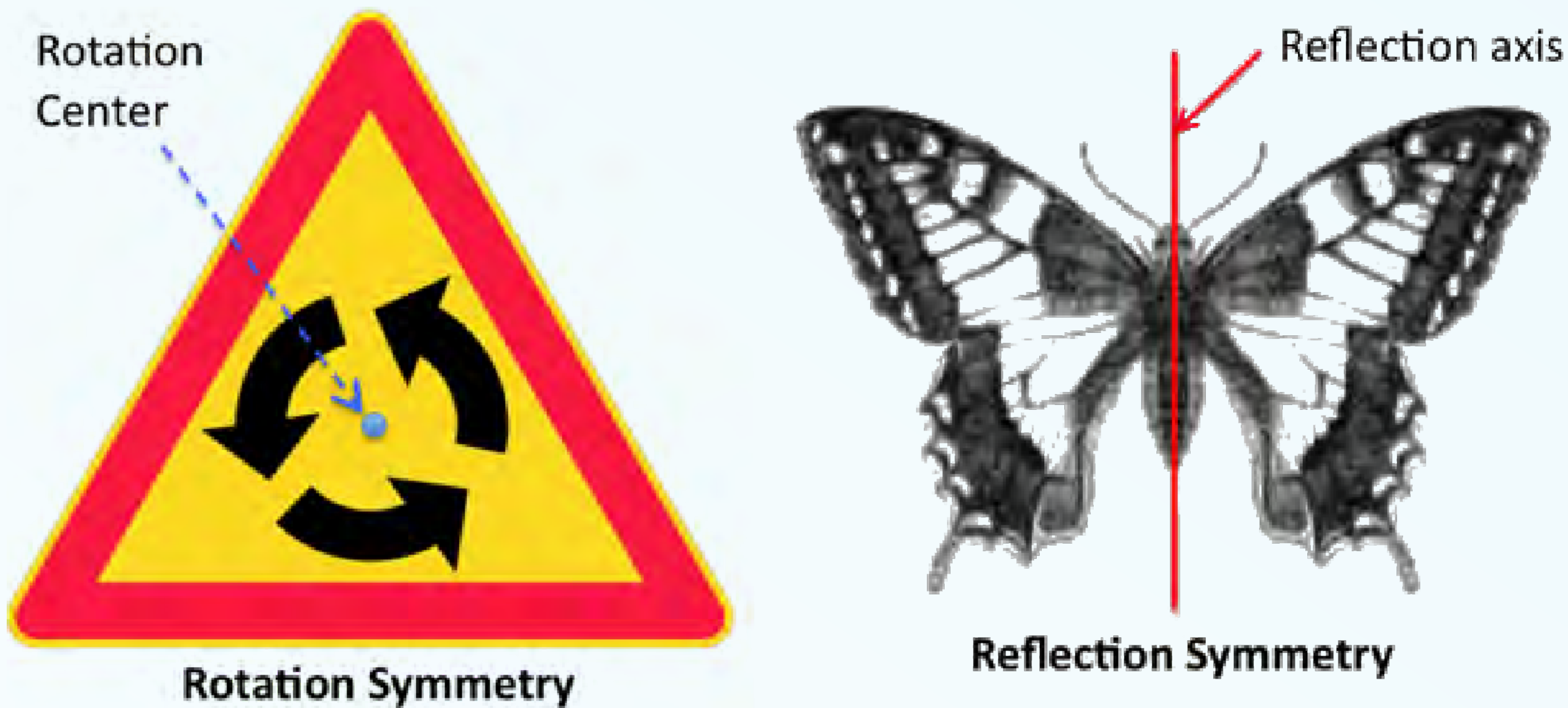




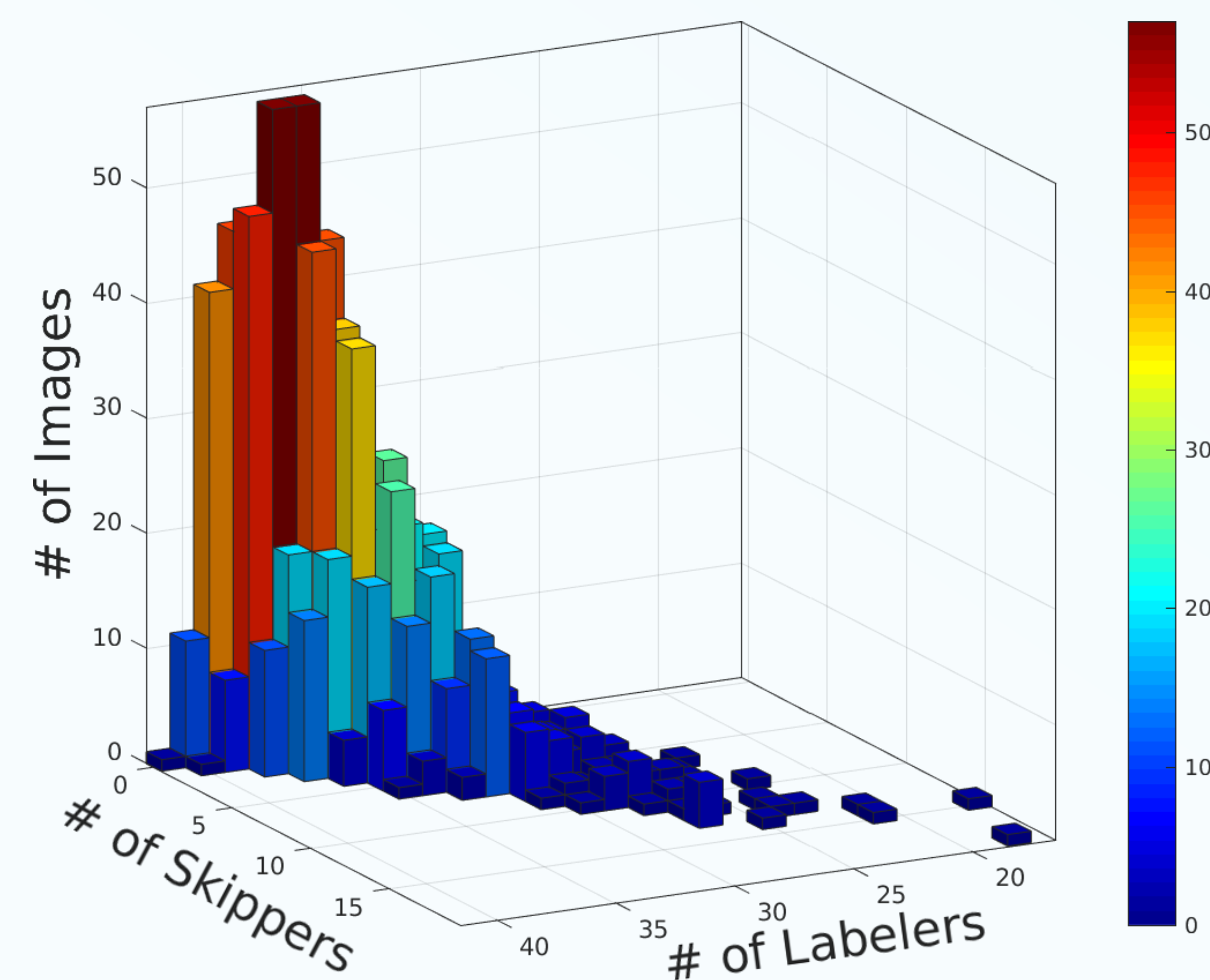
## Overview

- We have built an online tool for labeling symmetries from real-world images.
- Participants label rotational symmetries and/or reflection symmetries visually perceived.
- We have collected symmetry labels on **1200 images** (from the Microsoft COCO dataset[2]) from 413 Amazon Mechanical Turks.
- Each participant:
  - takes a quick quiz on the two types of symmetries (rotation and reflection).
  - labels 100 images and can skip images if no symmetries are perceived.
- We observe statistically significant performance differences between different education levels and age groups. Younger and high school educated participants are significantly better at finding commonly perceived symmetries.

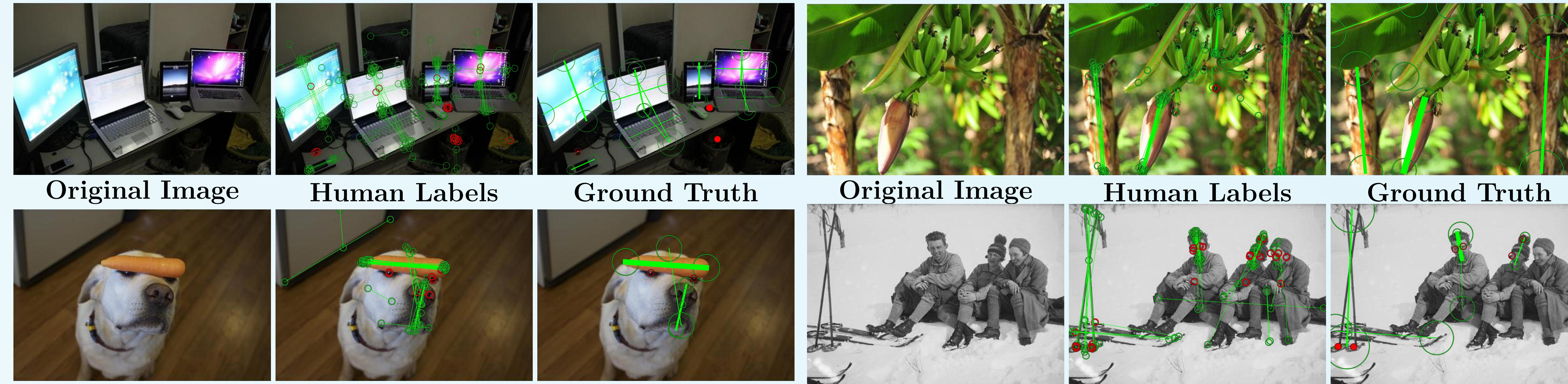
## Types of Symmetry



## Histogram of Skippers-Labelers scores



## Sample Images



## Statistical Results

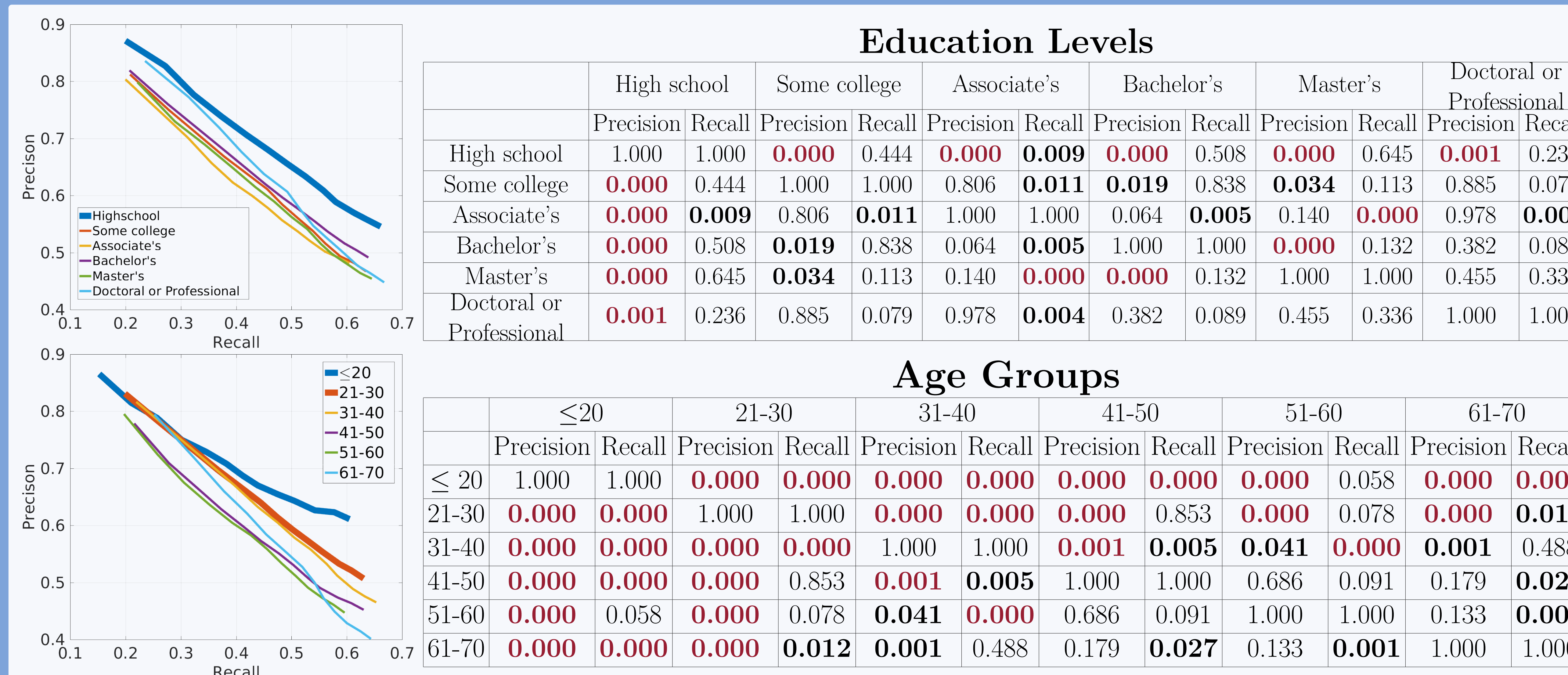
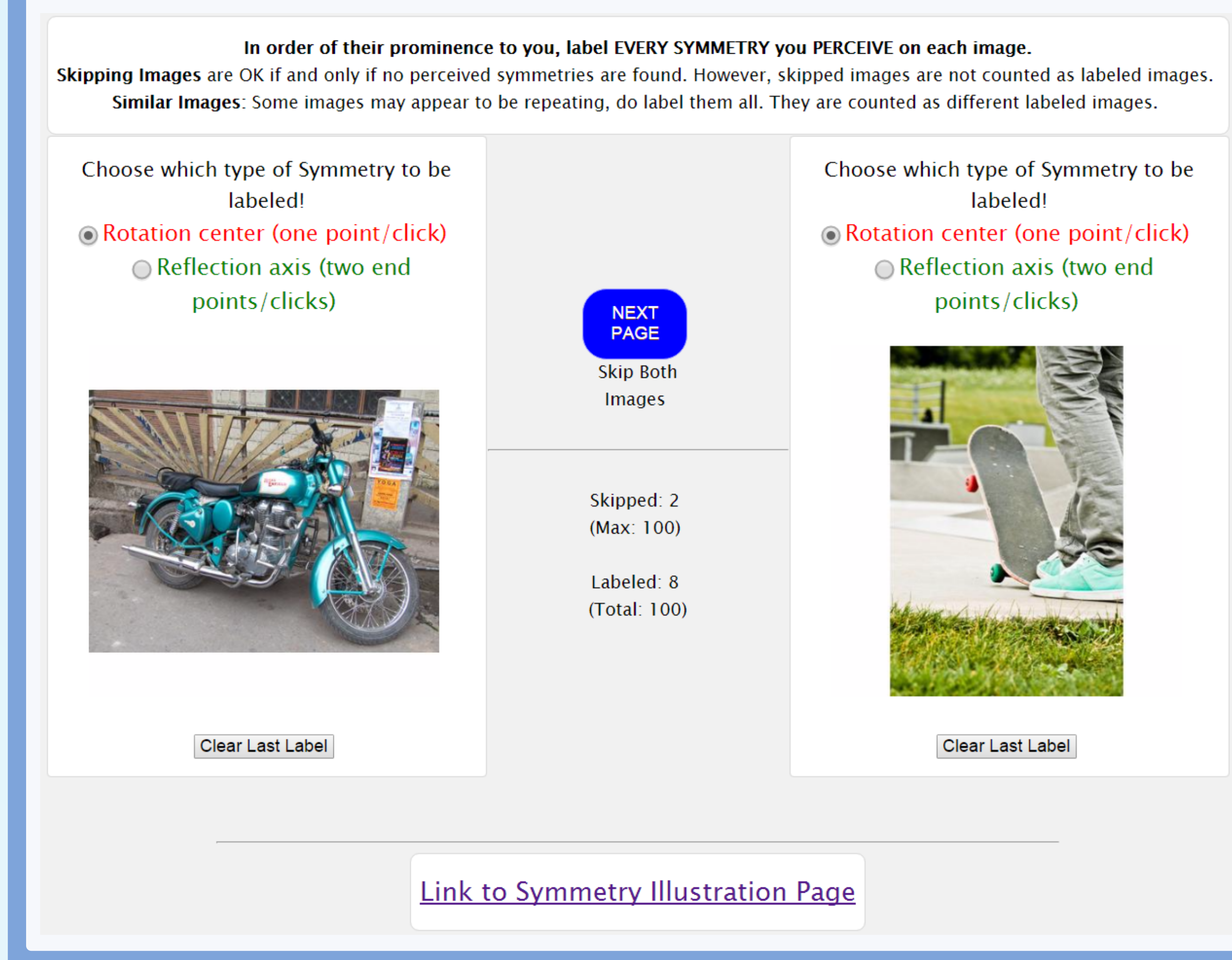


Table 1: **Bold font** are P-values < .05 and **red font** are P-Values < .001. Precision and Recall values are computed by varying the minimum number of symmetries necessary to define a symmetry.

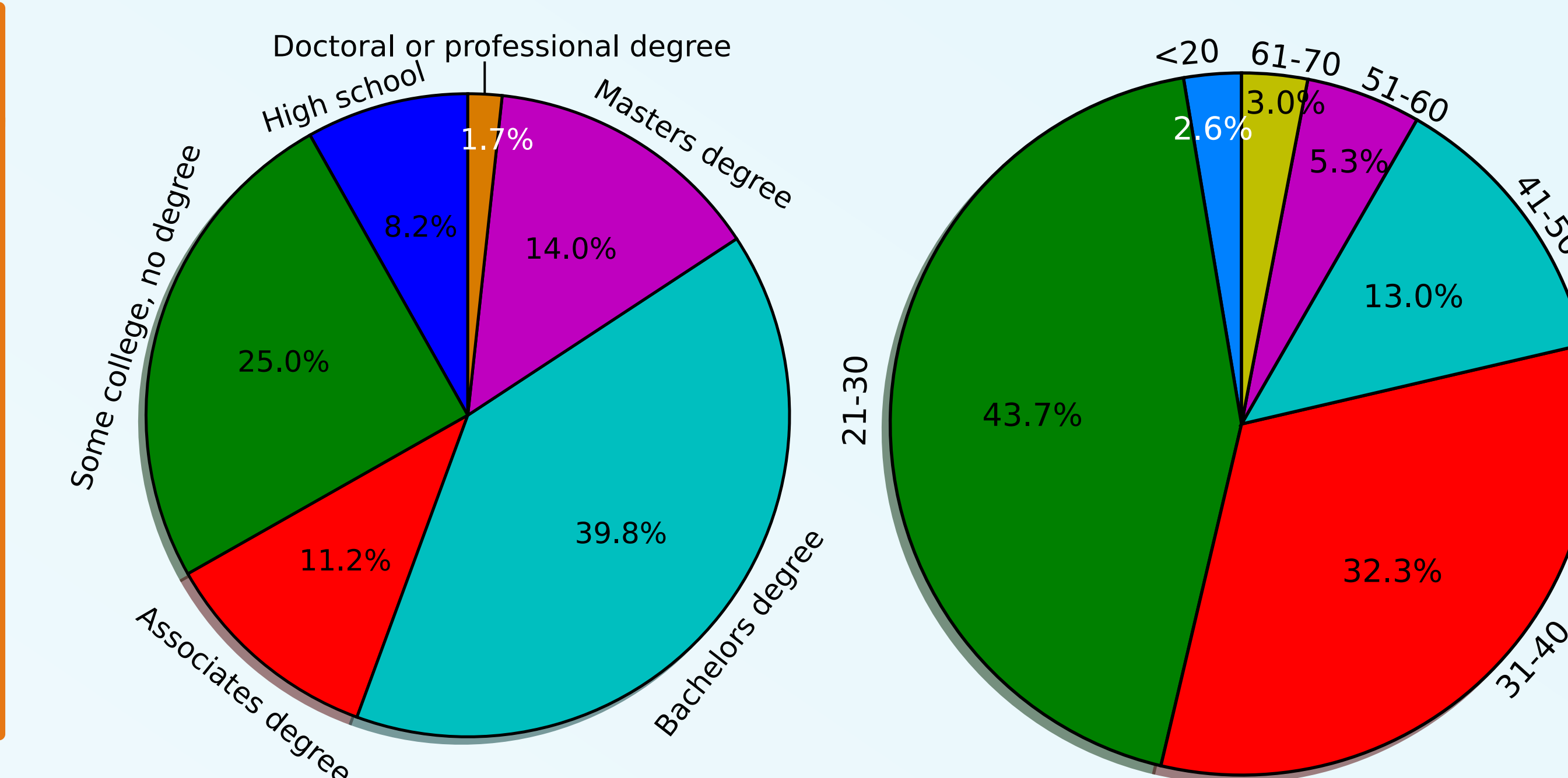
## LabelMe Interface



## Dataset Statistics

Total # of Images	1,200
Total # of Human Labelers	413
Average # of Labelers / Image ± std	34(±3)
Average # Skippers / Image ± std	2(±3)
Total Rotation Symmetries Labeled	38,673
Total Reflection Symmetries Labeled	68,499
Average Symmetries Labeled / Image ± std	89(±38)
Average Rotation Symmetries Labeled / Image ± std	32(±32)
Average Reflection Symmetries Labeled / Image ± std	57(±23)

## Demographics



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## References

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