

Neanderthals and Upper Paleolithic modern humans

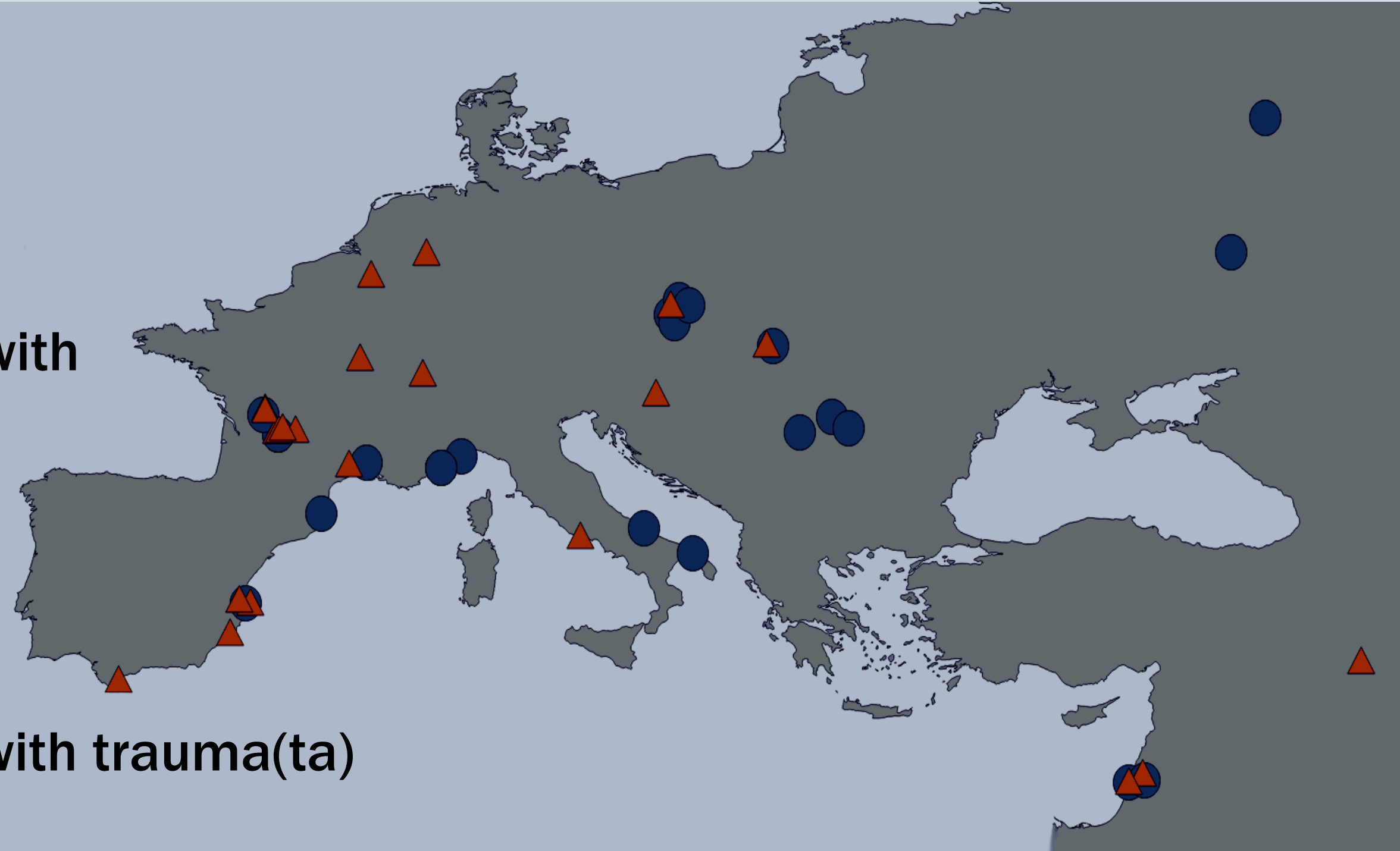
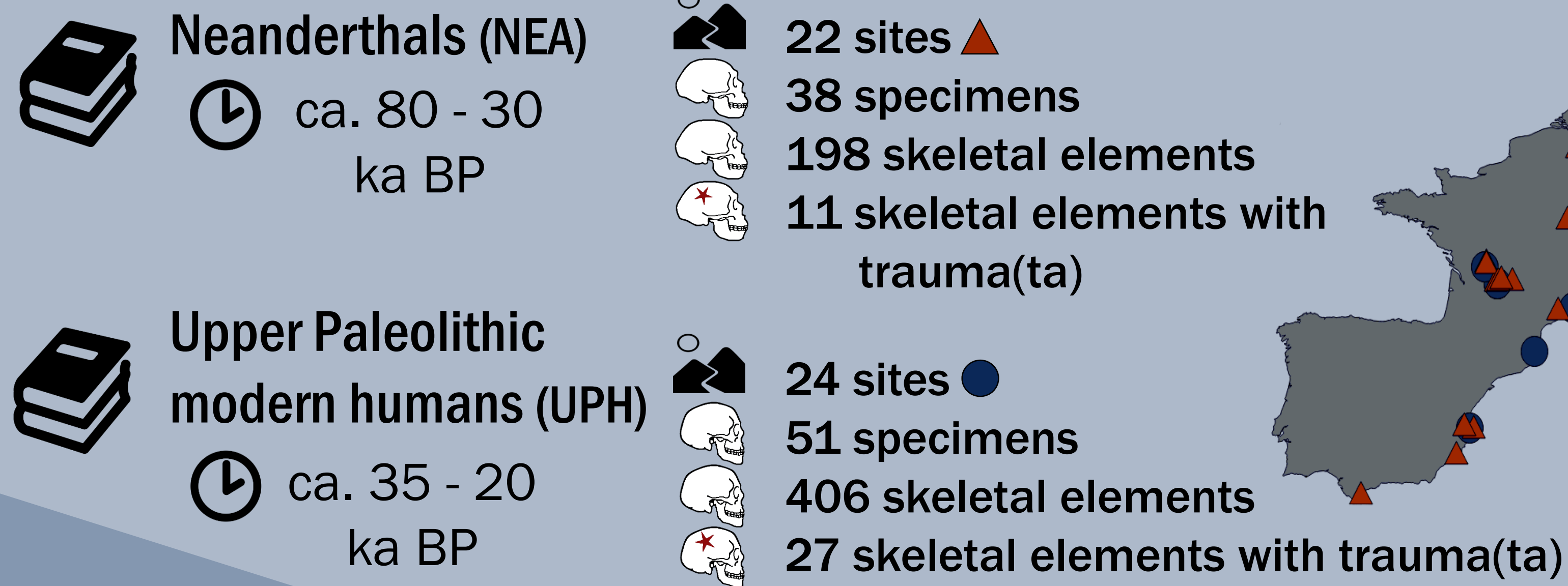
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Intro

Neanderthals are thought to show high frequencies of traumatic injuries^{1,2,3} that exceed those of Upper Paleolithic modern humans^{4,5}. This led to a common depiction of Neanderthals living dangerous and stressful lives, plagued by hunting accidents and interpersonal violence. However, recent research casts doubts about this prevalent view^{6,7}. Here, we present the first results of a new research project scrutinizing whether Neanderthals and Upper Paleolithic modern humans actually differ in the incidence of traumata using a novel dataset of cranial fossil remains and applying state-of-the-art statistical approaches.

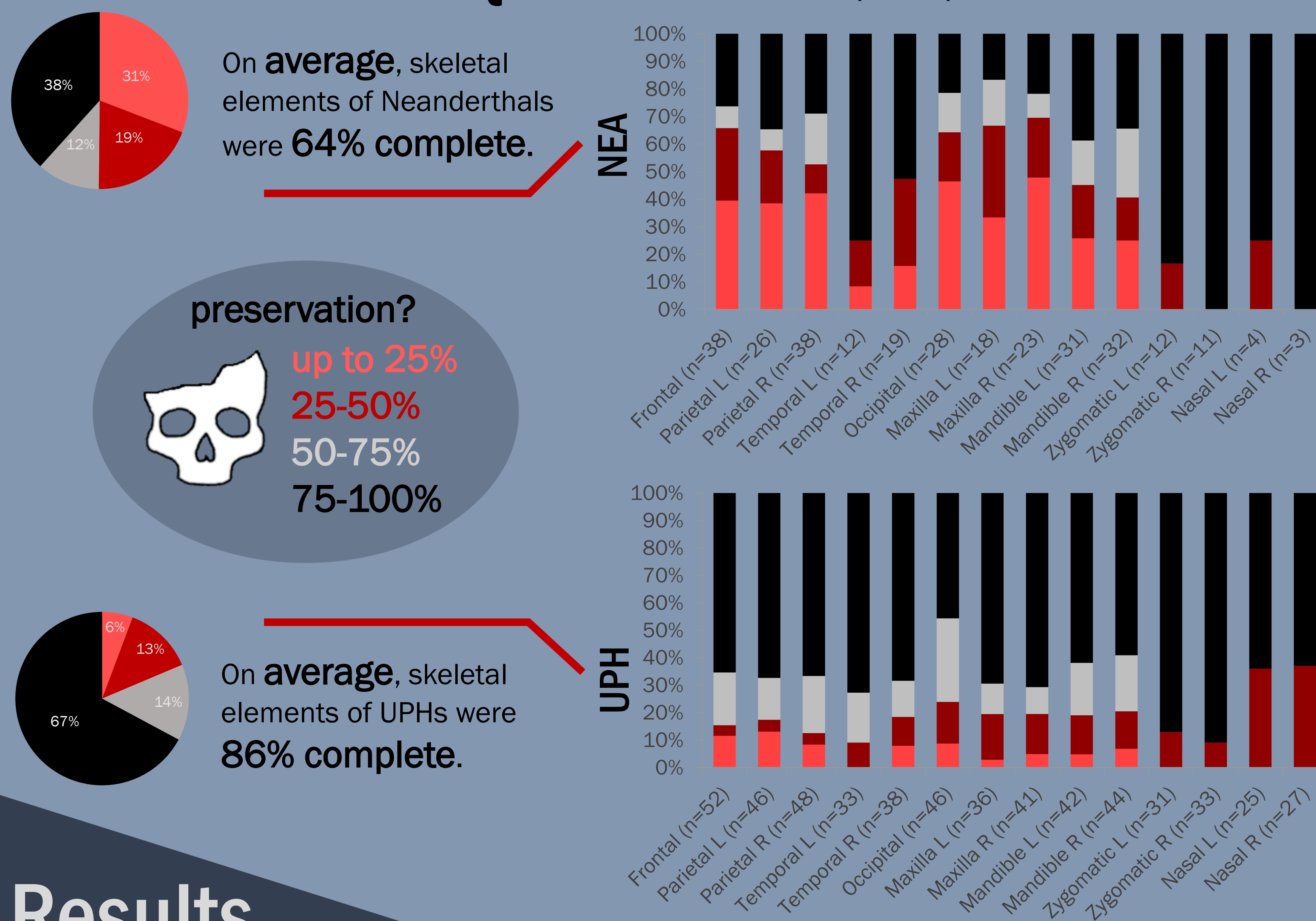
Materials



We collected data on fossil skull remains from Eurasian Neanderthals and UPHs from published sources. We scored whether specimens had traumatic lesions (0/1), recorded their age (12-30/+30) and sex (m/f), and rated the preservation of each skeletal element (see below). For statistical analyses we reduced the full dataset (n=837) and excluded n=233 skeletal elements with undetermined adult age or sex.

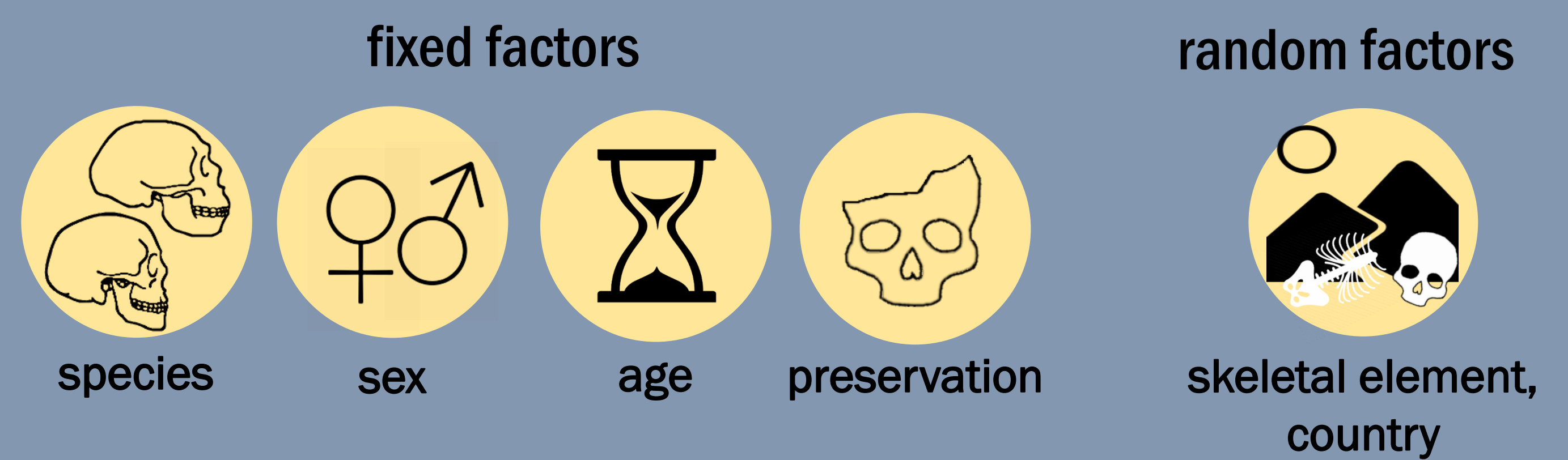
Methods

Quantification (n=837)



Statistical model

to predict trauma frequencies (n=604)

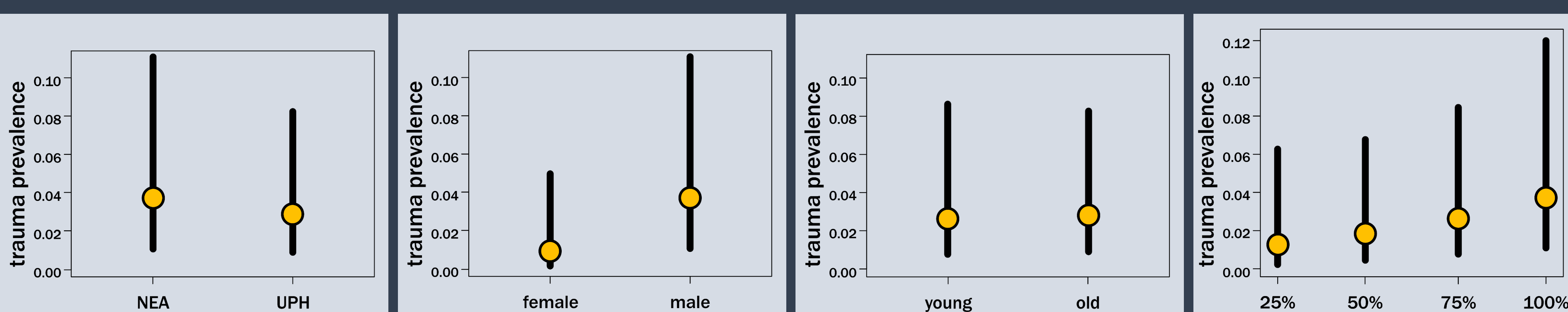
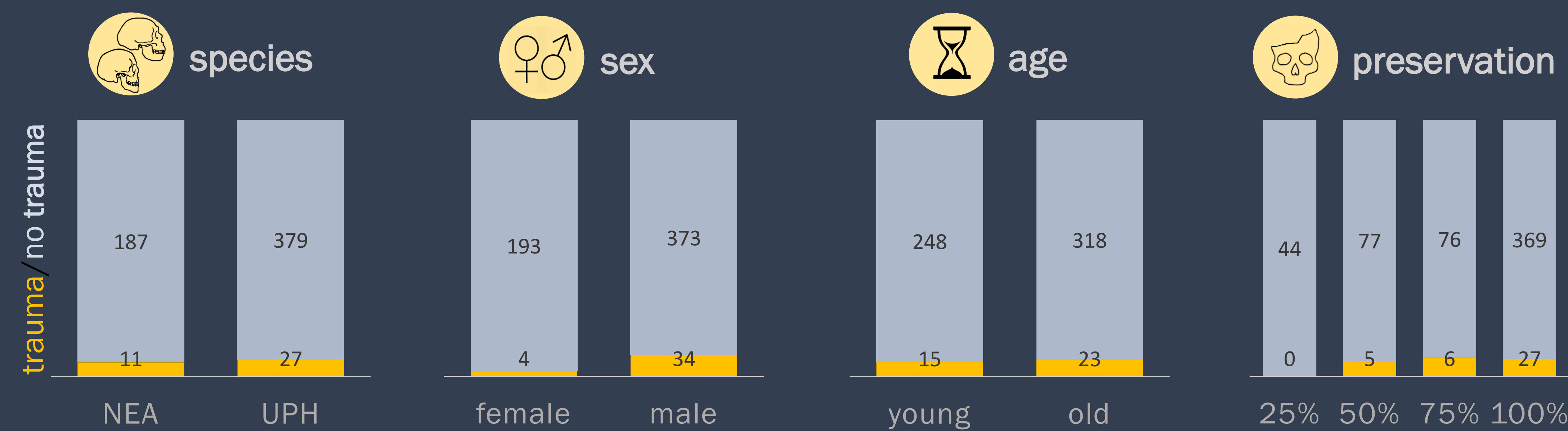


Generalized Linear Mixed Model:

$$\text{trauma} \sim \text{species} + \text{sex} + \text{age} + \text{preservation} + (1 | \text{skeletal element}) + (1 | \text{country})$$

We performed a GLMM with a binomial error distribution and a logit link function using the lme4 package⁸ for the statistical software R⁹. For each fixed factor, results show raw trauma ratios (top), and model-predicted trauma probabilities (bottom) while taking the effects of the remaining predictors into account.

Results



Wald-Chi²= 0.232, df=1, p= 0.630

Wald-Chi²= 5.623, df=1, p= 0.018

Wald-Chi²= 0.023, df=1, p= 0.880

Wald-Chi²= 2.288, df=1, p= 0.130

Conclusions

We found no indication for differences in cranial trauma probabilities among Neanderthals and Upper Paleolithic modern humans. Instead, trauma probabilities were significantly higher in males, and tended to increase with the preservation status of the skeletal remains. Age had no effect on trauma probabilities. In conclusion, we cannot confirm a higher skull trauma prevalence in Neanderthals and we caution against performing population-wide trauma analyses without considering sex and skeletal preservation. Future research will include samples from a broader timeframe as well as postcranial remains.

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