



Physical Anthropology Section - 2013

H37 Assessment of Presentation Methods for ReFace Computerized Facial Approximations

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After attending this presentation, attendees will understand that the way in which a facial approximation is presented to the public impacts the probability of achieving a successful identification of the unknown individual with certain presentation methods having a greater likelihood of eliciting identification success. Attendees will also be made aware of the possibility that traditional methods of evaluating facial approximation success may not be the most appropriate when considering the practical applications of these approximations.

This presentation will impact the forensic science community by recommending new methods of presenting facial approximations to the public in order to improve recognition potential. It will also provide new criteria for evaluating the performance of facial approximations in a way that is more representative of their practical application.

New computerized techniques have made it possible to present facial approximations in a variety of layouts, but there are currently no clear indicators as to what style of presentation is most effective at eliciting recognition. The primary purpose of this study is to determine which of the tested presentation methods produces the most favorable recognition results. A secondary goal of the research is to evaluate a new method for testing the accuracy of facial approximations. Previous studies have evaluated facial approximation effectiveness using standards similar to studies of eyewitness positive identification in which a single, definitive choice must be made by the research participant. These criteria seem inappropriate given the accepted understanding that facial approximations cannot produce positive identifications but are merely an investigative tool leading to positive identification.

Facial approximations were generated using CT scan data from living volunteers instead of scans from skulls of actual missing persons. Approximations were presented in one of five formats: Basic, Front and Profile, Weight Variation, Estimated Average Age, and Estimated Age Range. Participants were asked to compare one approximation at a time to one front and one profile photograph of the "missing person." If the participant felt the approximation looked enough like the missing person that they would contact authorities, the approximation would be placed in a folder marked "Yes." If they did not feel there was enough similarity to warrant contacting police, the approximation would be placed in a "No" folder. Once all ten approximations had been evaluated, the participant was asked to simultaneously compare all approximations in the "Yes" folder with each other and the missing person photos to determine which approximation looked most like the missing person.

Effectiveness of presentation methods was determined using three values: sensitivity (percent of true positive responses out of the total possible true positives), specificity (percent of true negative responses out of the total possible true negatives), and percent above chance for correct final selection (the criterion used by most other facial approximation studies). Functionally, a successful facial approximation is one that generates a short list of possible candidates, including the missing person in question. For this reason, and the fact that false positives can be ruled out with further investigation, sensitivity was chosen as the primary benchmark for success.

Weight Variation achieved the highest sensitivity, but this value was not significantly different from Front and Profile or Estimated Age Range. Interestingly, the two methods with the poorest performance each consisted of only a single picture, leading to the possibility that presenting more than one image of an approximation may improve recognition potential. When all criteria were considered, Front and Profile produced the best results. This is particularly encouraging because this presentation method can easily be achieved with traditional clay approximations as well. Also, it was found that percentage above chance for final selection failed to reflect the successfulness of particular presentation methods, and generally under-represented the successfulness of all methods, in terms of sensitivity. These results suggest that single-selection studies may not be the best method for determining the effectiveness of facial approximations.

Facial Approximation, ReFace, Method Performance