

Simulation Update

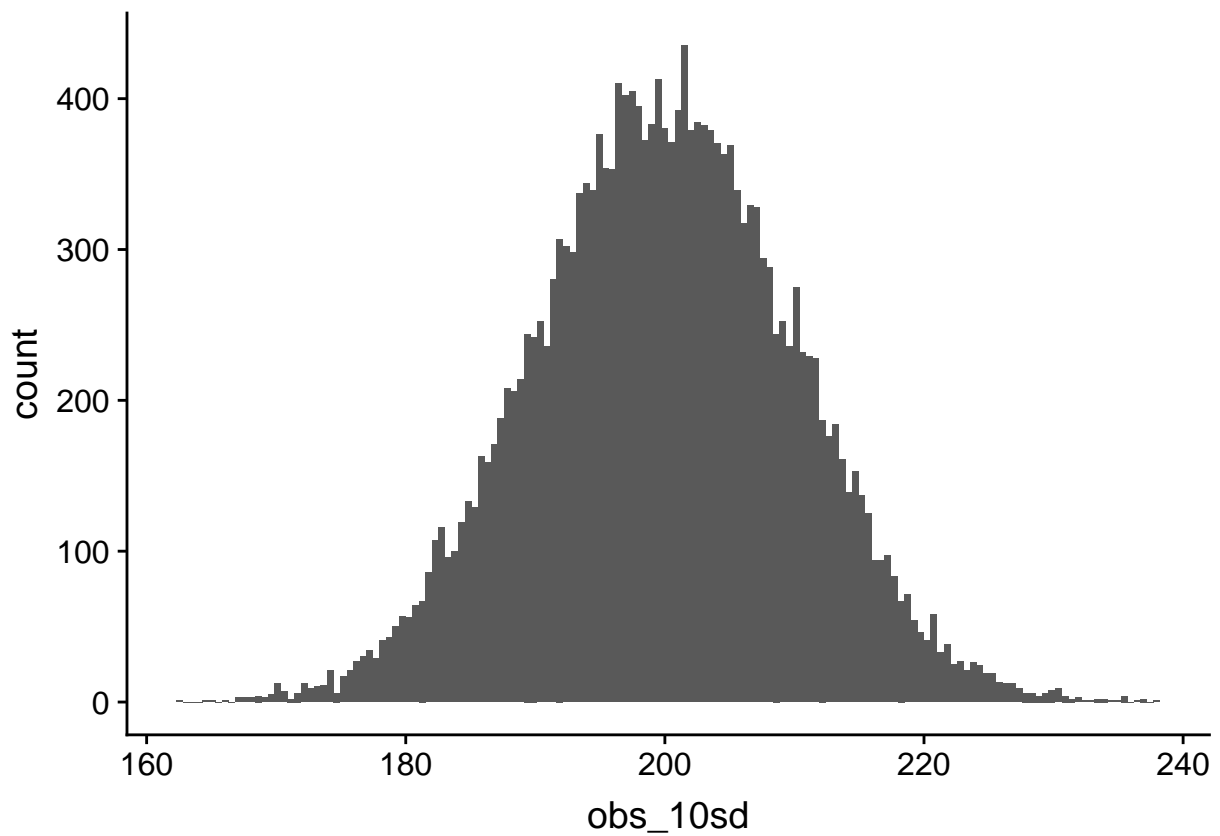
Michael W Belitz

July 11, 2019

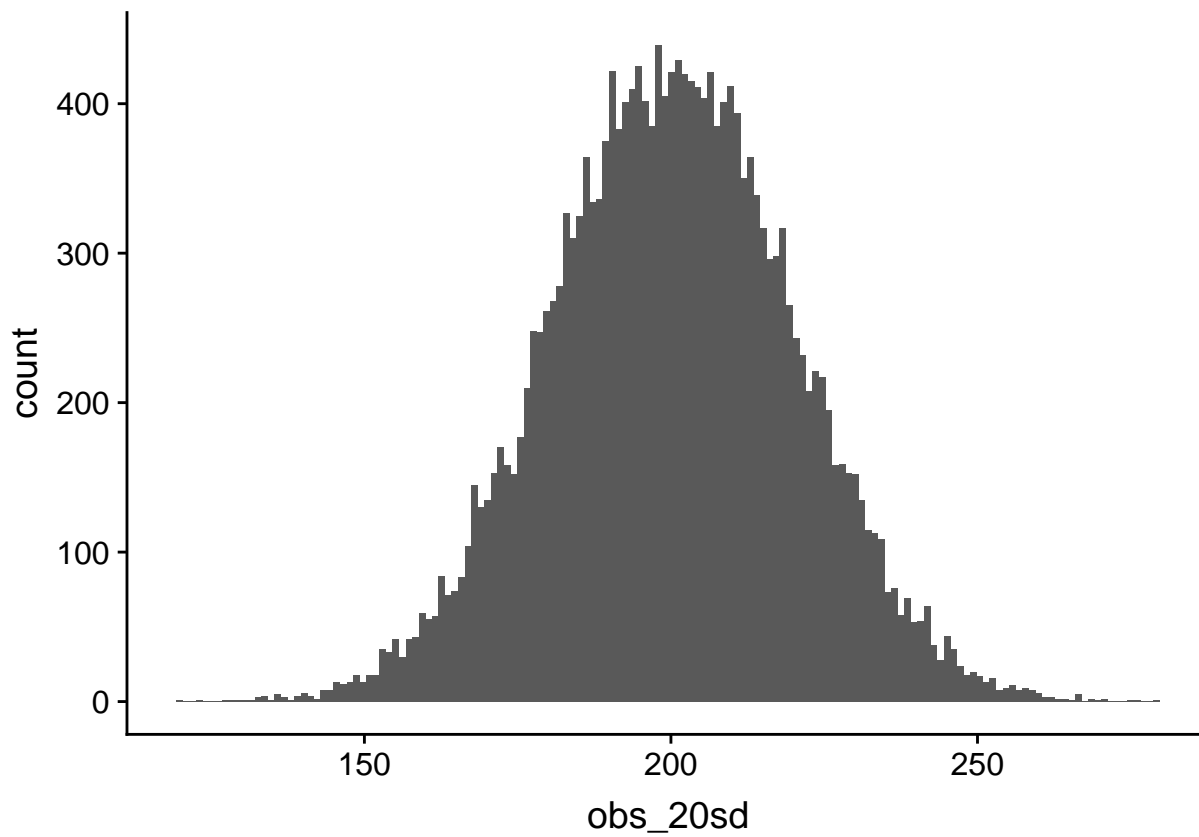
Unimodal Distribution

Below are the simulated distributions of three hypothetical species.

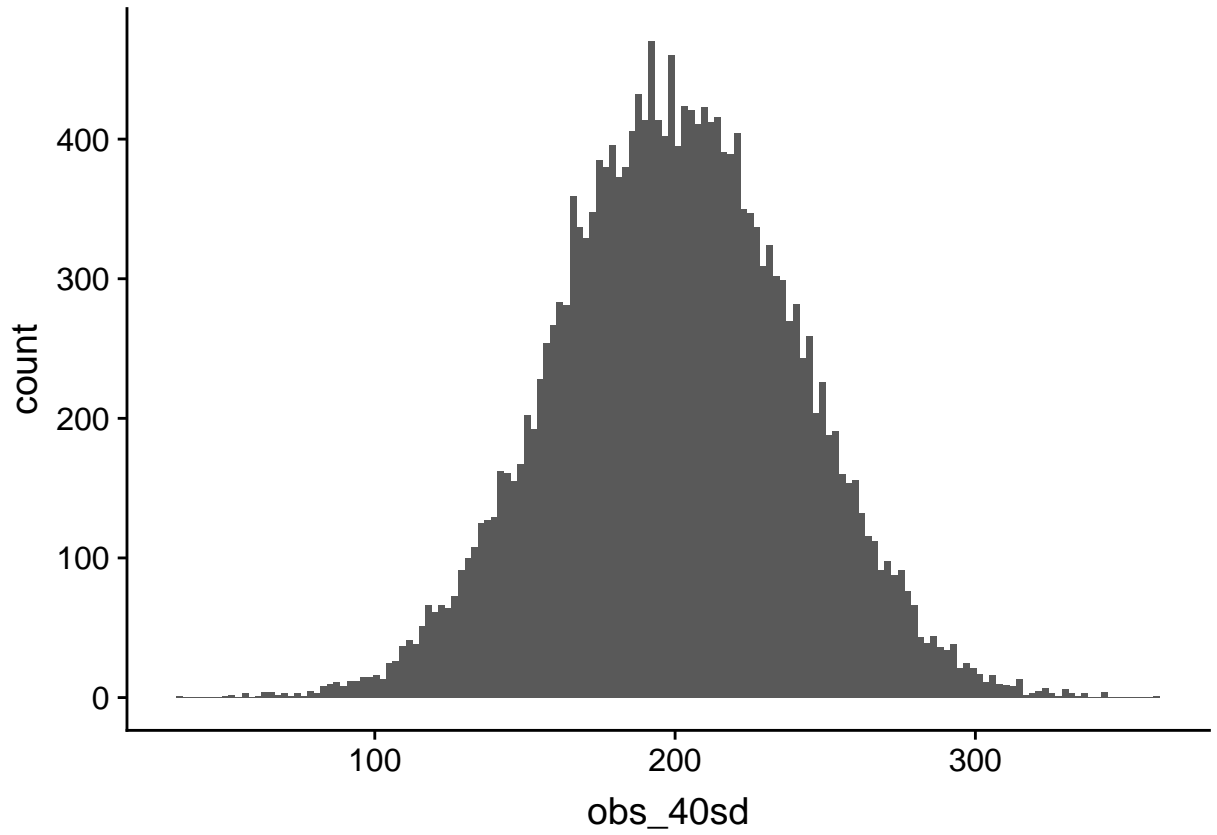
The first represents a species that is univoltine and has a fairly narrow flight length (Mean 200, 10 SD).



The next represents a species with a longer flight length (Mean 200, 20 SD).



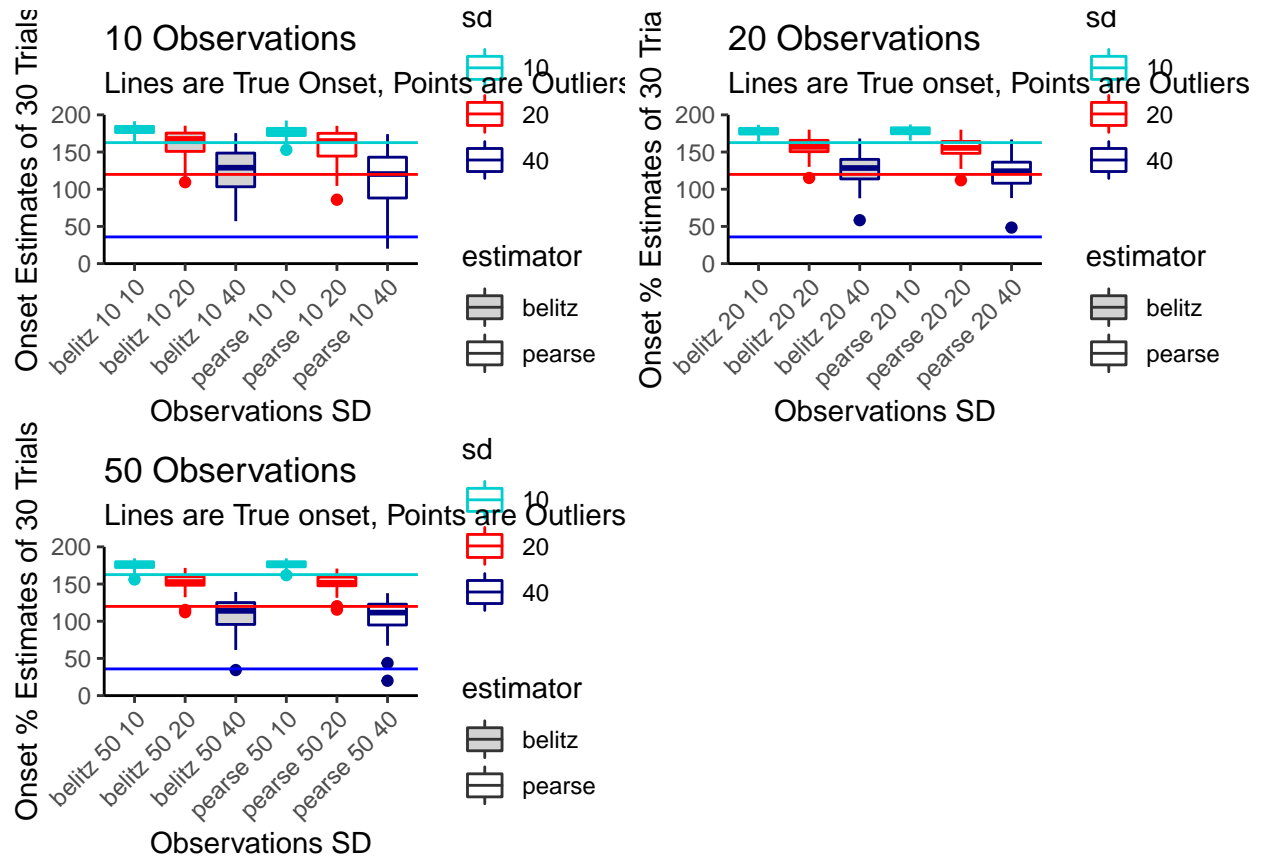
And the third would more likely be a species that flies year long with overlapping broods but has one peak in density (Mean 200, 40 SD).



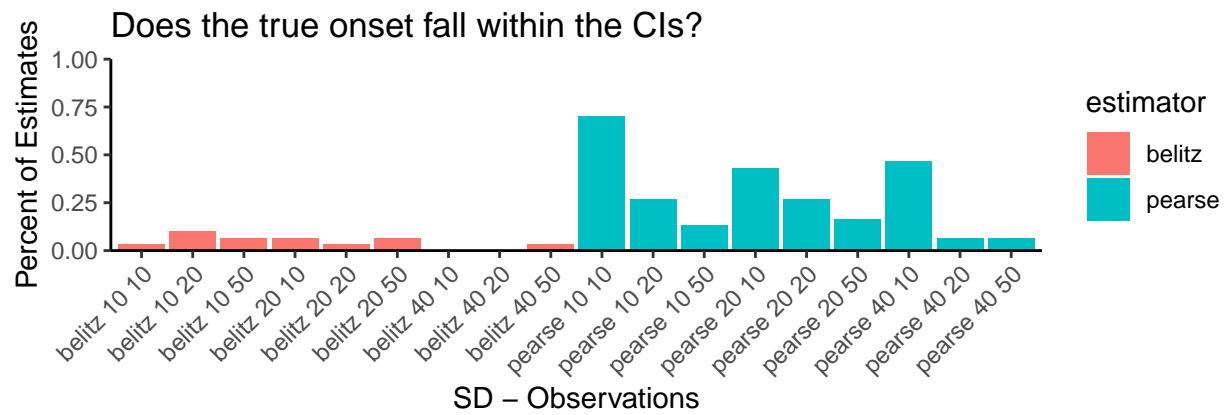
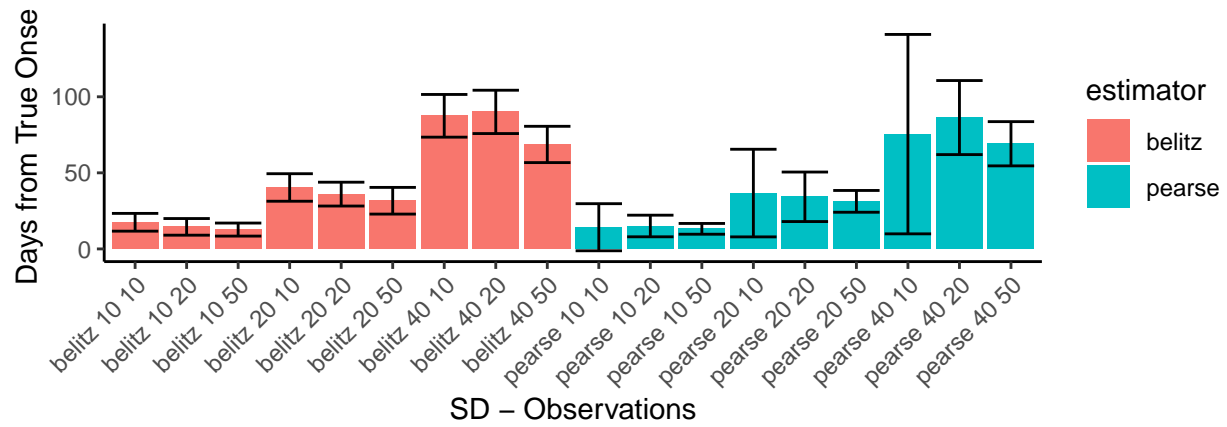
Results of unimodal simulation

Onset

For onset and offset estimates, I compared estimates derived from my biased-corrected weibull estimator to Will Pearce's R package. My estimator is similar in the MLE estimate but has smaller CIs.

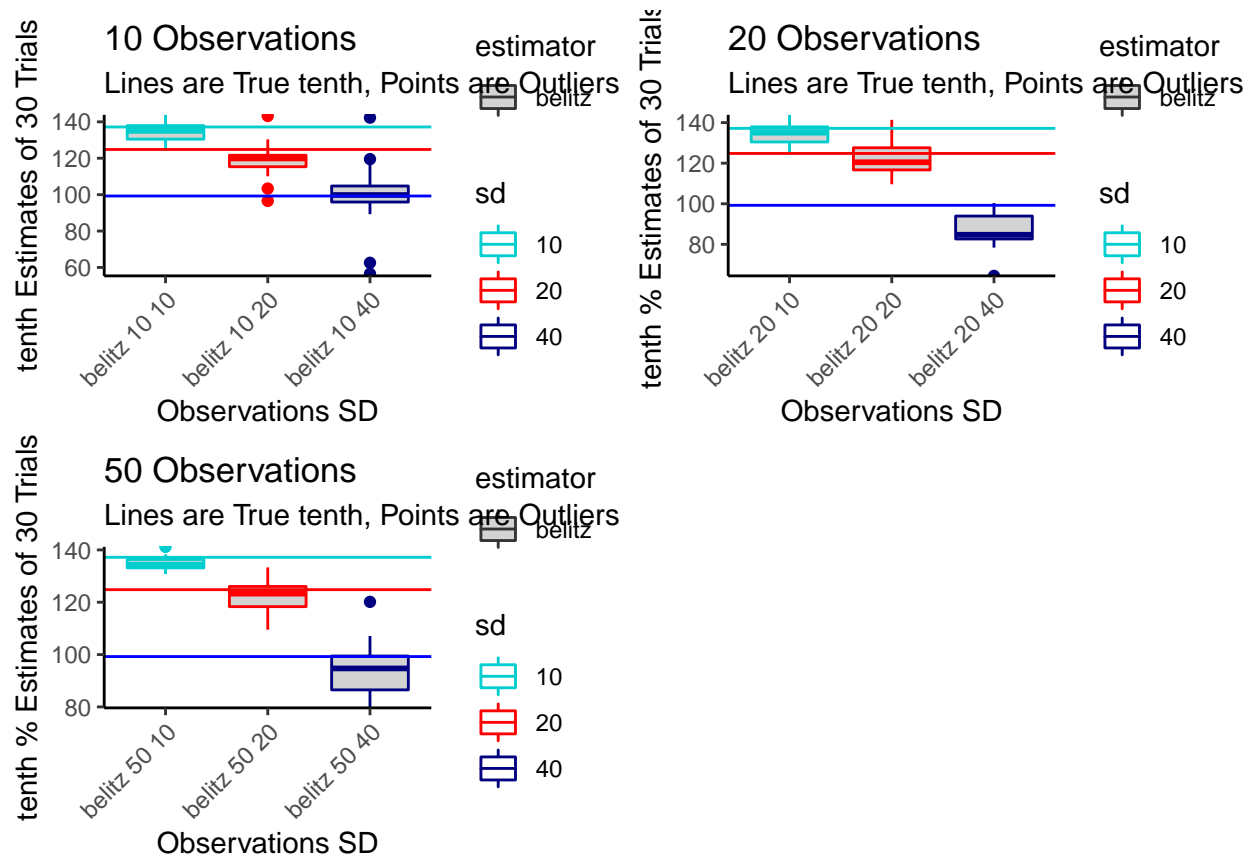


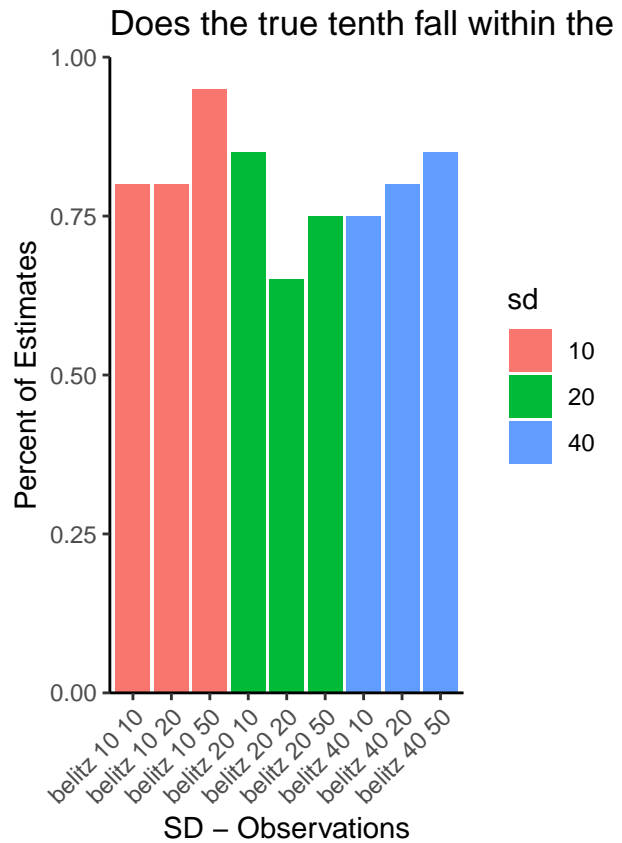
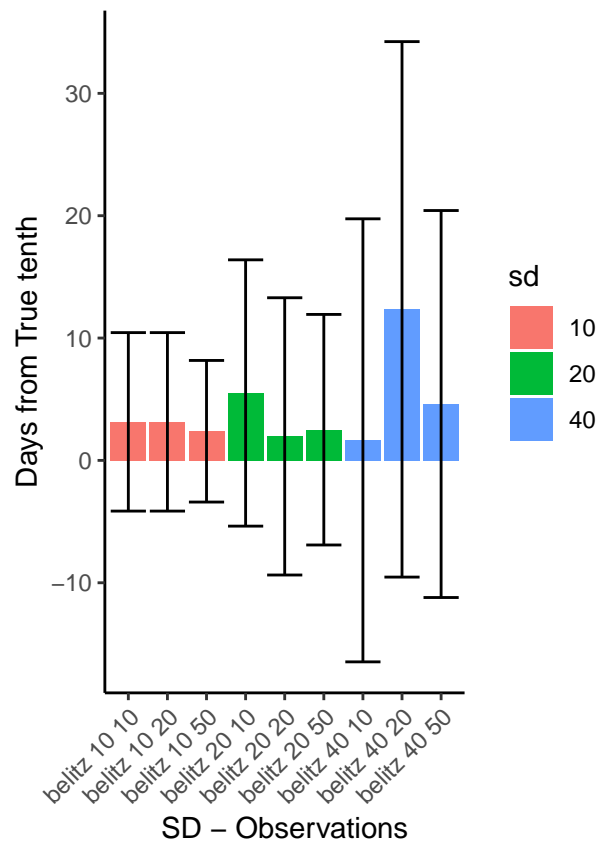
Although both estimators perform similar in how many days away they estimate from the “true onset”, Pearse’s CI include the “true onset” more often because of the much larger CI.



Tenth

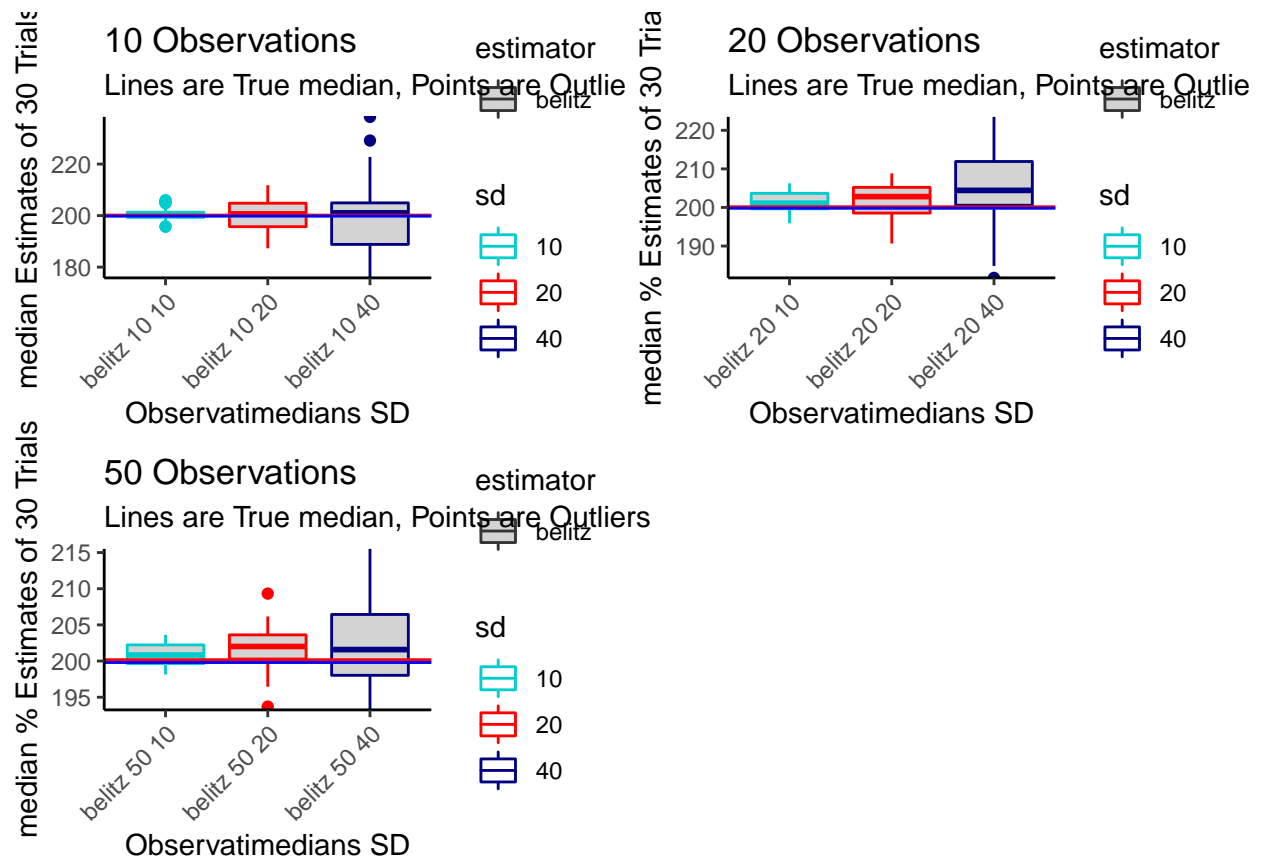
My estimator does better at estimatin the 10 percentile than onset.

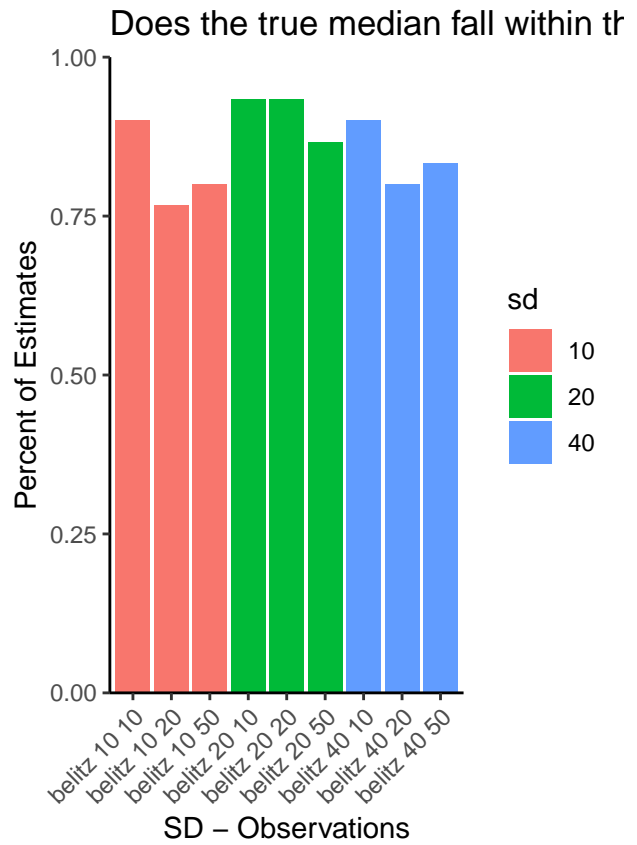
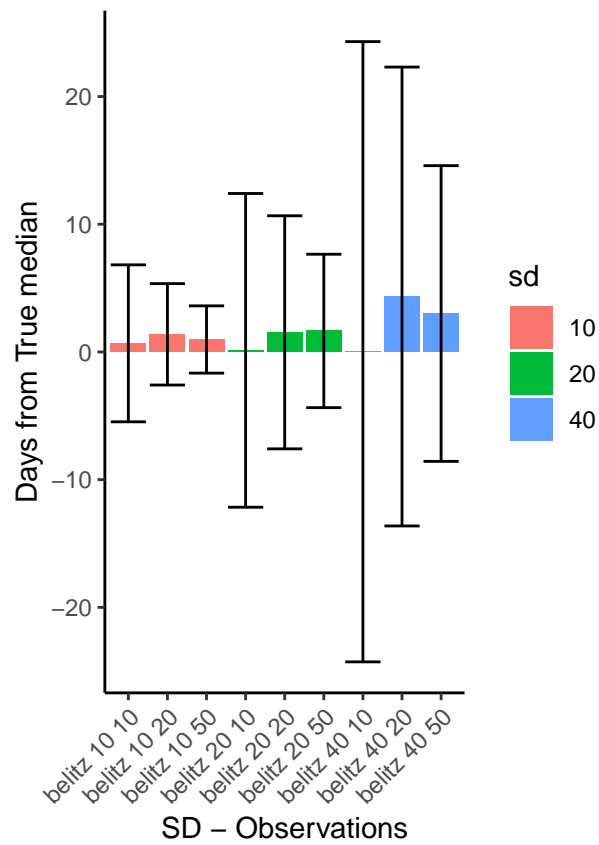




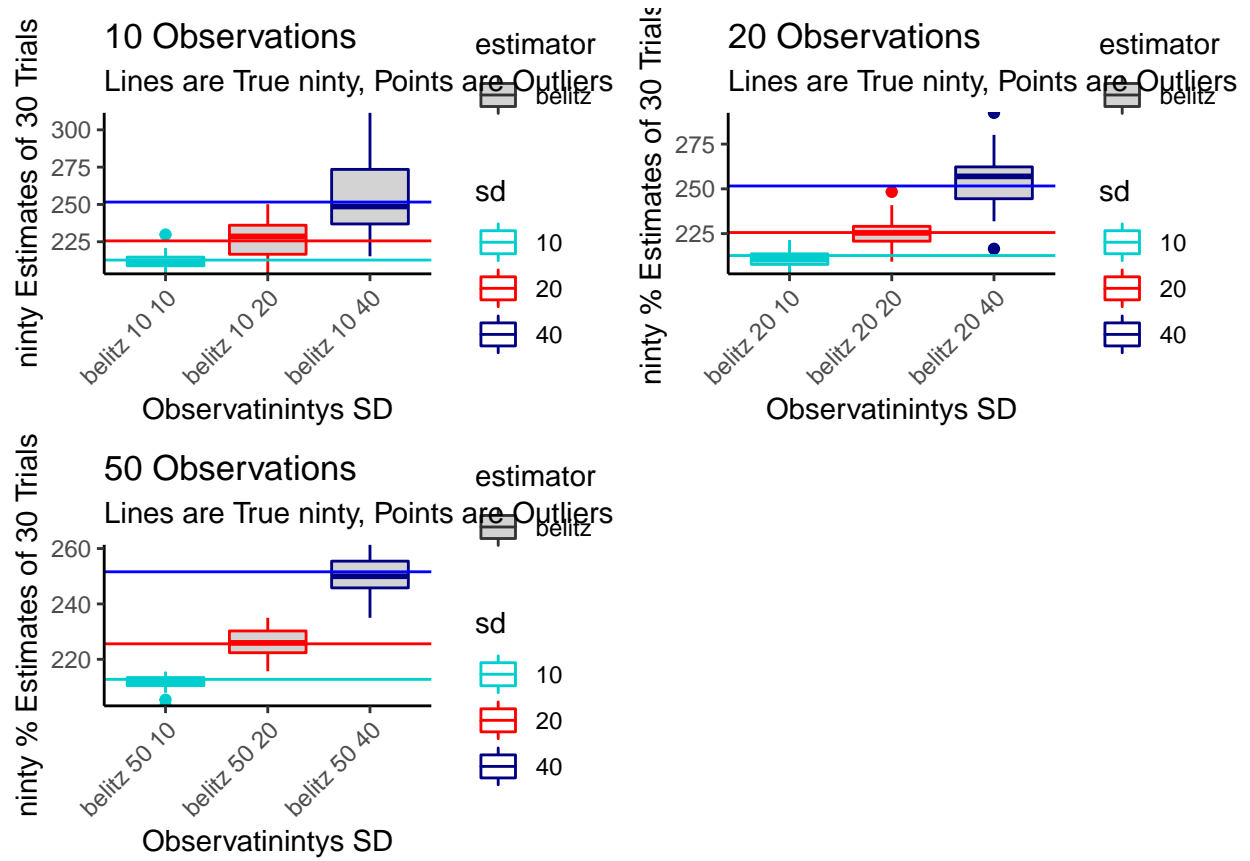
Median

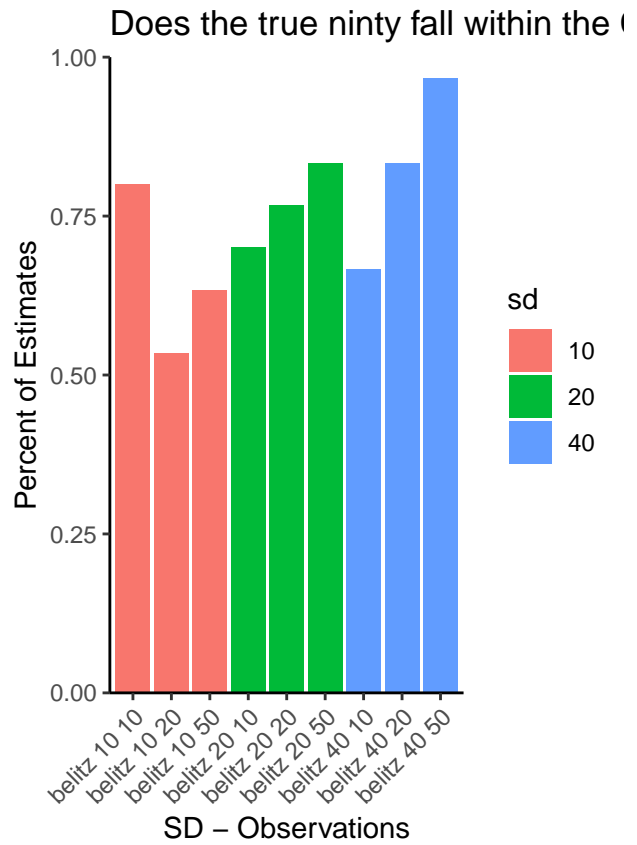
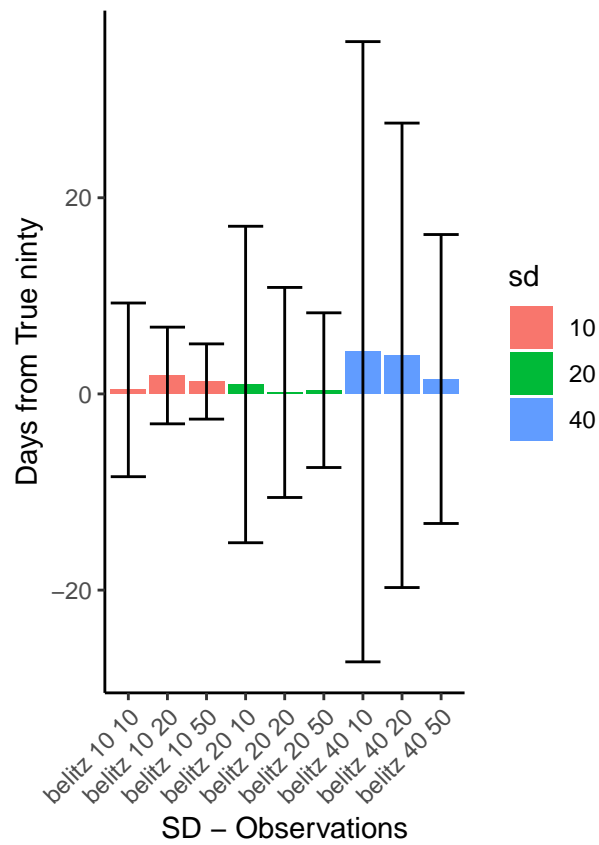
Median Estimates are even better.



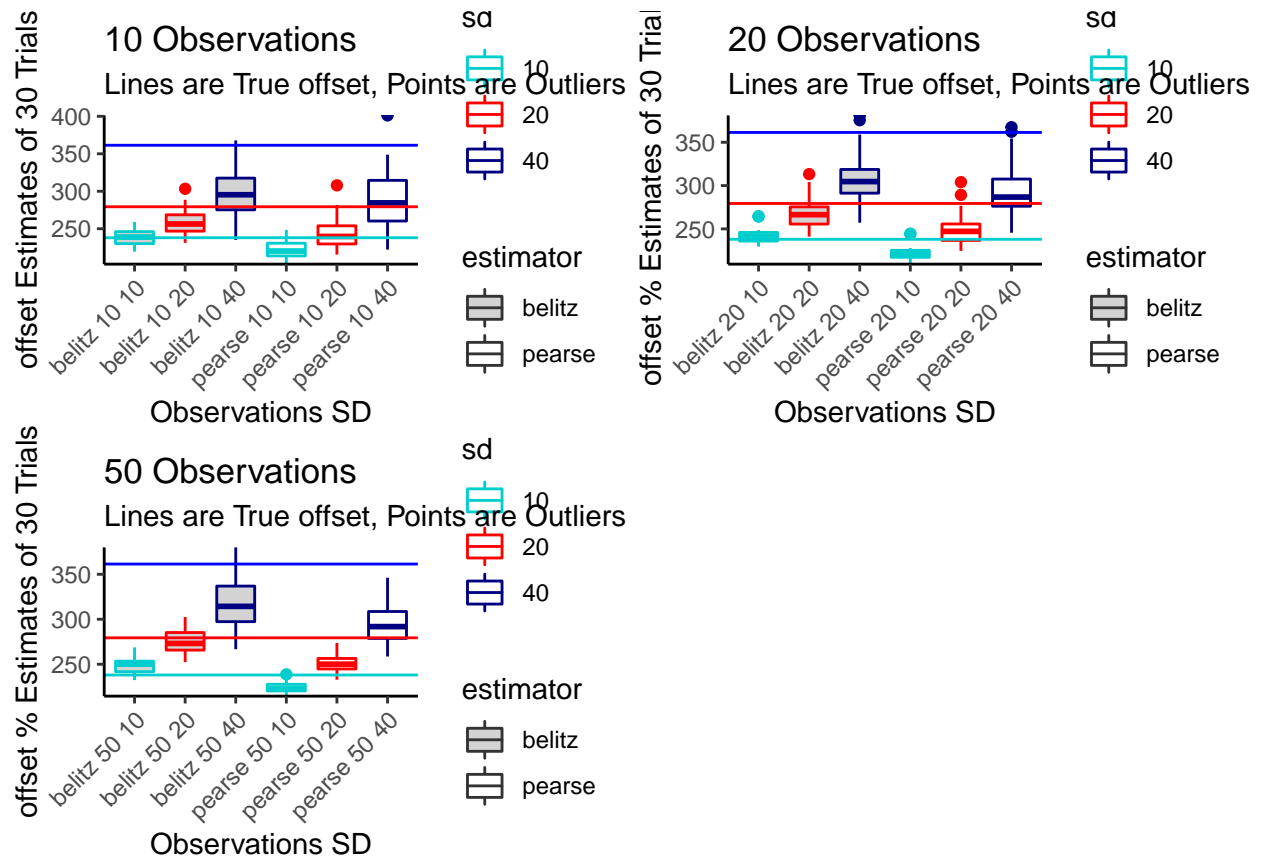


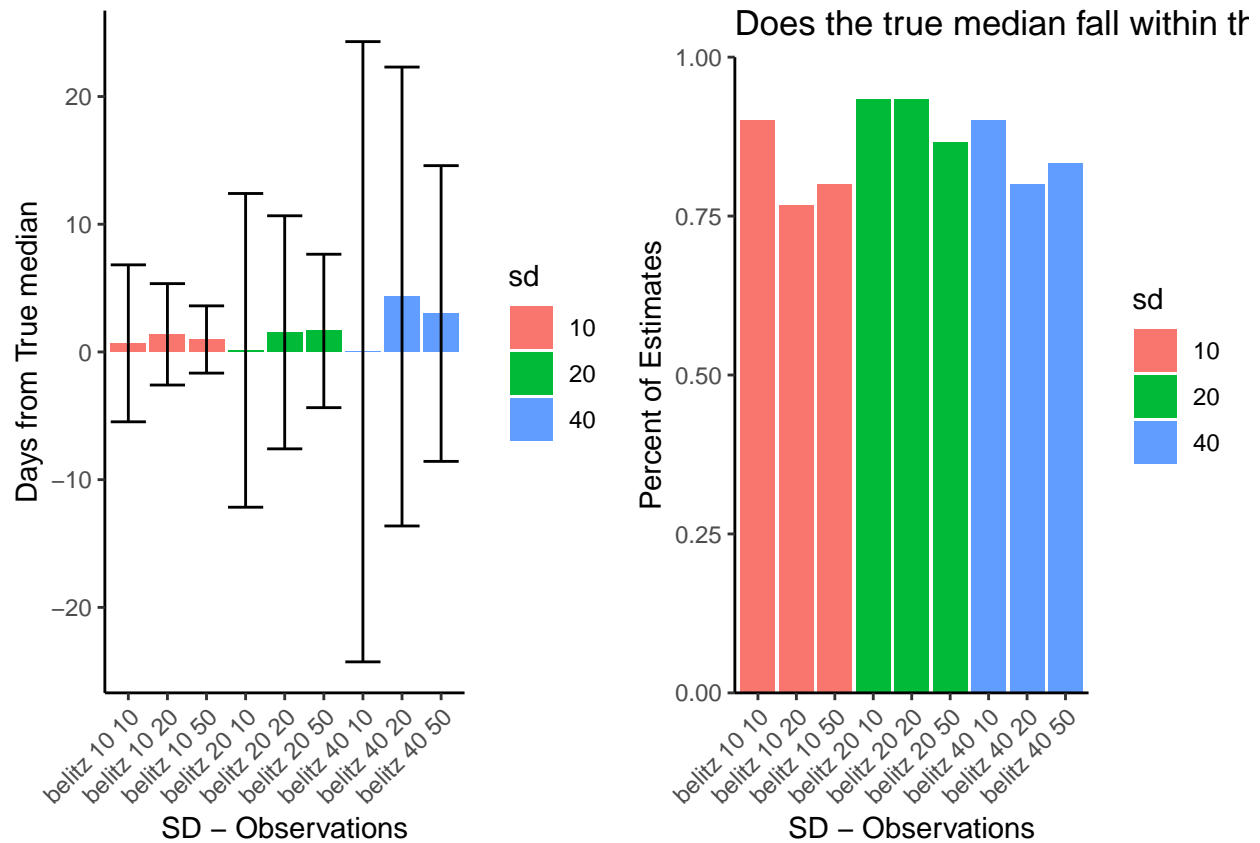
Ninety





Offset

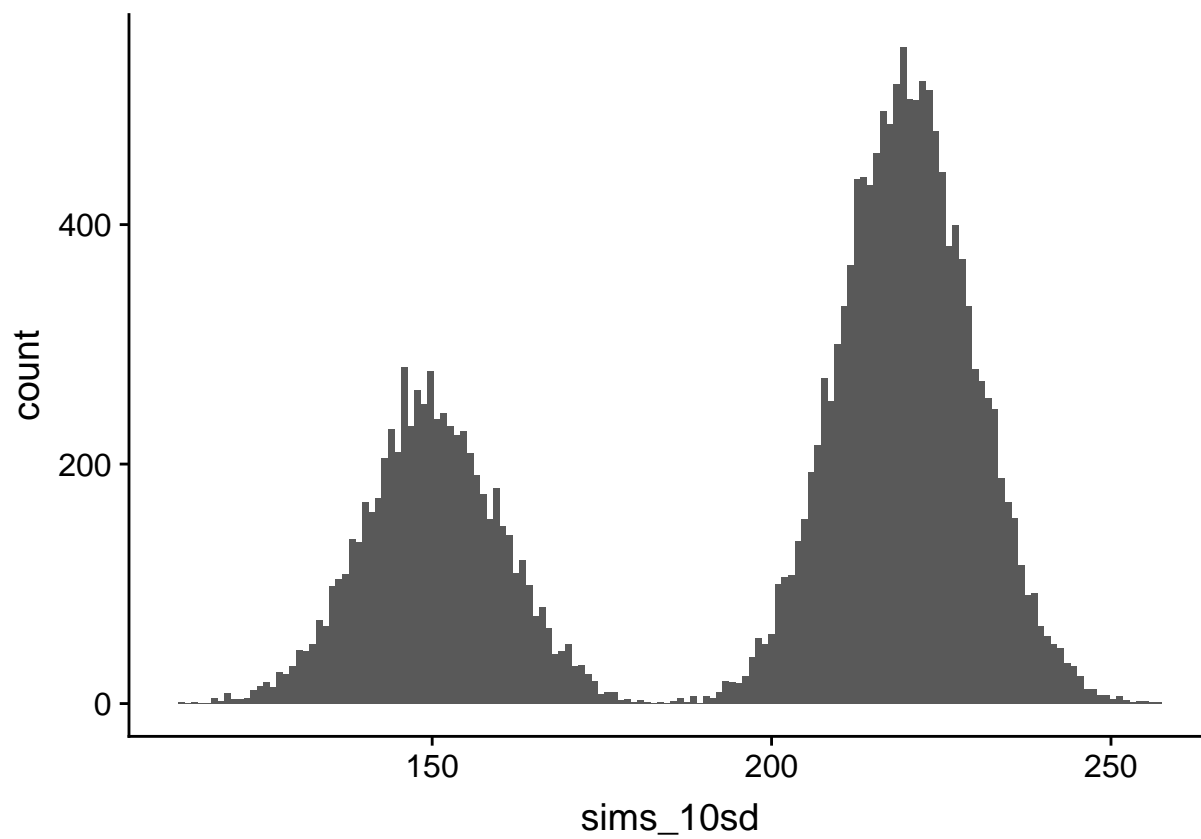




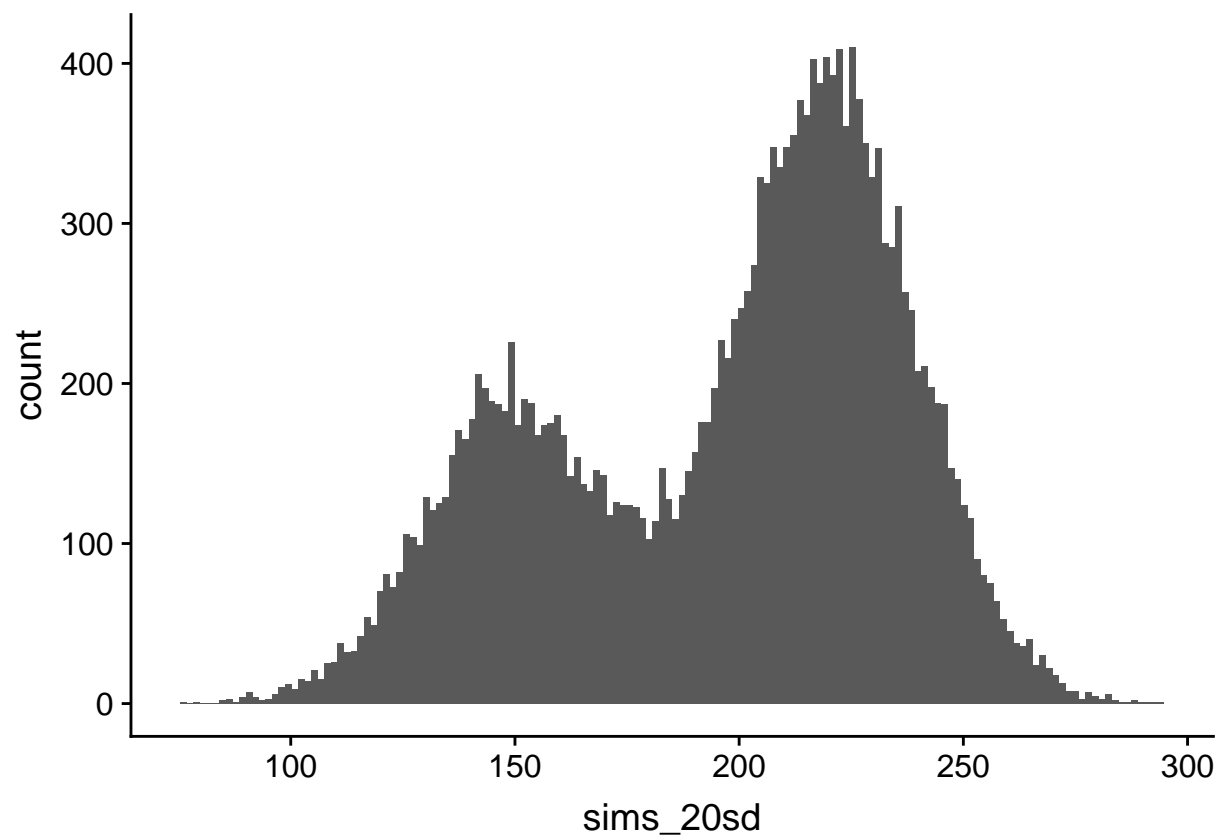
Bimodal Distribution

Below are the simulated distributions of two hypothetical species.

The first represents a species that is Bivoltine with 2/3 of its population density occurring in the second flight peak and overall a narrow flight length per brood that has little overlap (Mean 150 and 220, 10 SD).

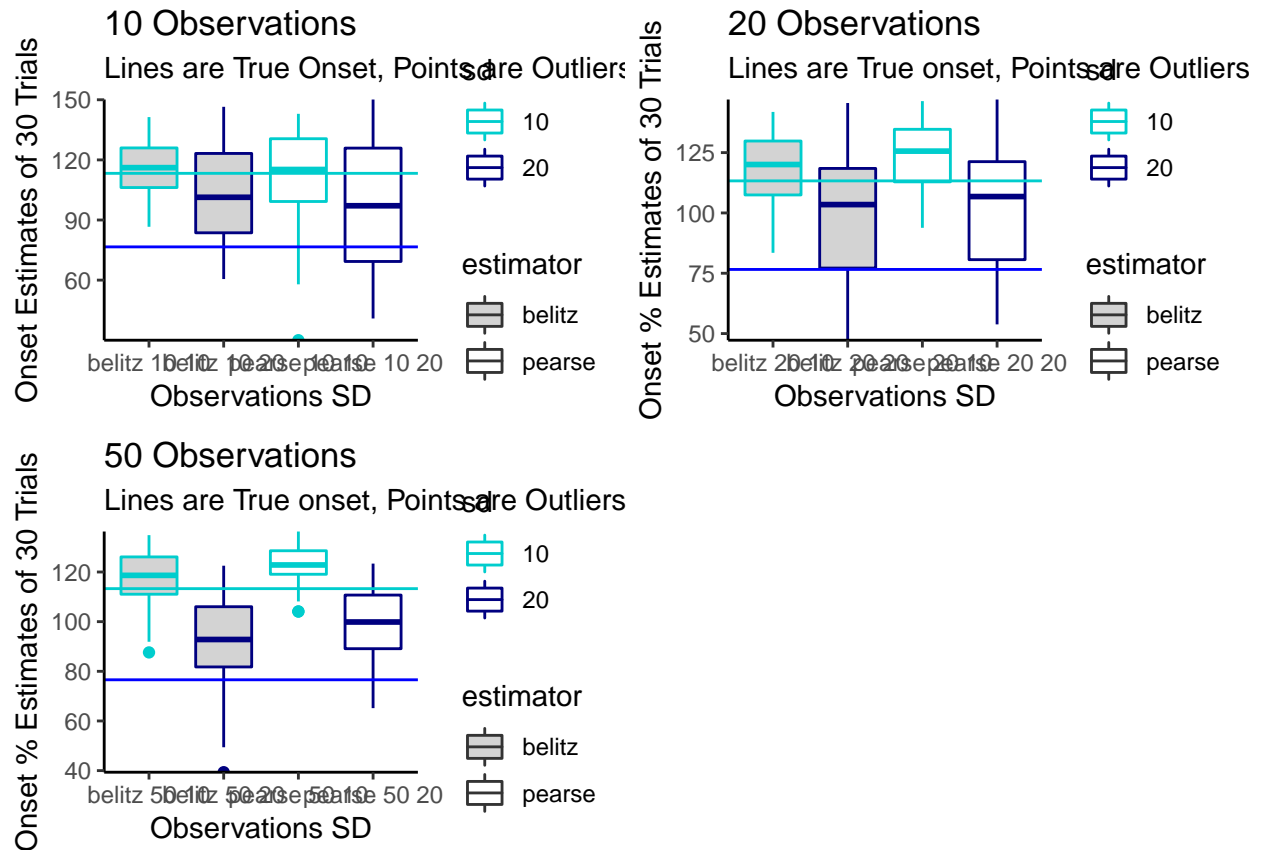


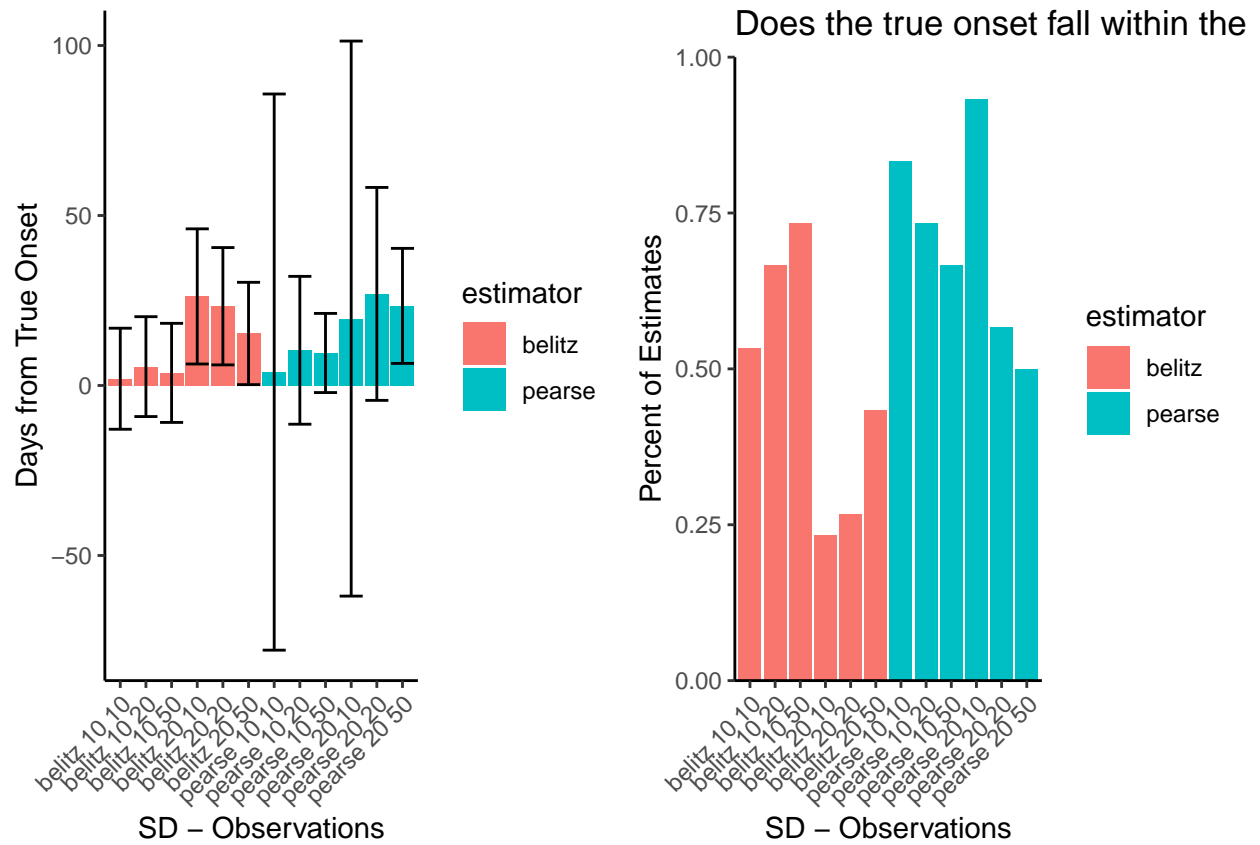
The next represents a species with a longer flight length, so more overlap between the two broods (Mean 150 and 220, 20 SD).



Results of Bimodal simulation

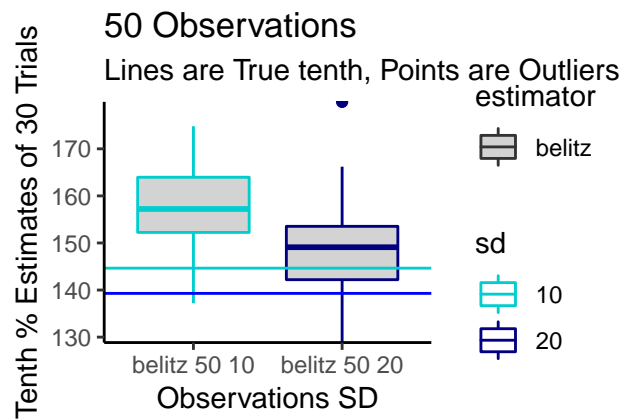
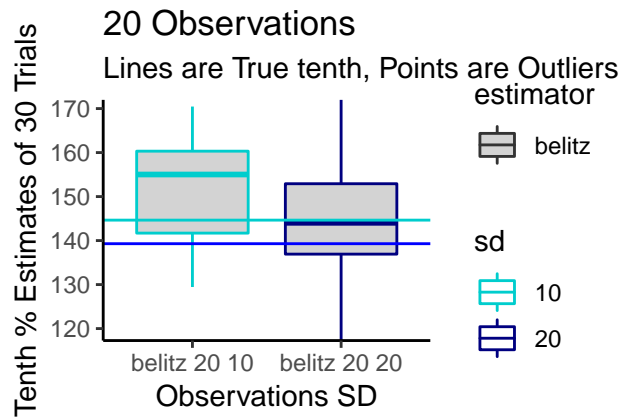
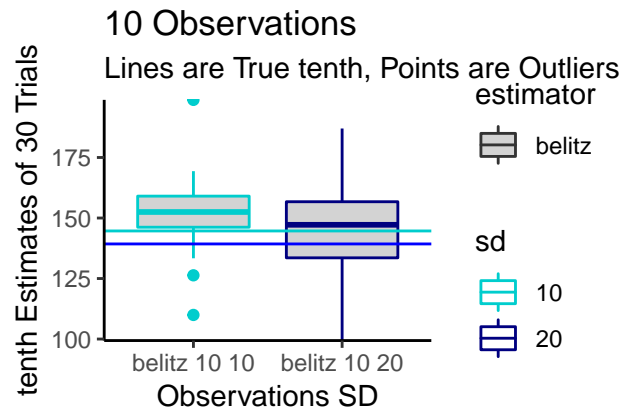
Onset

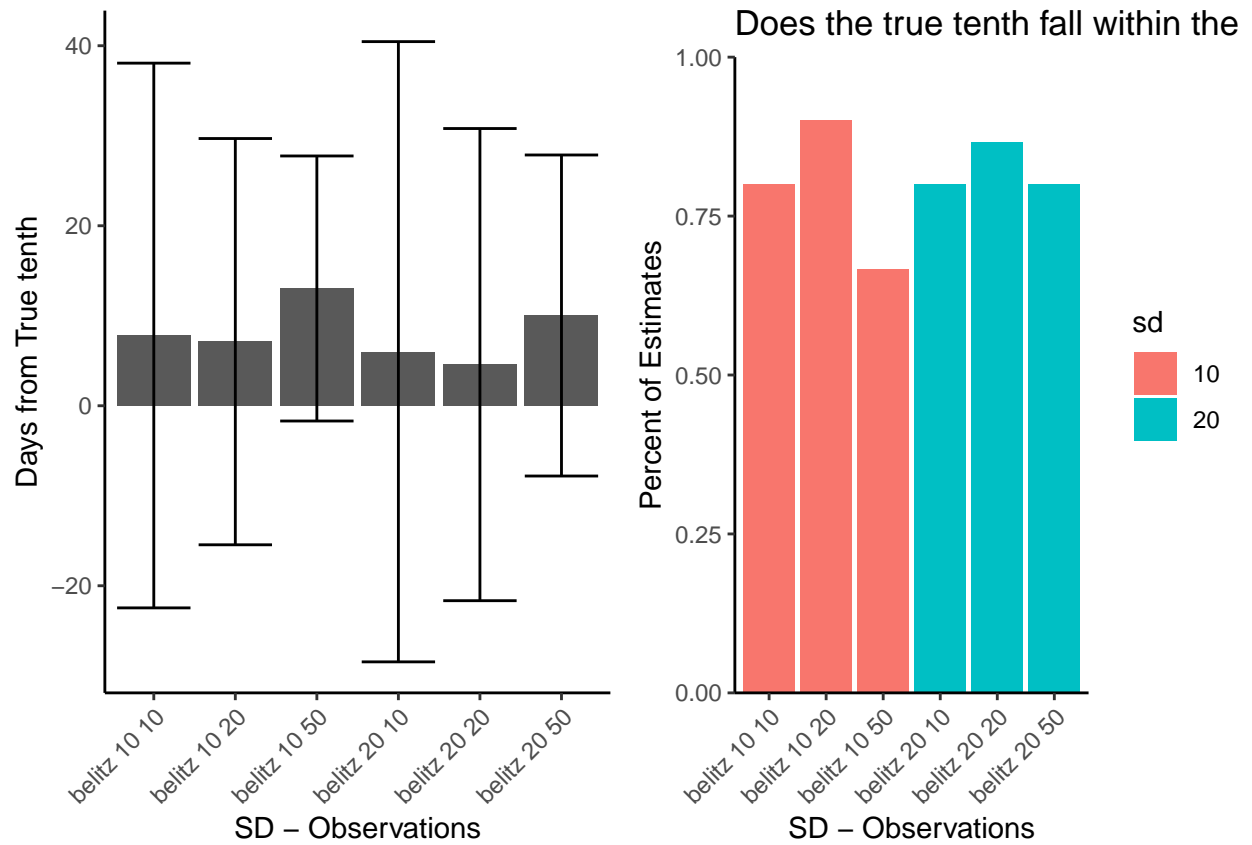




Tenth

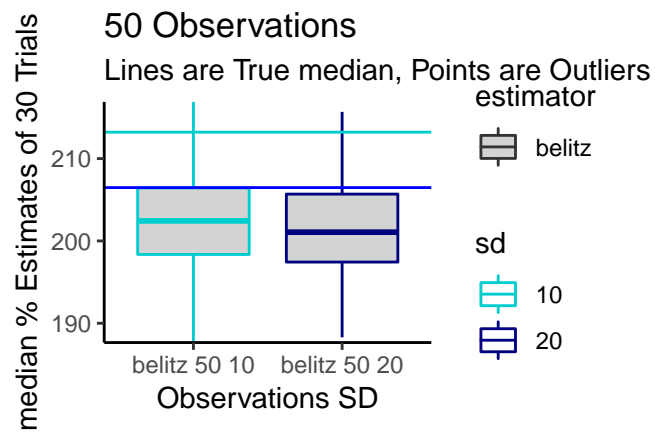
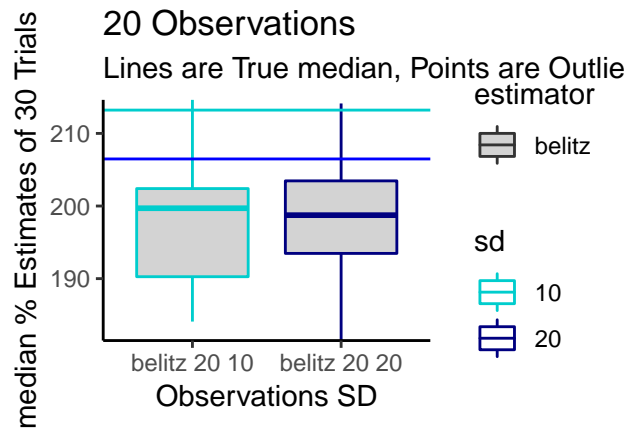
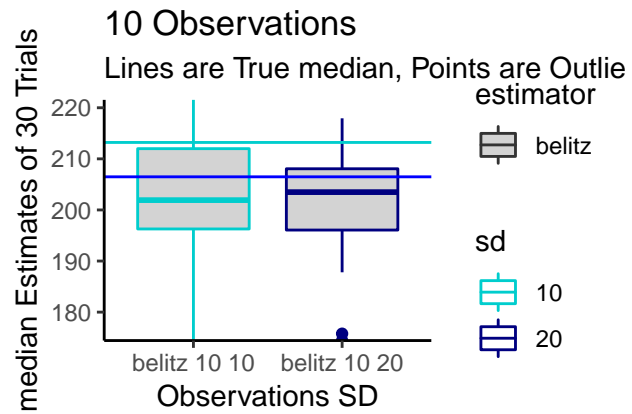
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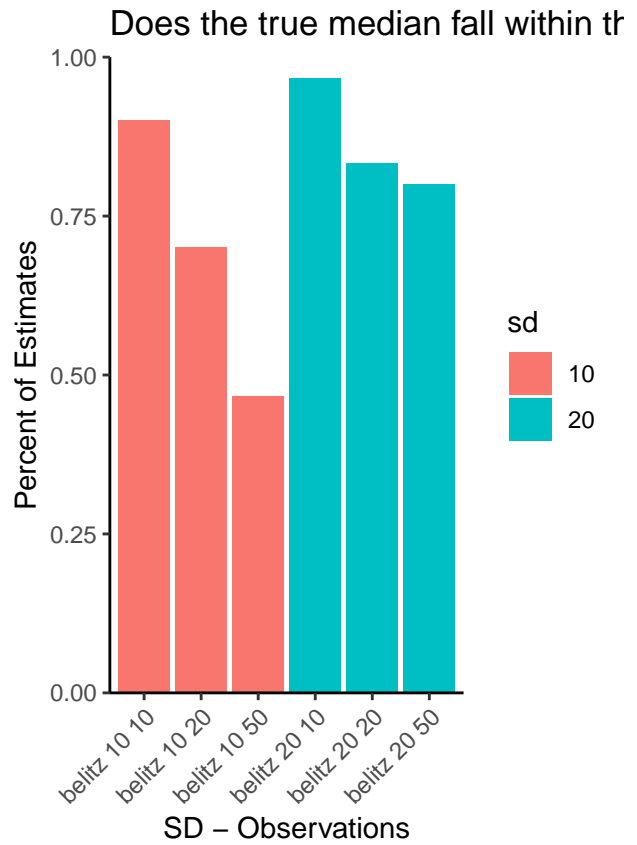
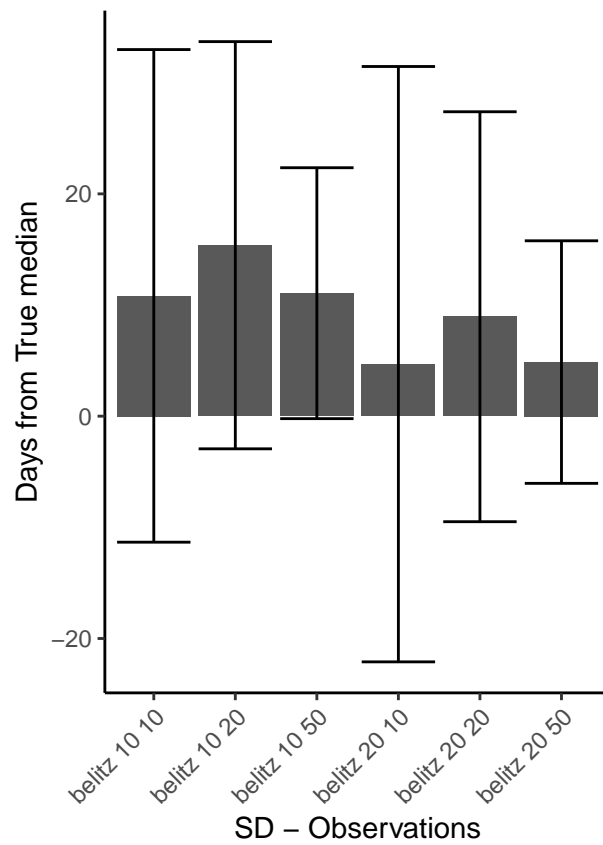




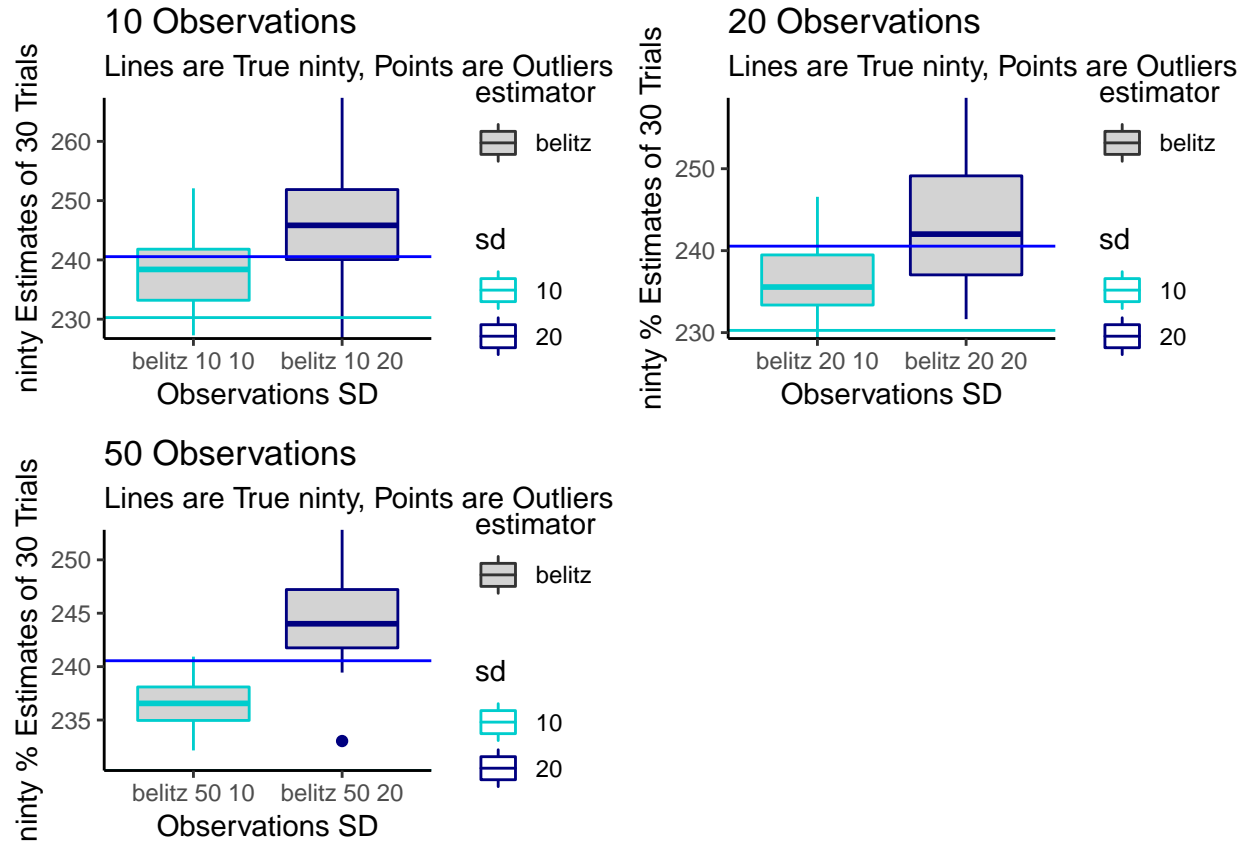
Median

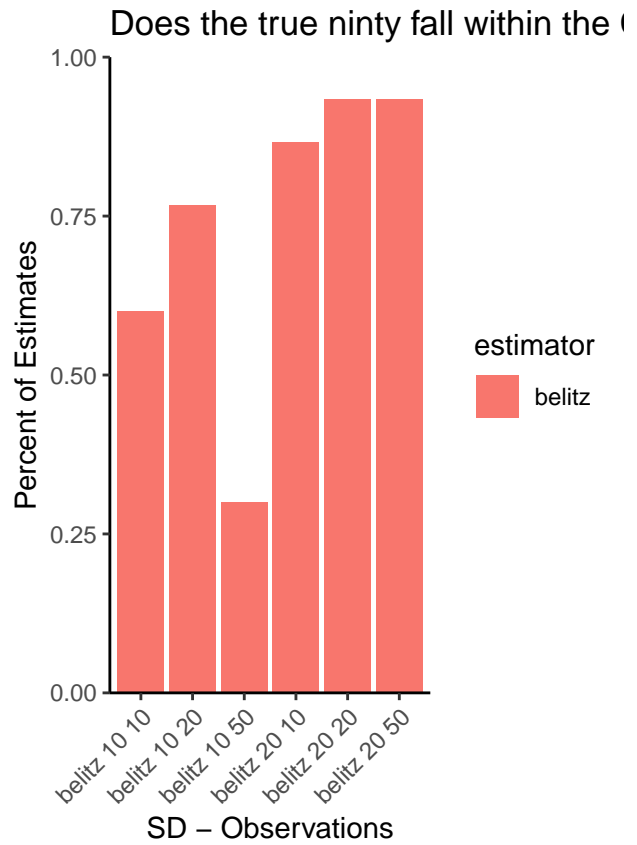
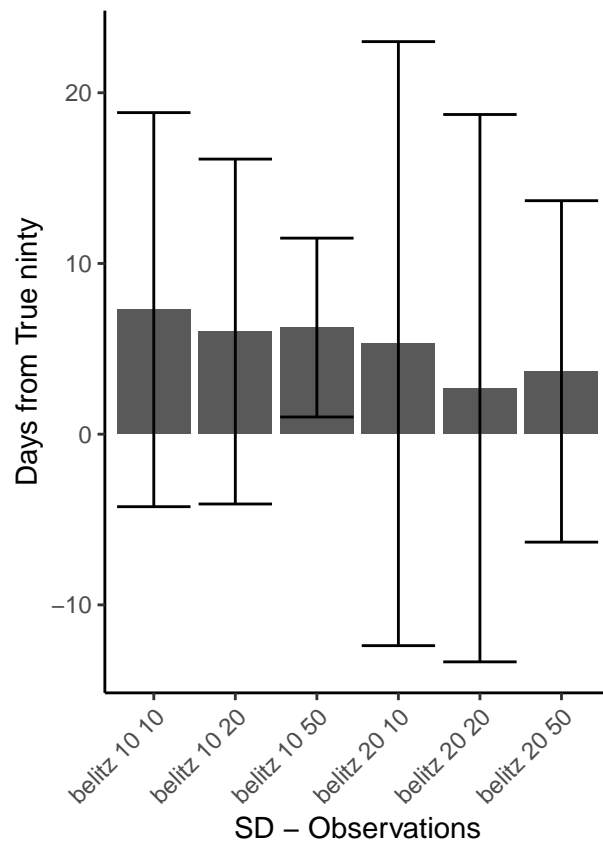
Median Estimates





Ninety





Offset

