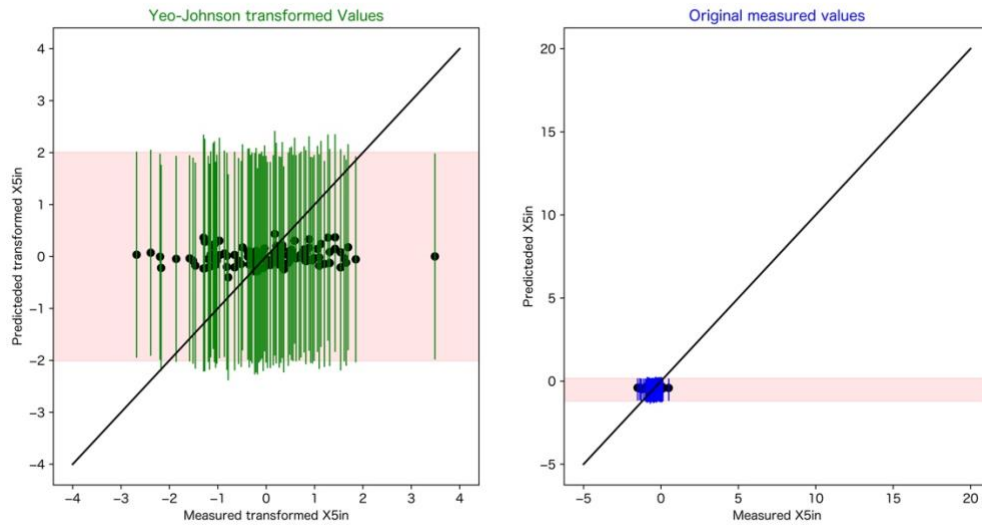
Female: Predicted vs Measured R5-R20delta



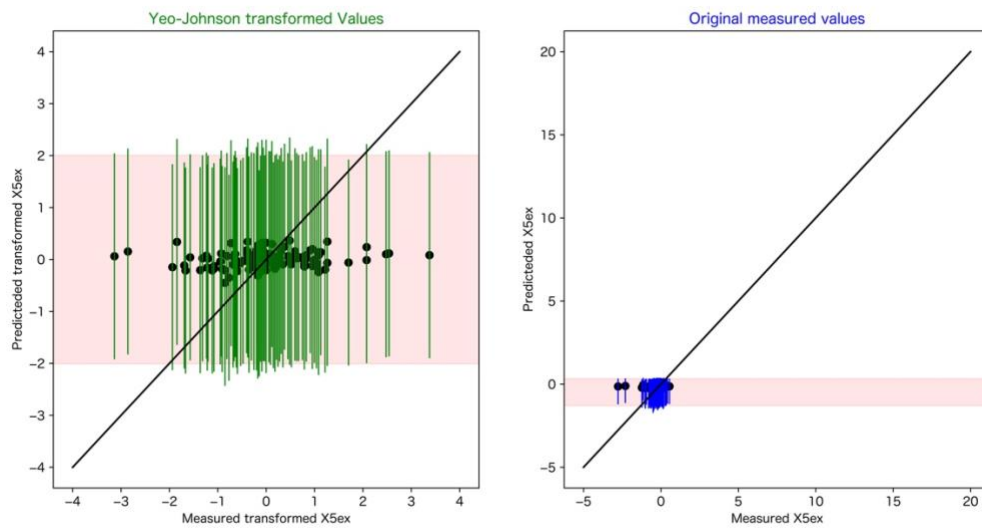
Female: Predicted vs Measured X5



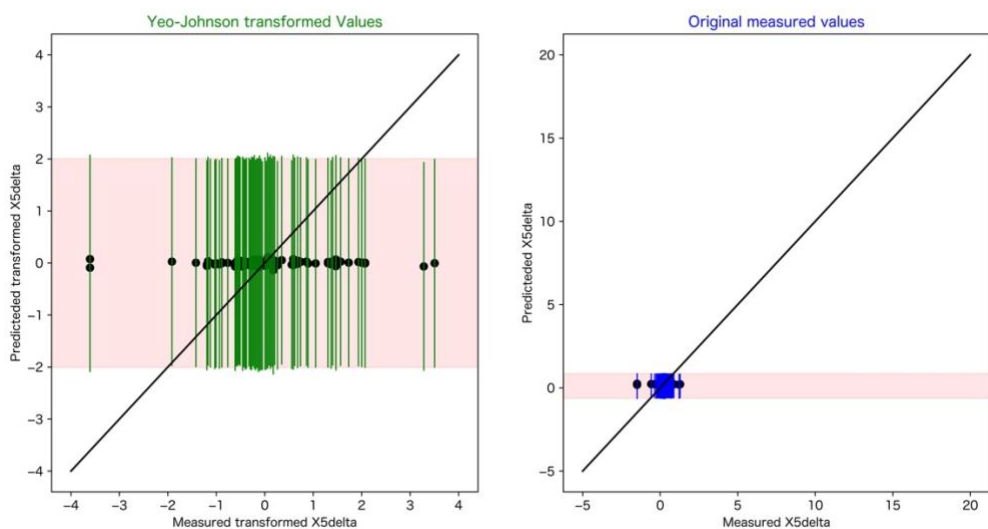
Female: Predicted vs Measured X5in



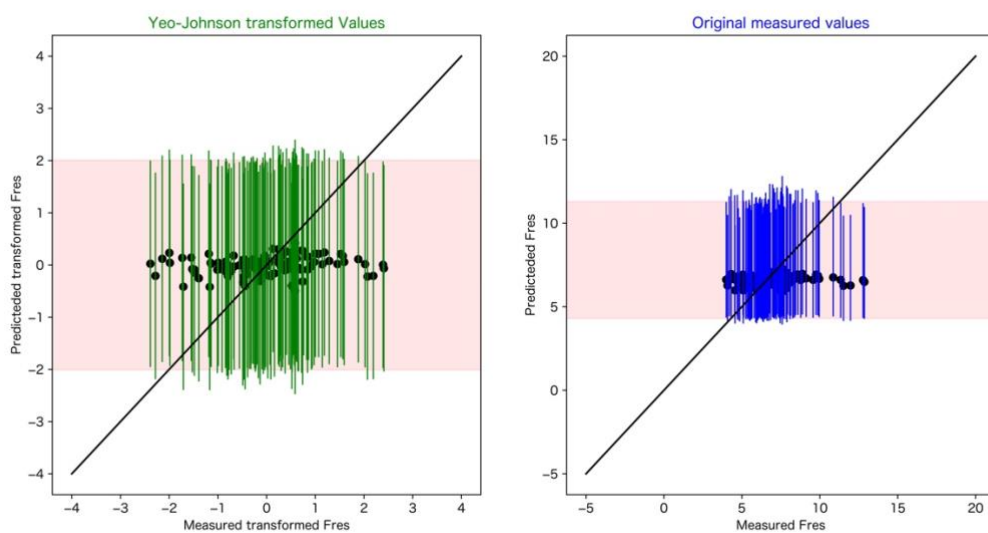
Female: Predicted vs Measured X5ex



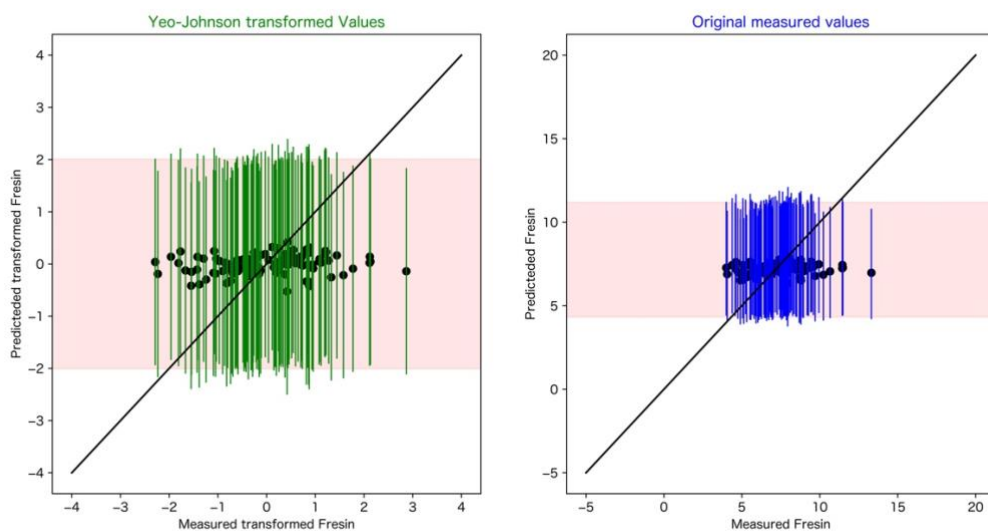
Female: Predicted vs Measured X5delta



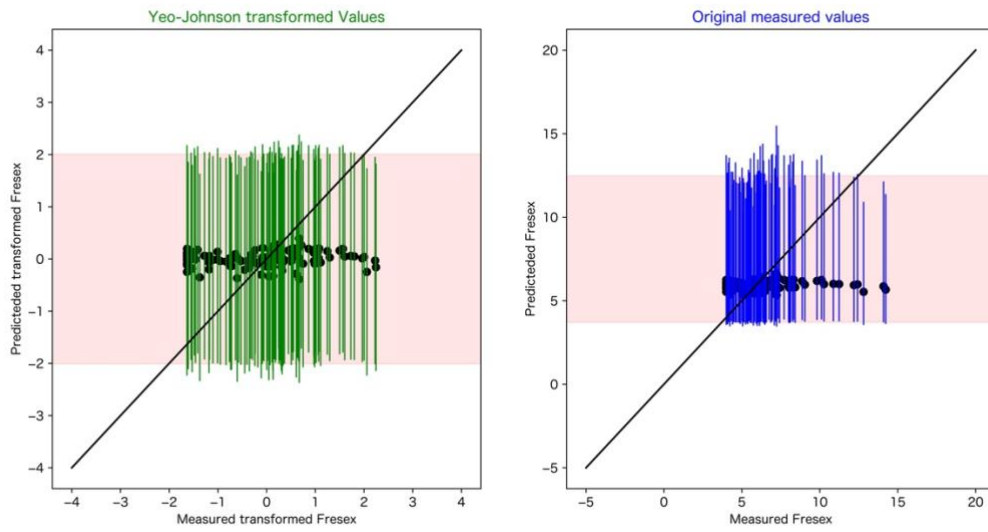
Female: Predicted vs Measured Fres



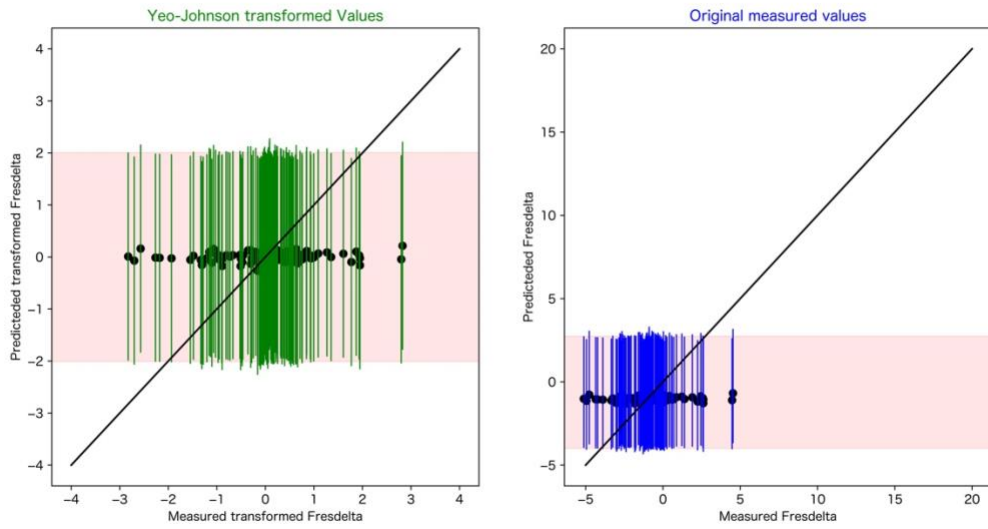
Female: Predicted vs Measured Fresin



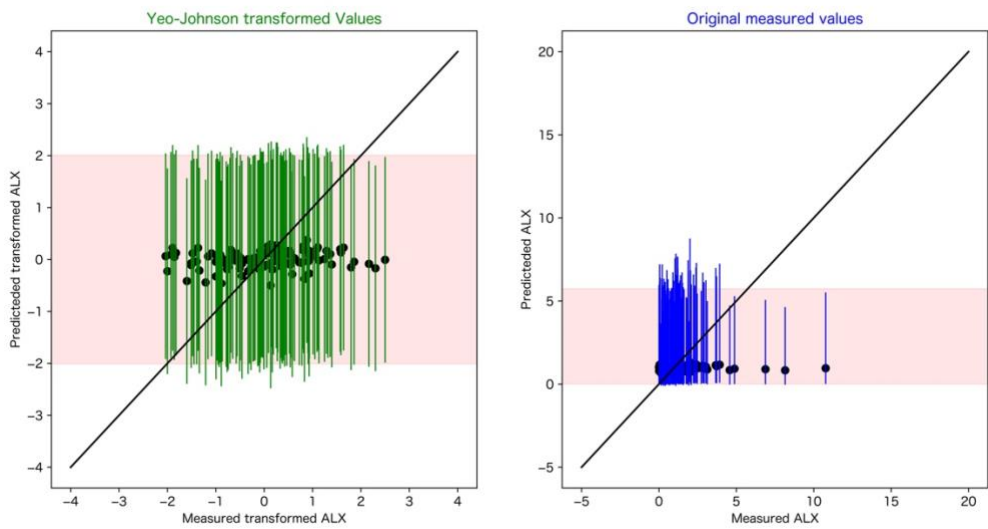
Female: Predicted vs Measured Fresex



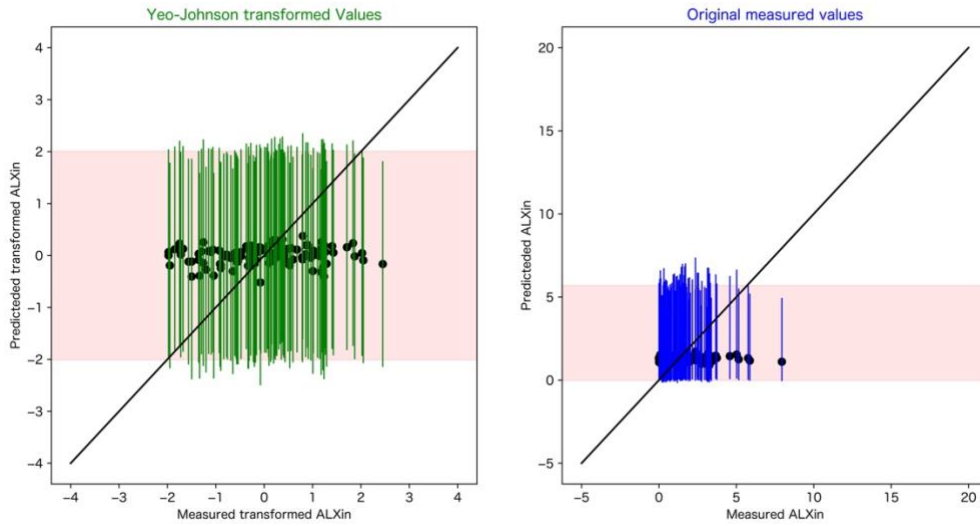
Female: Predicted vs Measured Fresdelta



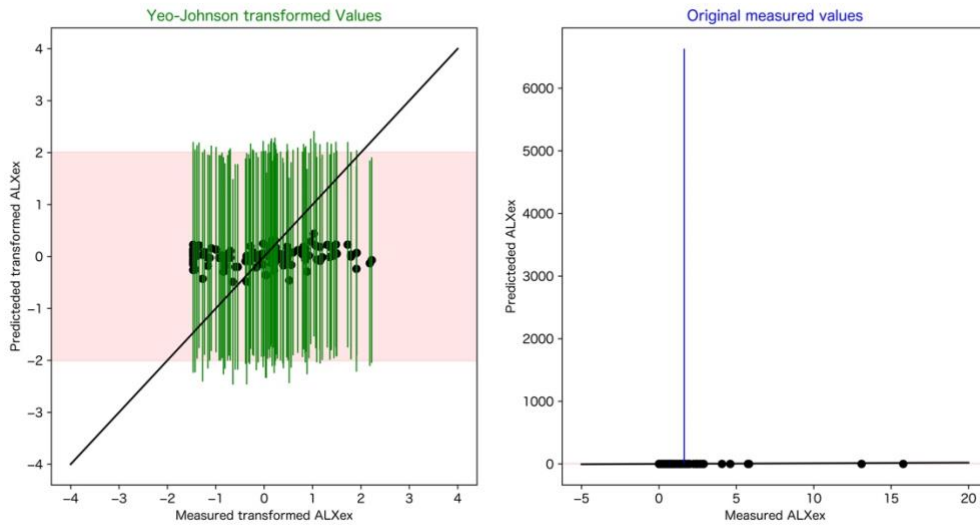
Female: Predicted vs Measured ALX



Female: Predicted vs Measured ALXin



Female: Predicted vs Measured ALXex



Female: Predicted vs Measured ALXdelta

