LATENTKEYPOINTGAN: CONTROLLING GANS VIA LATENT KEYPOINTS

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Paper under double-blind review

In this document we provide additional qualitative results and comparisons. The images are generated fully automatic by sampling 105 images as pose source and independently 105 appearance source images. These are then combined to form various editing settings and comparisons. For removing, we show the first 30 images of the 105 pose source images. For interpolation of individual parts, we show the first 60 samples.

Figure 1-7: editing on FFHQ;

Figure 8-9: editing by removing keypoints one by one;

Figure 10-13: eye embedding interpolation;

Figure 14-17: mouth embedding interpolation;

Figure 18-21: nose embedding interpolation;

Figure 22: editing on BBCPose;

Figure 23-24: editing on LSUN Bedroom;

Figure 25: Failure cases on LSUN Bedroom;

Figure 26-32: Editing Comparison with SEAN (Zhu et al., 2020b).

For LSUN Bedroom, failure cases are shown separately. We sample two times 100 images and all random pairs where one or both of the images are of low quality were deemed as a failure case (shown in a separate figure).

REFERENCES

Peihao Zhu, Rameen Abdal, Yipeng Qin, and Peter Wonka. Sean: Image synthesis with semantic region-adaptive normalization. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, pp. 5104–5113, 2020.

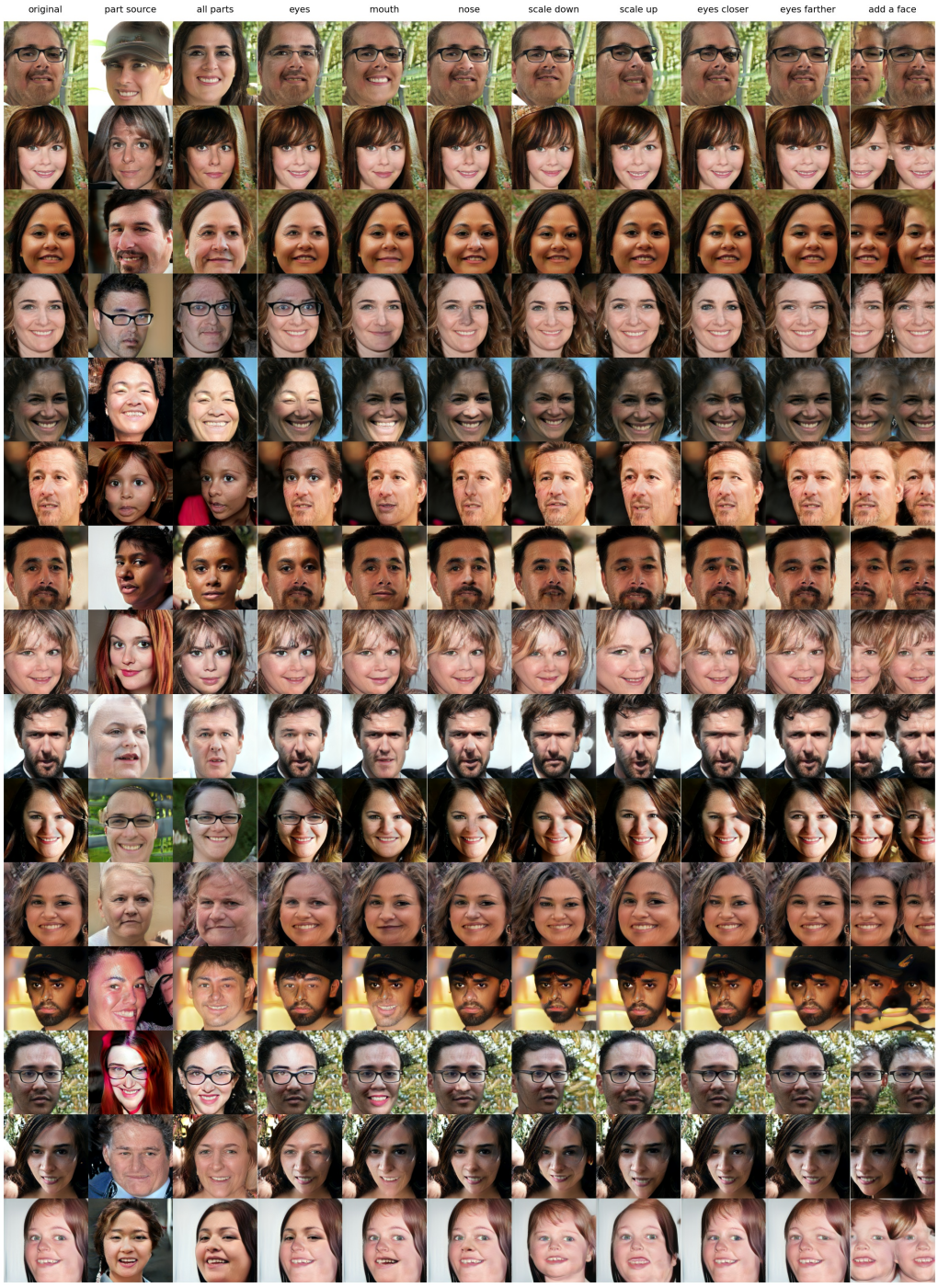

Figure 1: **Editing on FFHQ. The 1st column**: original image; **the 2nd column**: part appearance source image used to swap part appearance; **the 3rd column**: the combined image with shape from the original images and the appearance from the part appearance source image; **the 4th column**: only changing eyes; **the 5th column**: only changing mouth; **the 6th column**: only changing nose; **the 7th column**: scaling the face 0.85x down; **the 8th column**: scaling the face 1.15x up; **the 9th column**: move eyes closer; **the 10th column**: move eyes farther; **the 11th column**: move the face to the left and add another one on the right;

Figure 2: **Editing,** with the settings as in previous figures.

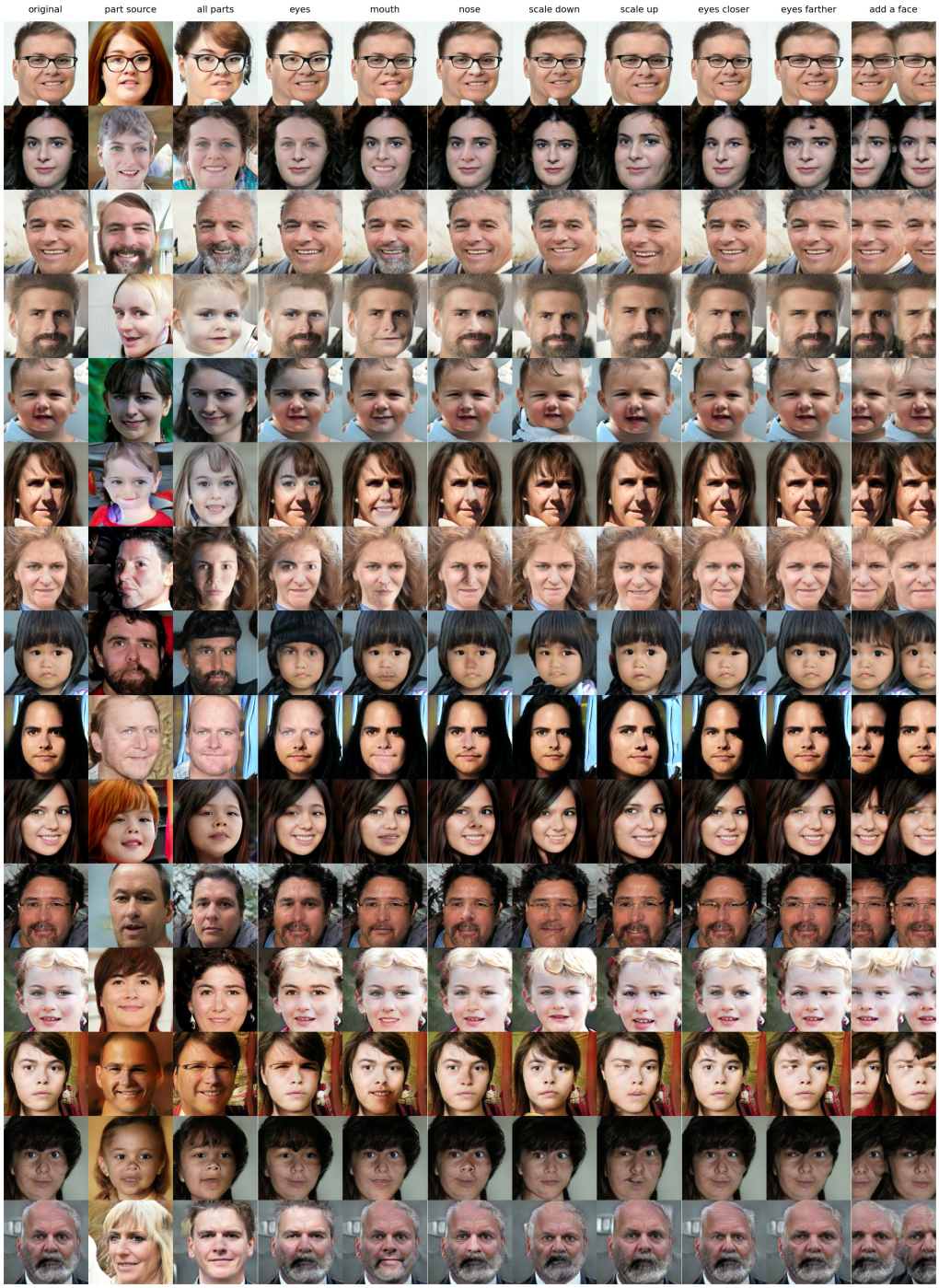

Figure 3: **Editing,** with the settings as in previous figures.

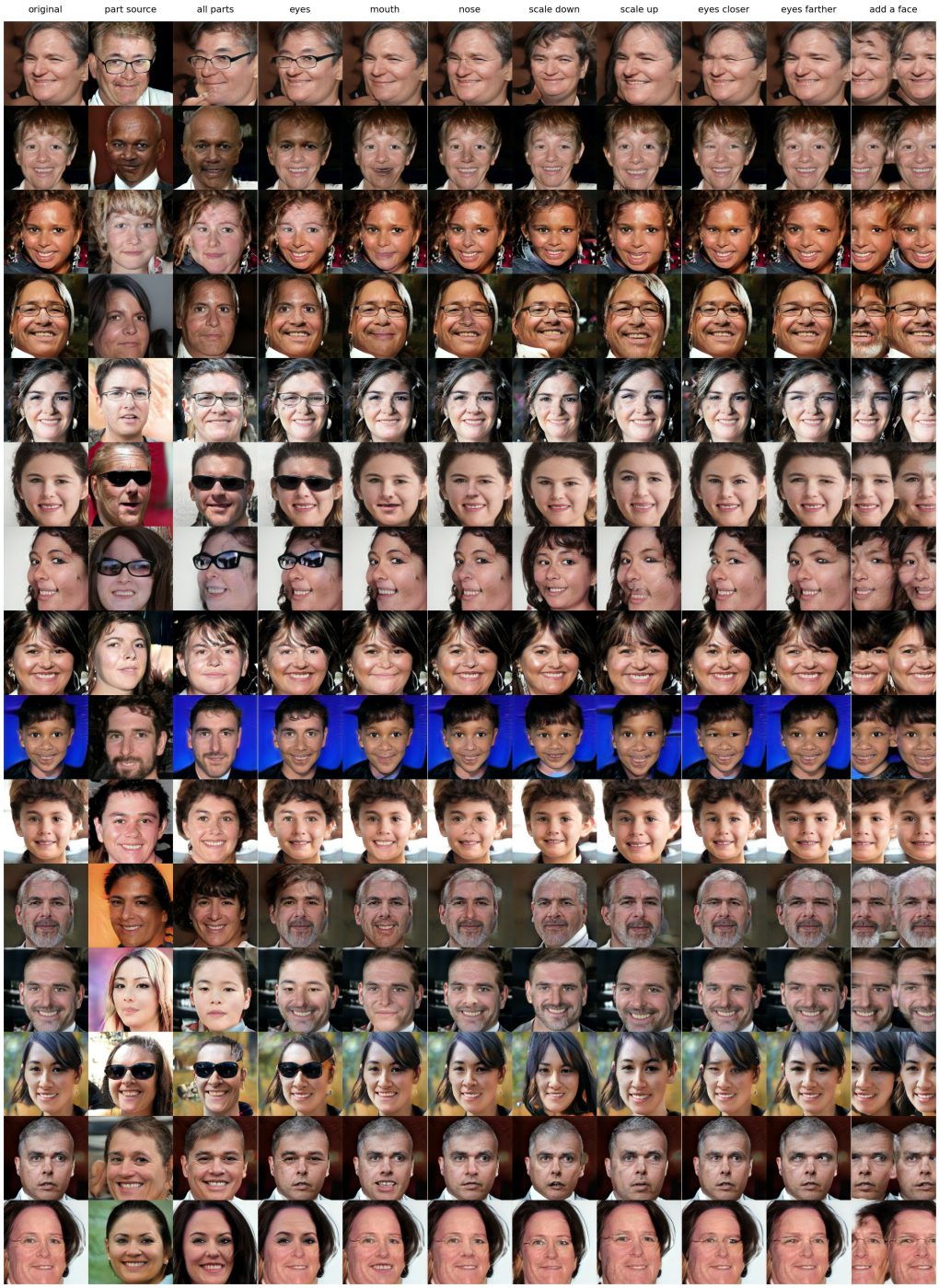

Figure 4: **Editing,** with the settings as in previous figures.

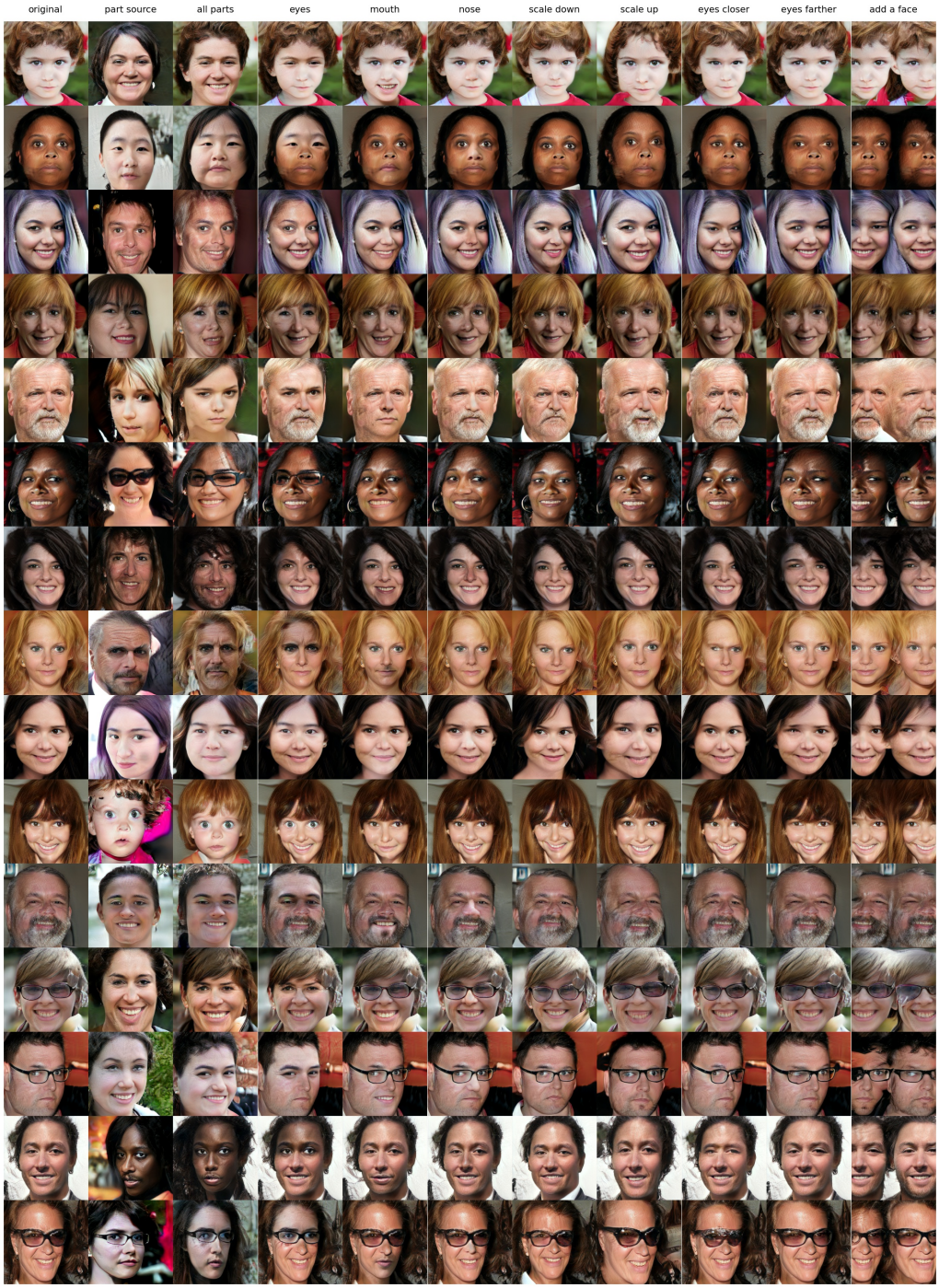

Figure 5: **Editing,** with the settings as in previous figures.

Figure 6: **Editing,** with the settings as in previous figures.

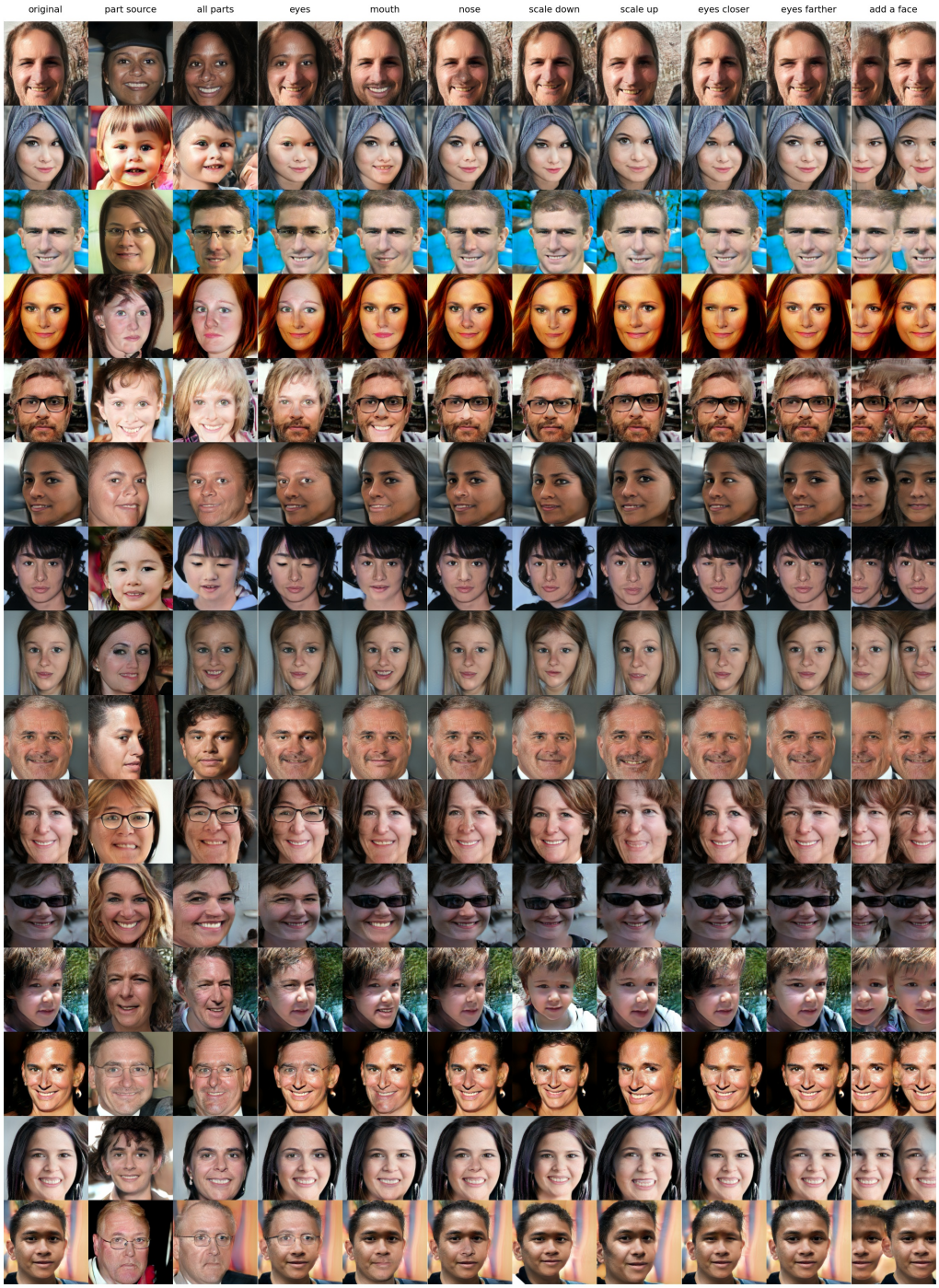

Figure 7: **Editing,** with the settings as in previous figures.

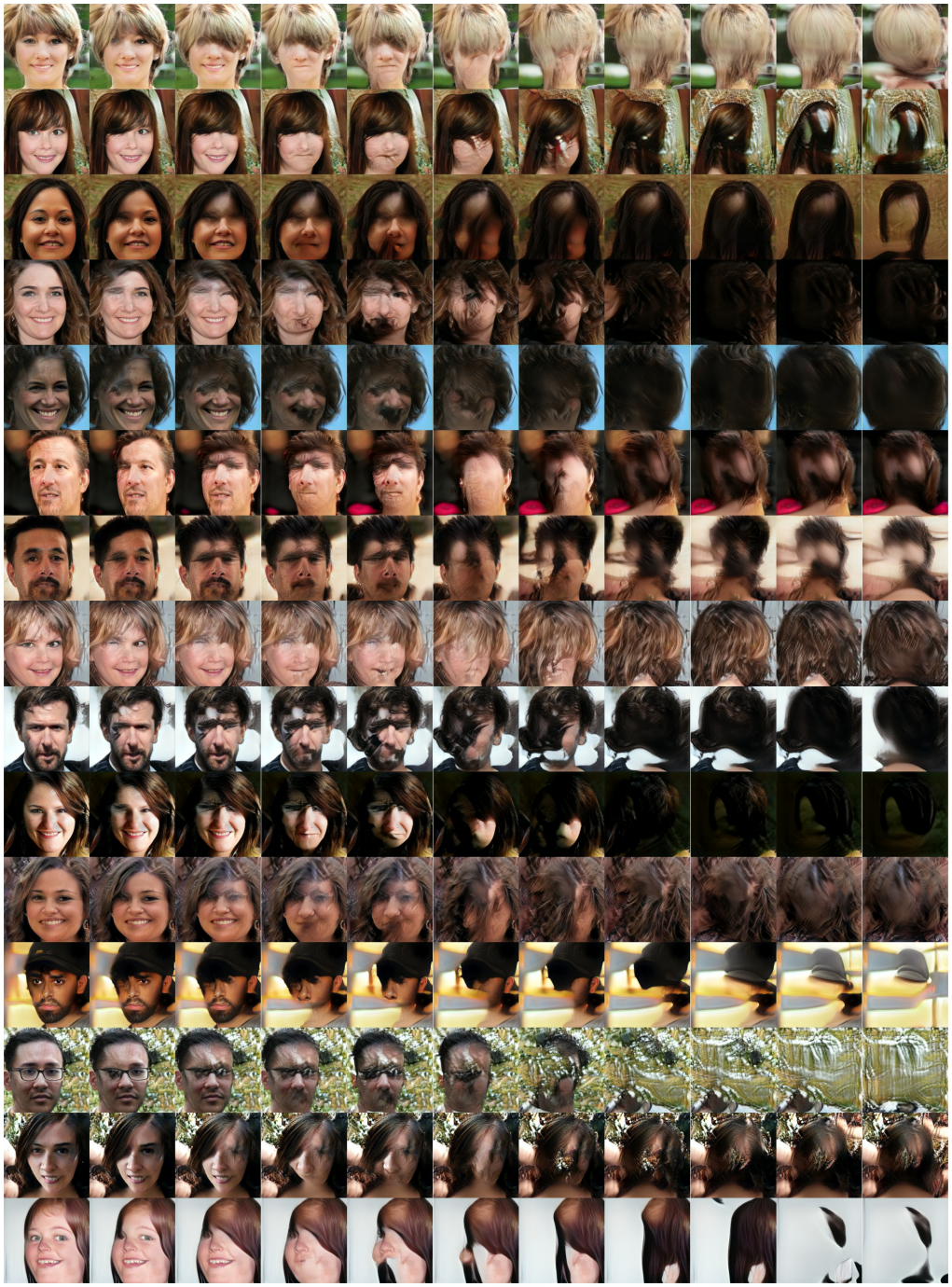

Figure 8: **Removing keypoints one by one.** We remove the keypoints one by one for faces previously shown in Figure 1. The first column shows the original image without removing any keypoints.

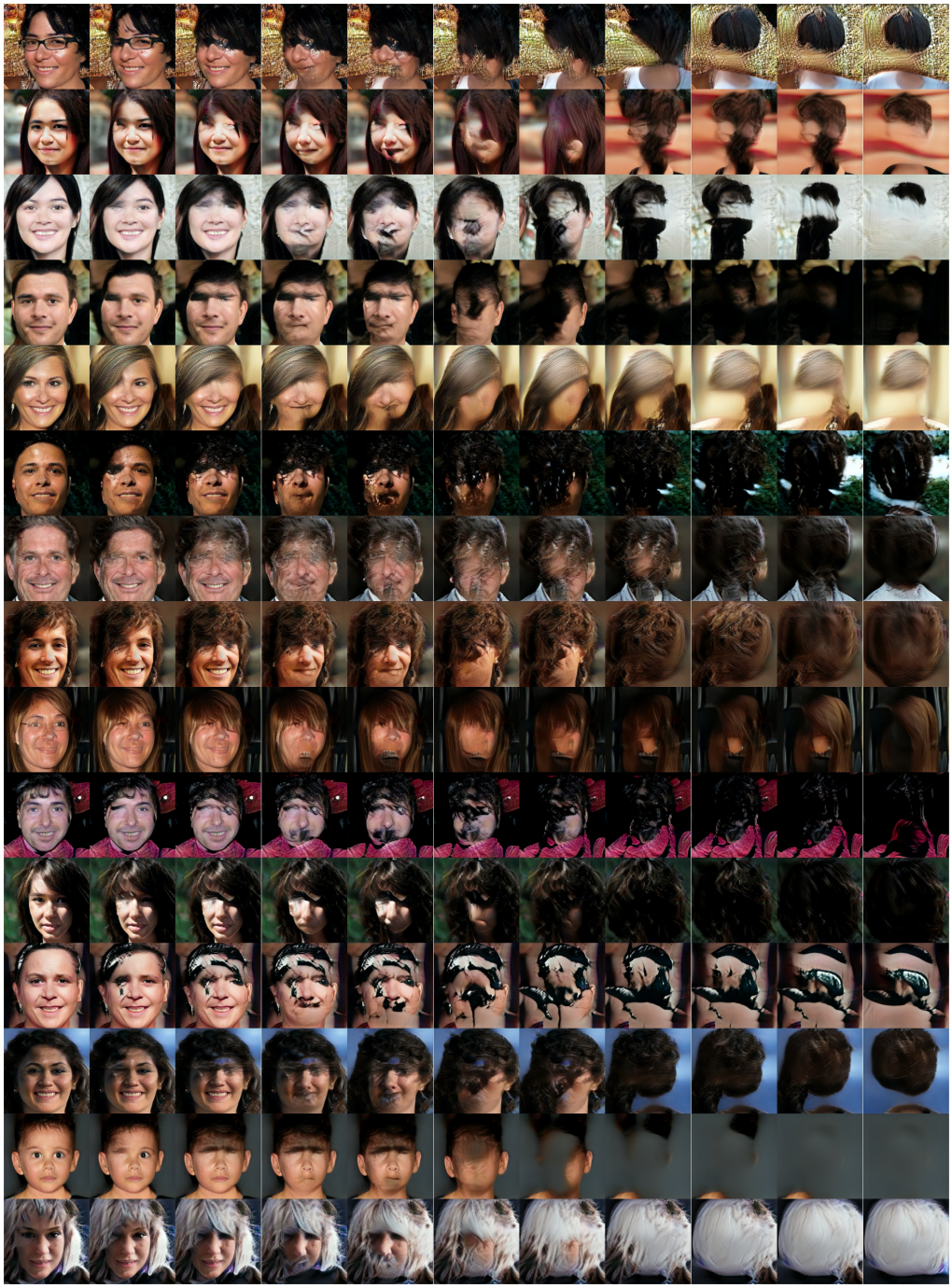

Figure 9: **Removing keypoints one by one.** We remove the keypoints one by one for faces previously shown in Figure 2.

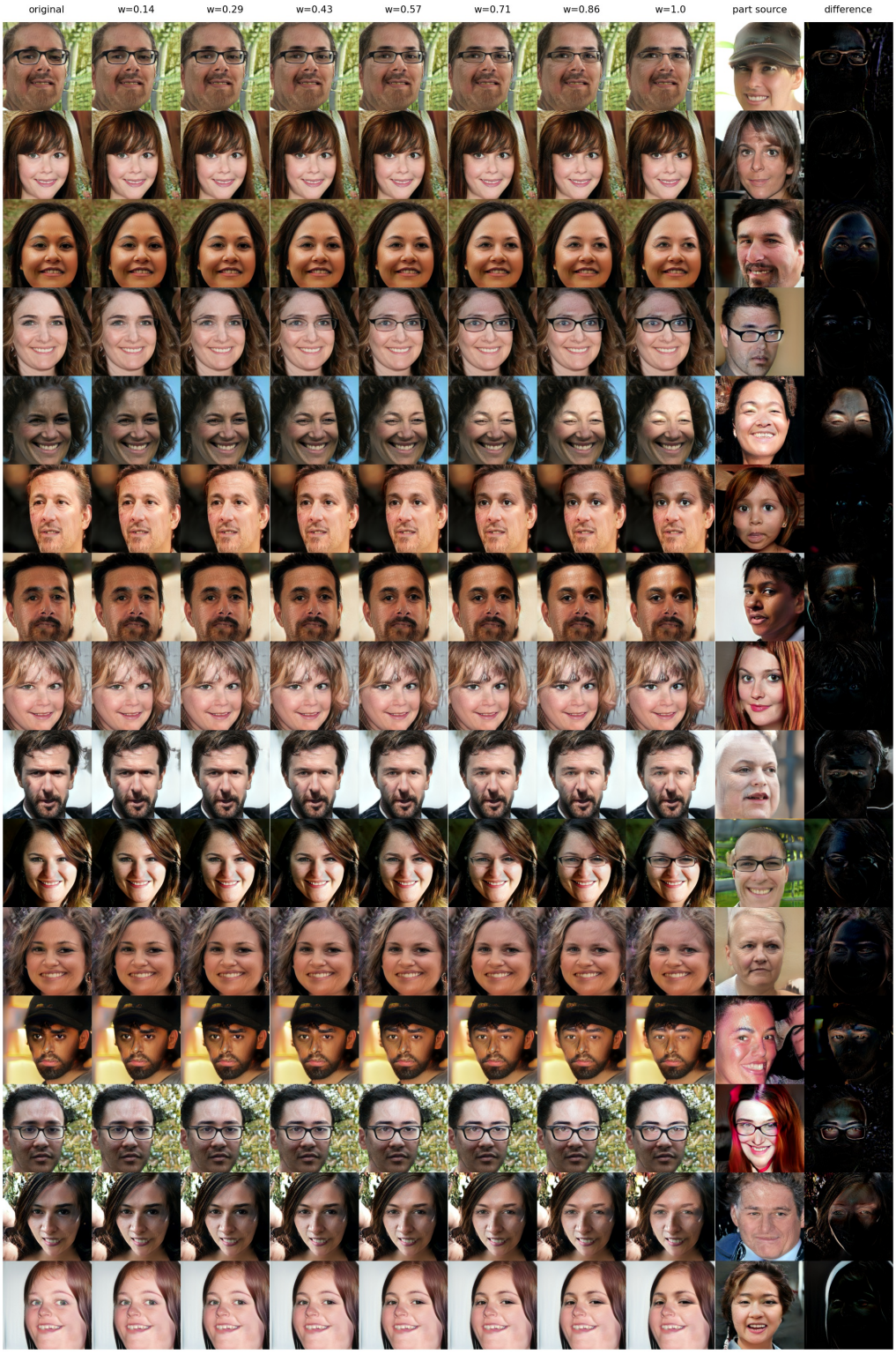

Figure 10: **Keypoint appearance embedding interpolation.** We show the interpolation of eyes for faces in Figure 1. **The 1st column**: original image; **the 2rd-8th column**: the interpolation from the original images to the part source images; **the 9th column**: part appearance source image used to swap part appearance;; **the 10th column**: the difference between the original images and the swapped images.

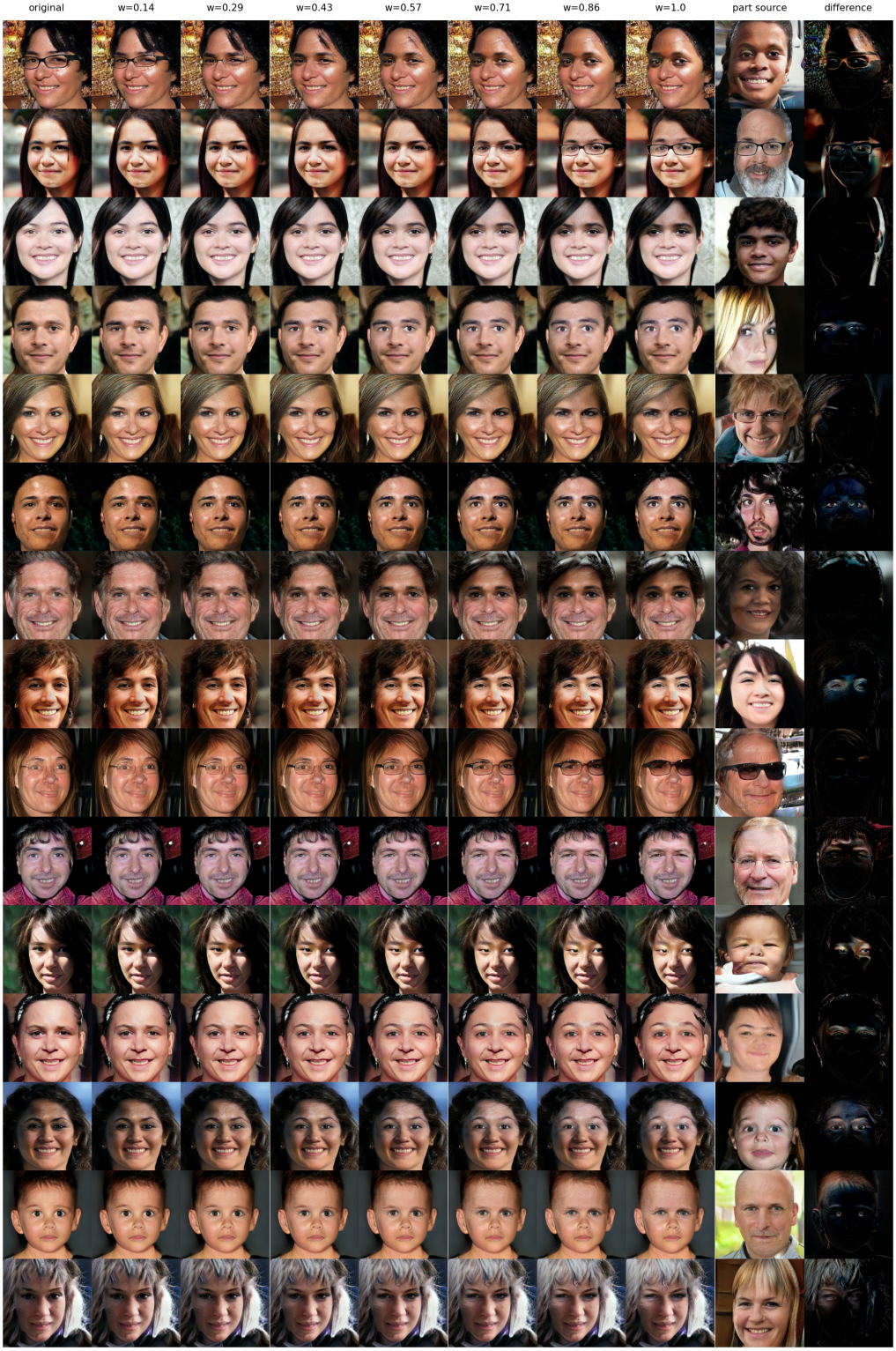

Figure 11: **Keypoint appearance embedding interpolation.** We show the interpolation of eyes for faces previously shown in Figure 2.

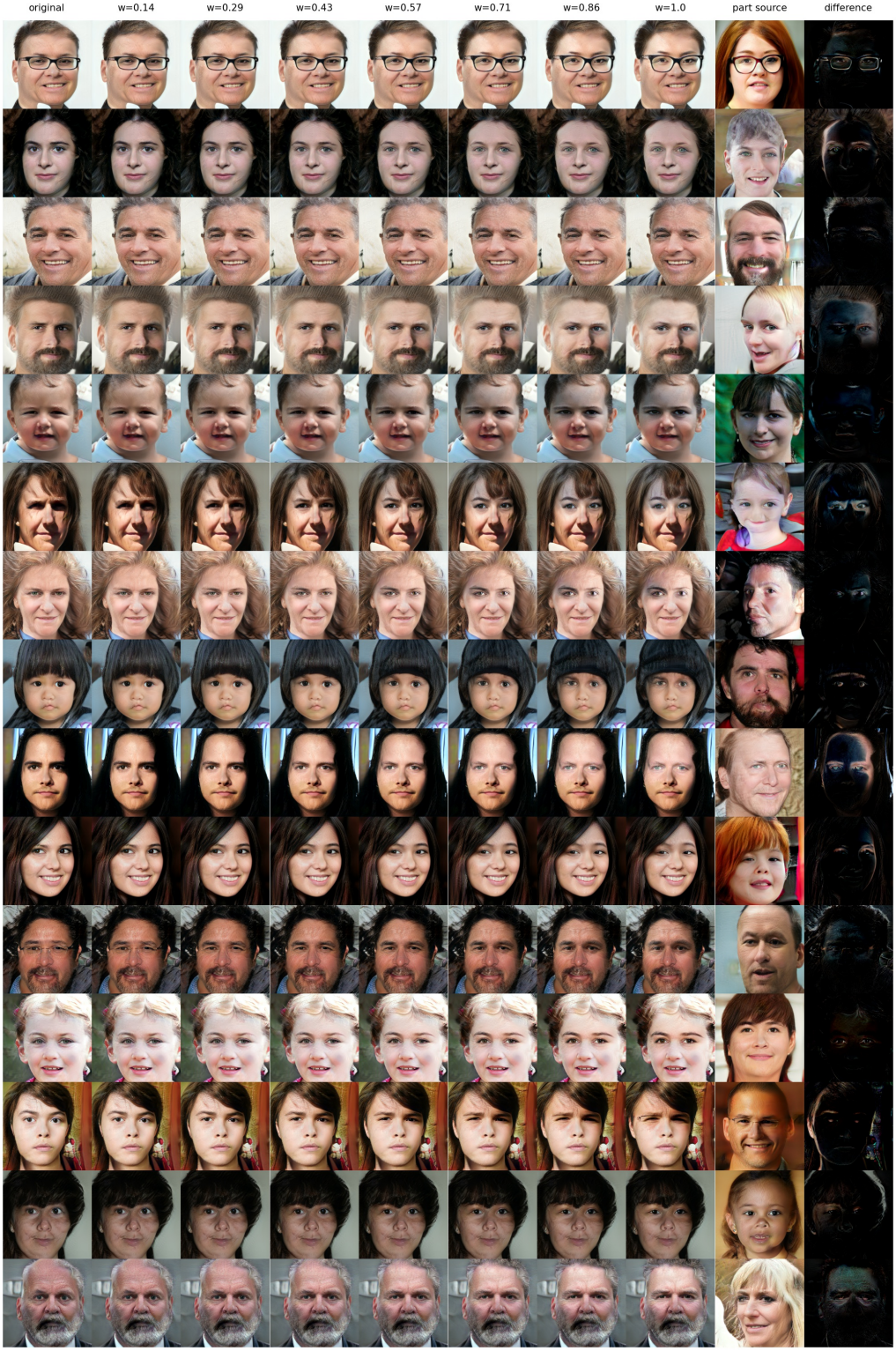

Figure 12: **Keypoint appearance embedding interpolation.** We show the interpolation of eyes for faces previously shown in Figure 3.

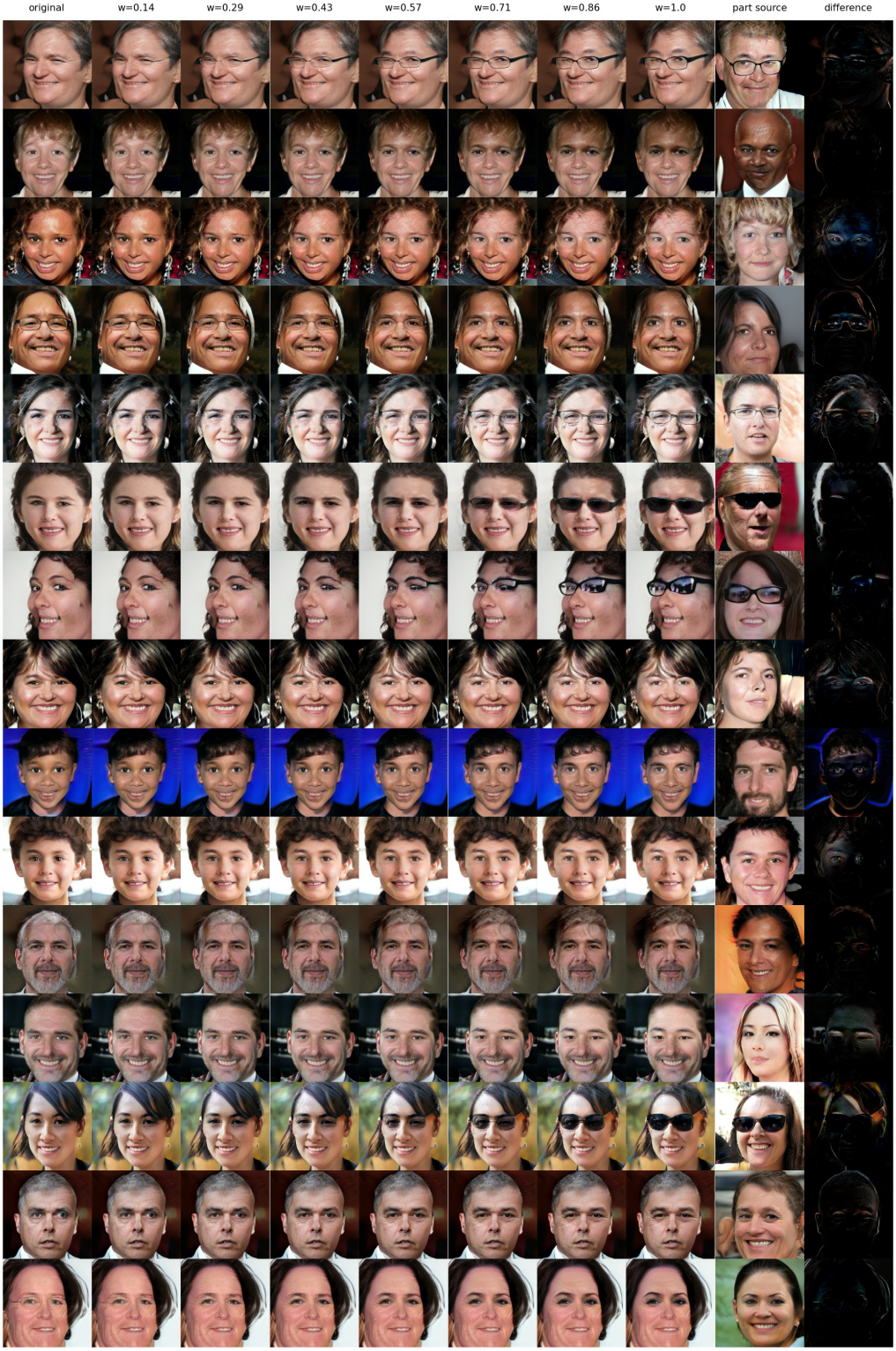

Figure 13: **Keypoint appearance embedding interpolation.** We show the interpolation of eyes for faces previously shown in Figure 4.

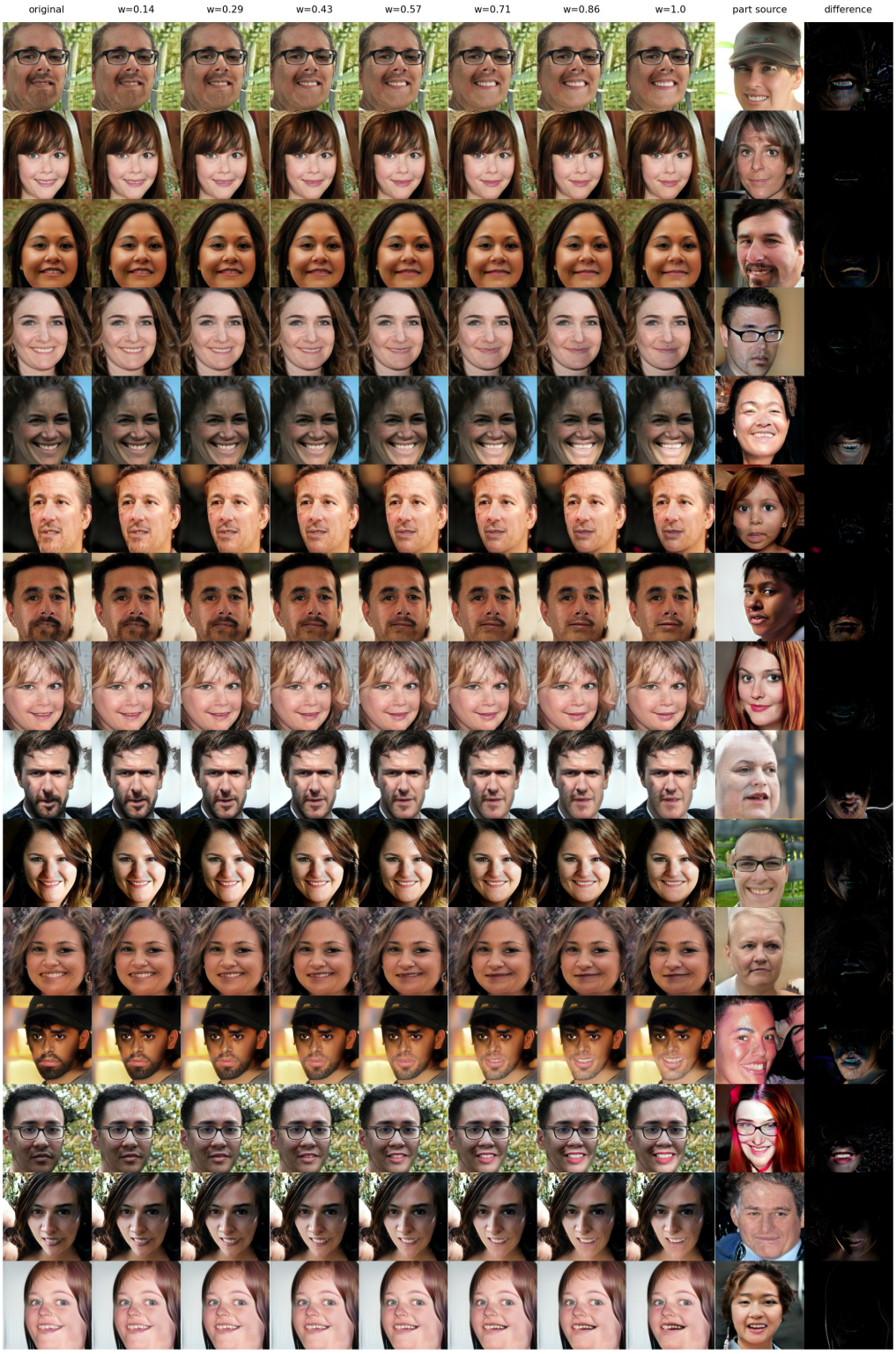

Figure 14: **Keypoint appearance embedding interpolation.** We show the interpolation of mouths for faces in Figure 1. **The 1st column**: original image; **the 2rd-8th column**: the interpolation from the original images to the part source images; **the 9th column**: part appearance source image used to swap part appearance; **the 10th column**: the difference between the original images and the swapped images.

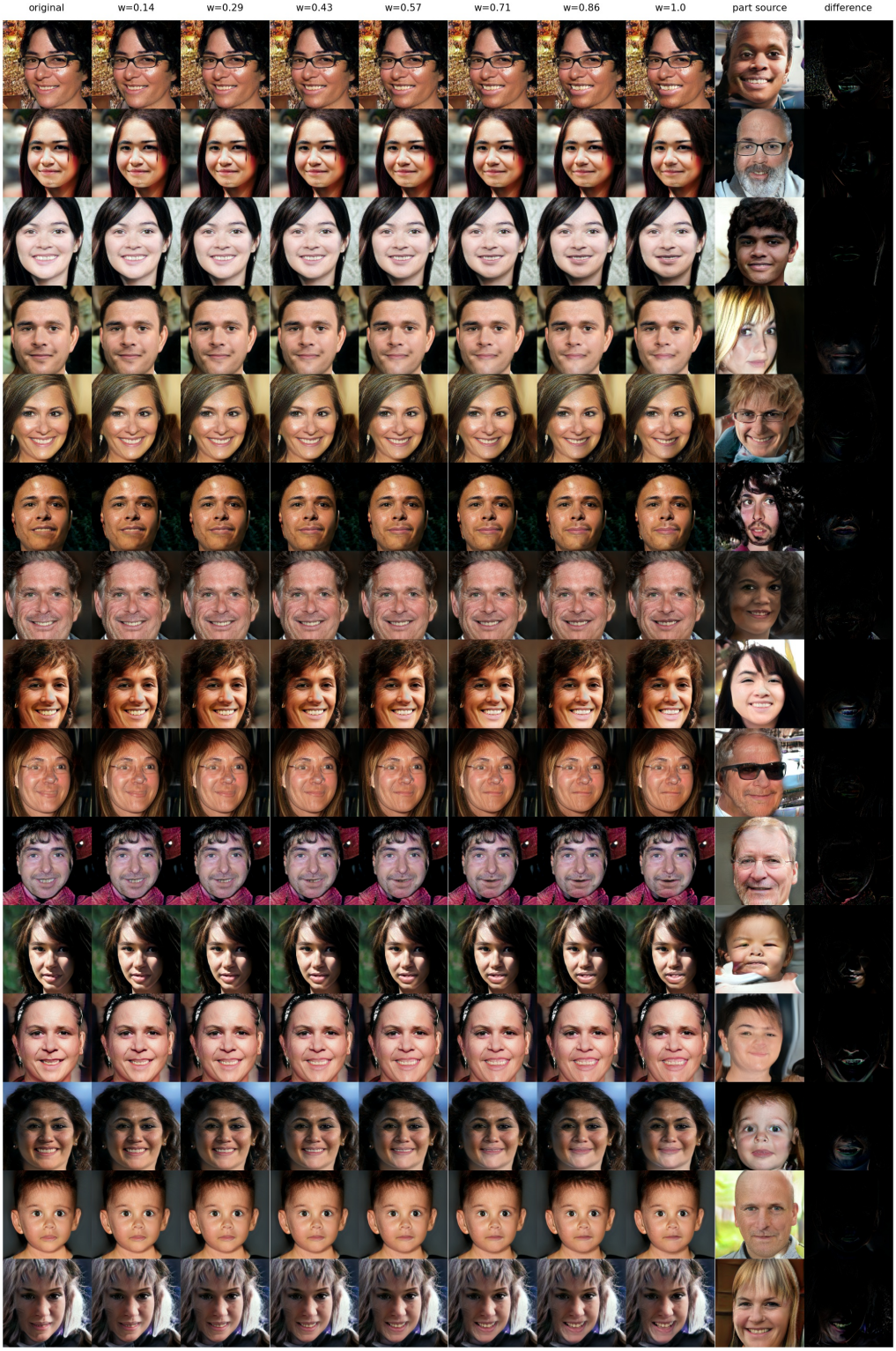

Figure 15: **Keypoint appearance embedding interpolation.** We show the interpolation of mouths for faces previously shown in Figure 2.

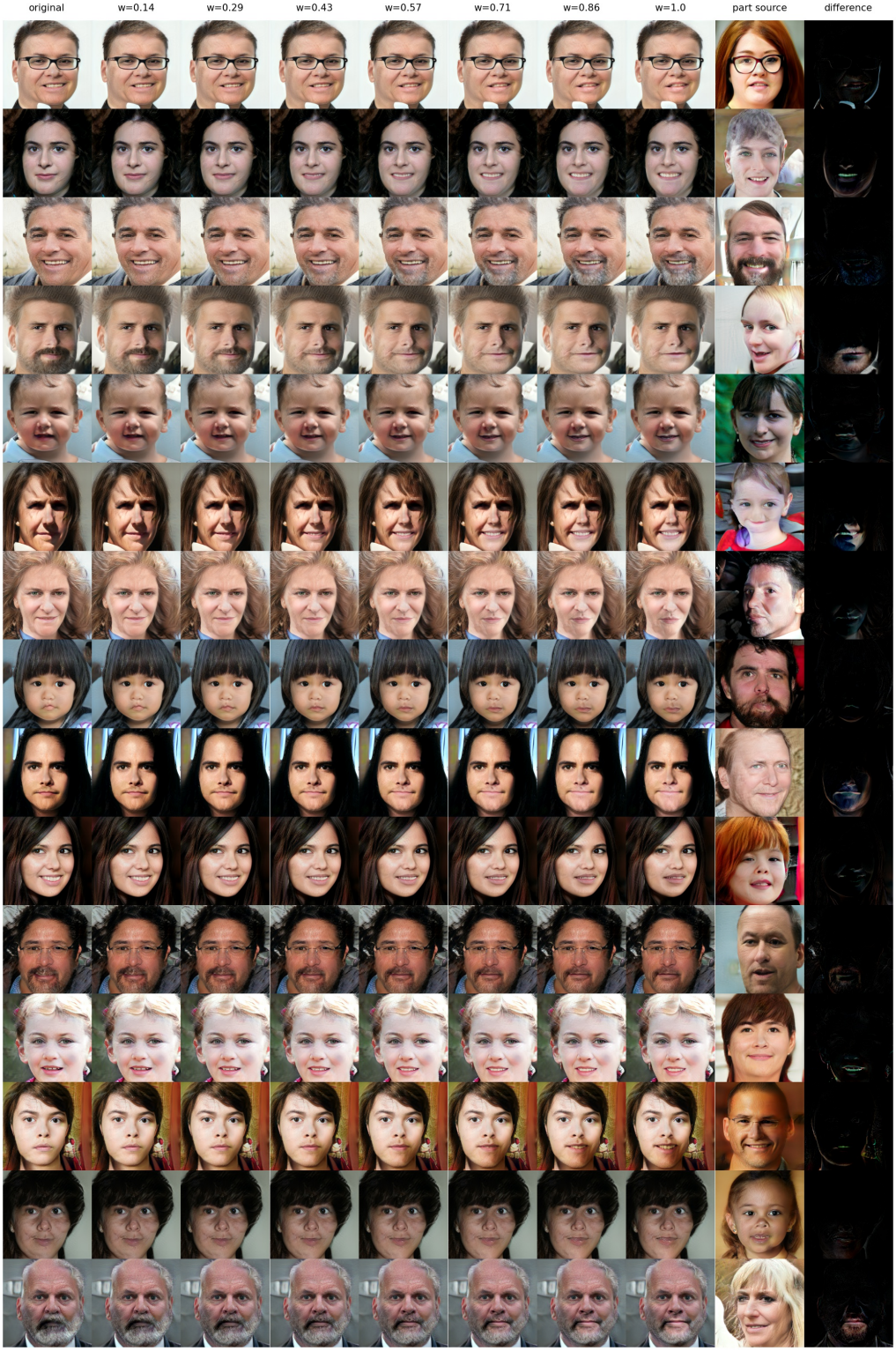

Figure 16: **Keypoint appearance embedding interpolation.** We show the interpolation of mouths for faces previously shown in Figure 3.

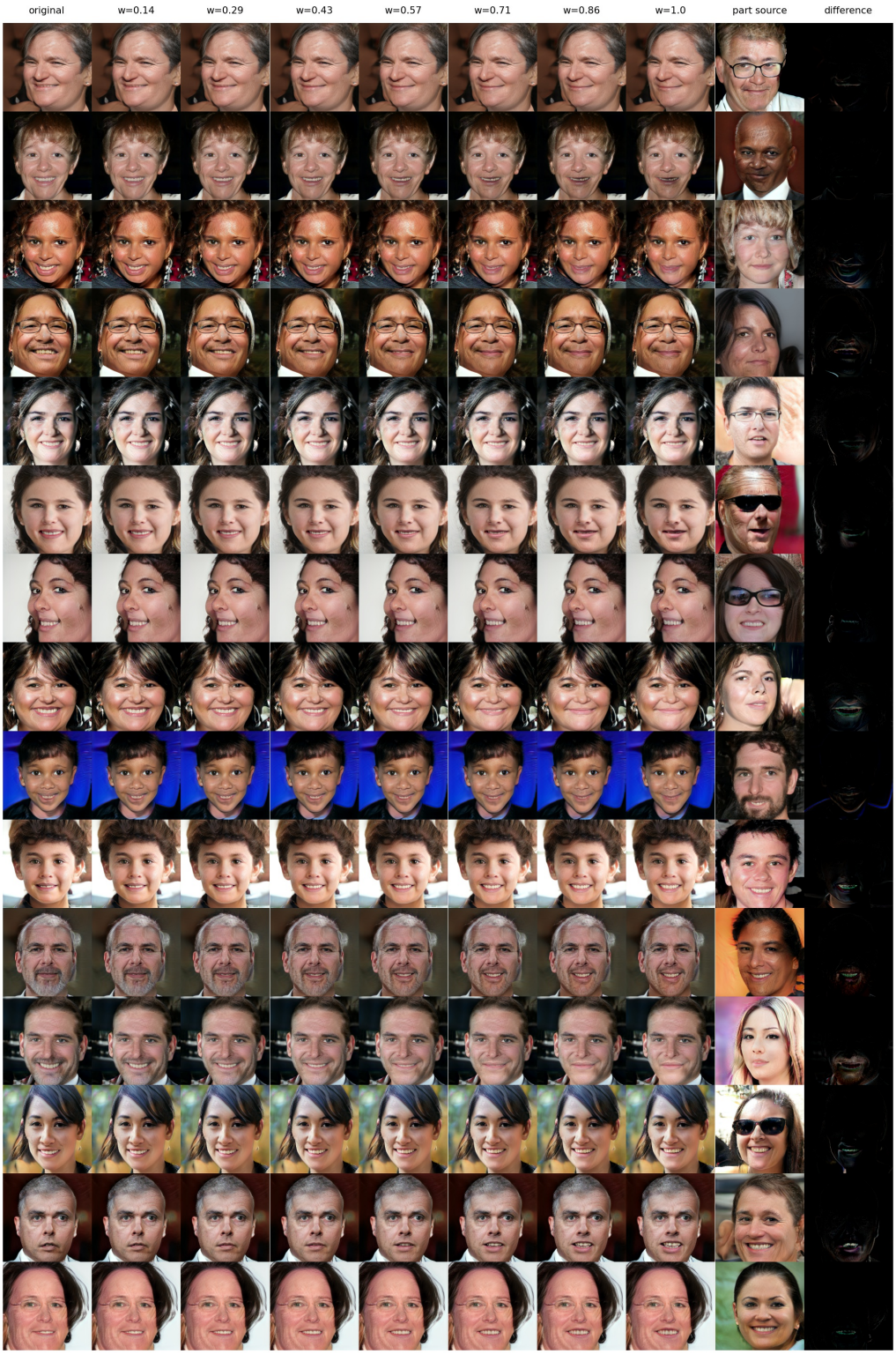

Figure 17: **Keypoint appearance embedding interpolation.** We show the interpolation of mouths for faces previously shown in Figure 4.

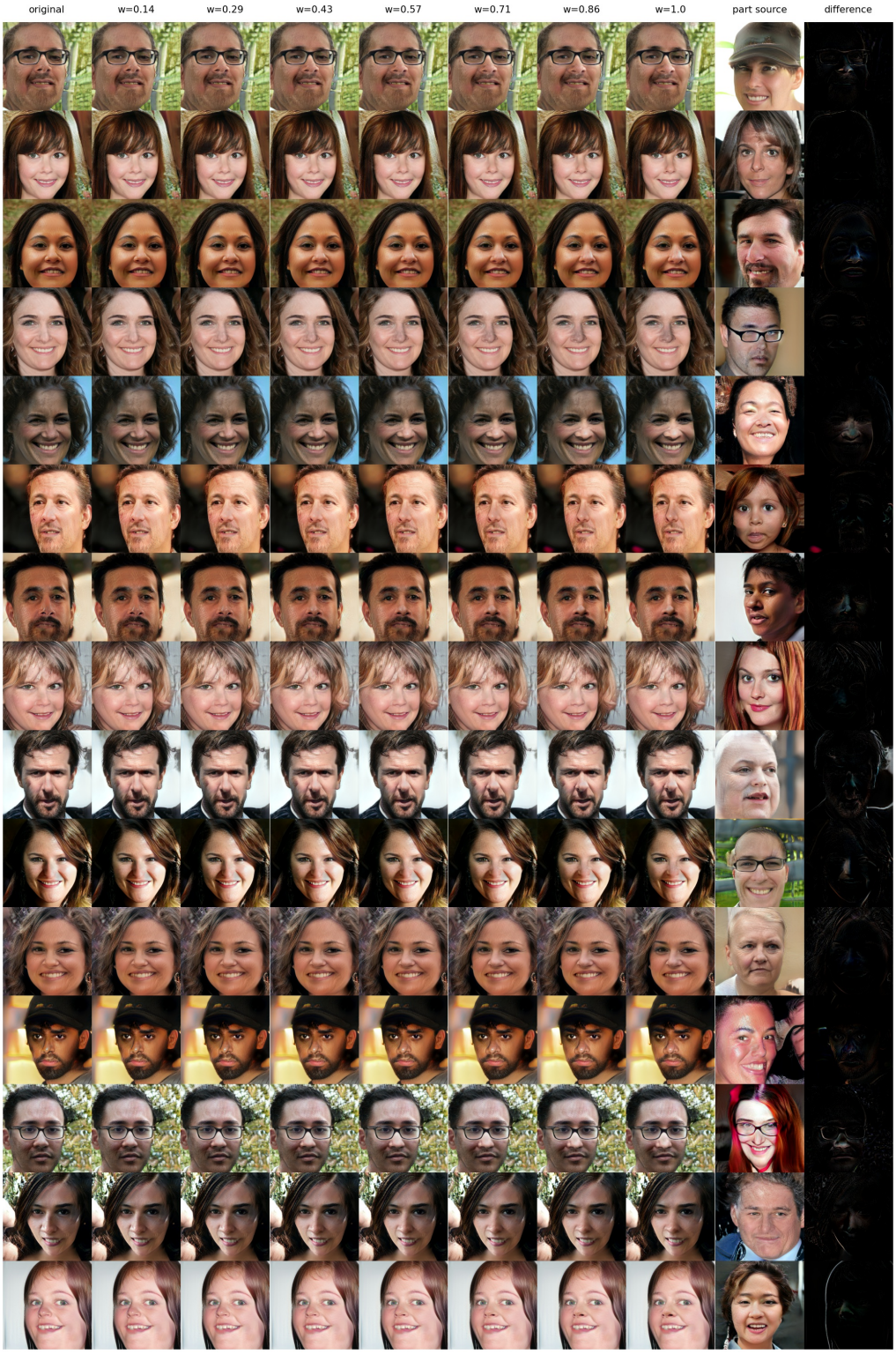

Figure 18: **Keypoint appearance embedding interpolation.** We show the interpolation of noses for faces in Figure 1. **The 1st column**: original image; **the 2rd-8th column**: the interpolation from the original images to the part source images; **the 9th column**: part appearance source image used to swap part appearance;; **the 10th column**: the difference between the original images and the swapped images.

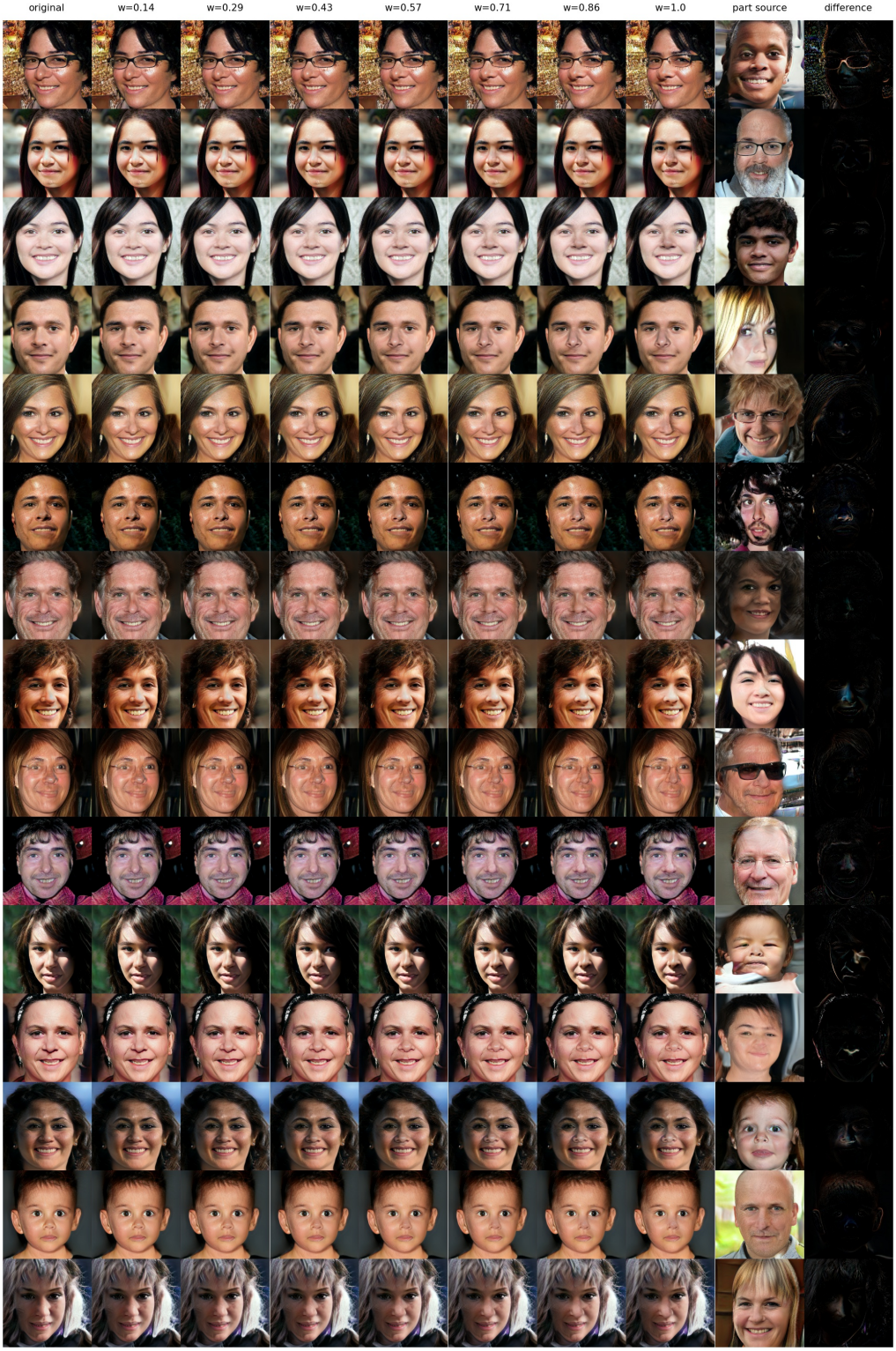

Figure 19: **Keypoint appearance embedding interpolation.** We show the interpolation of noses for faces previously shown in Figure 2.

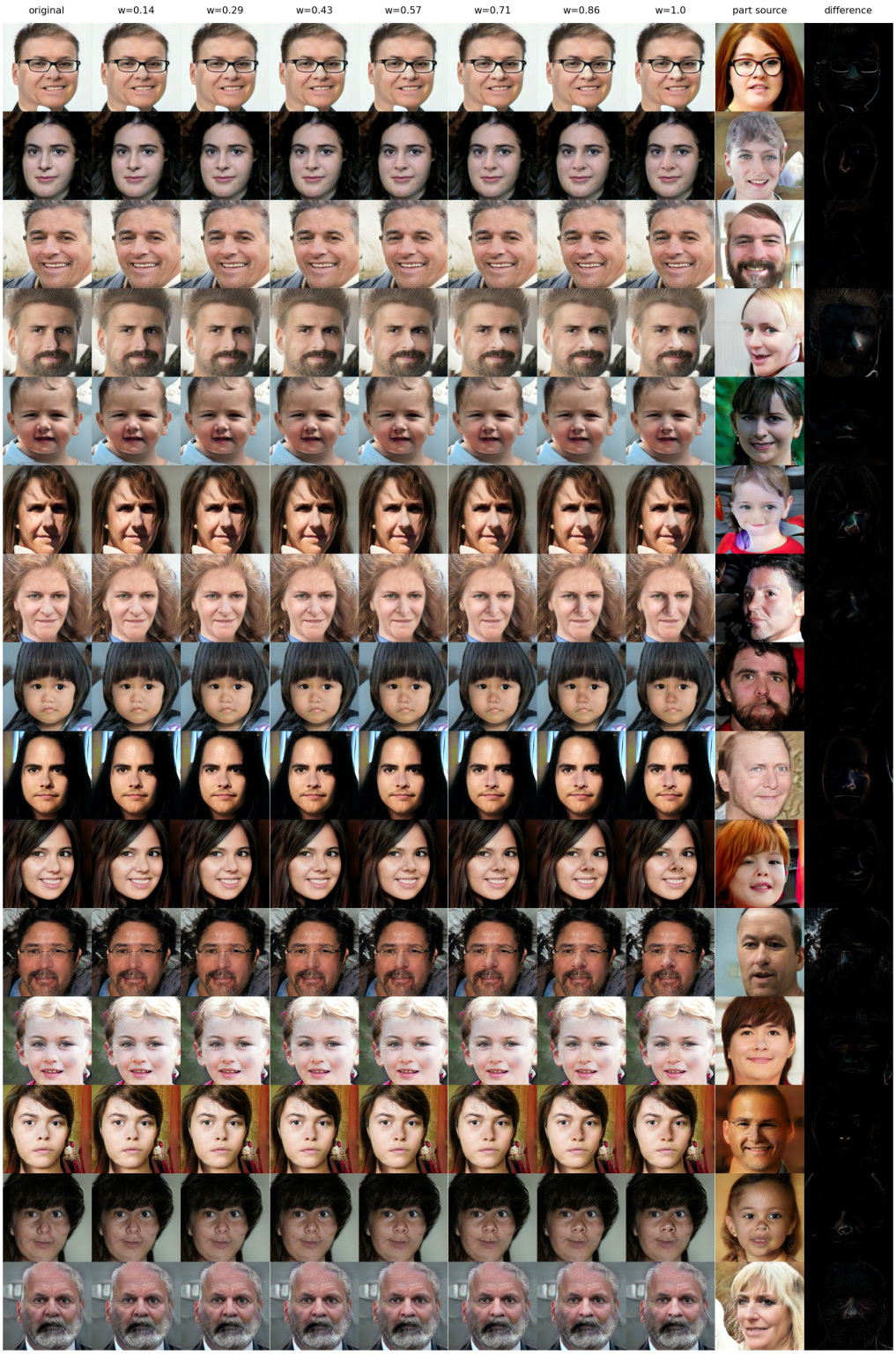

Figure 20: **Keypoint appearance embedding interpolation.** We show the interpolation of noses for faces previously shown in Figure 3.

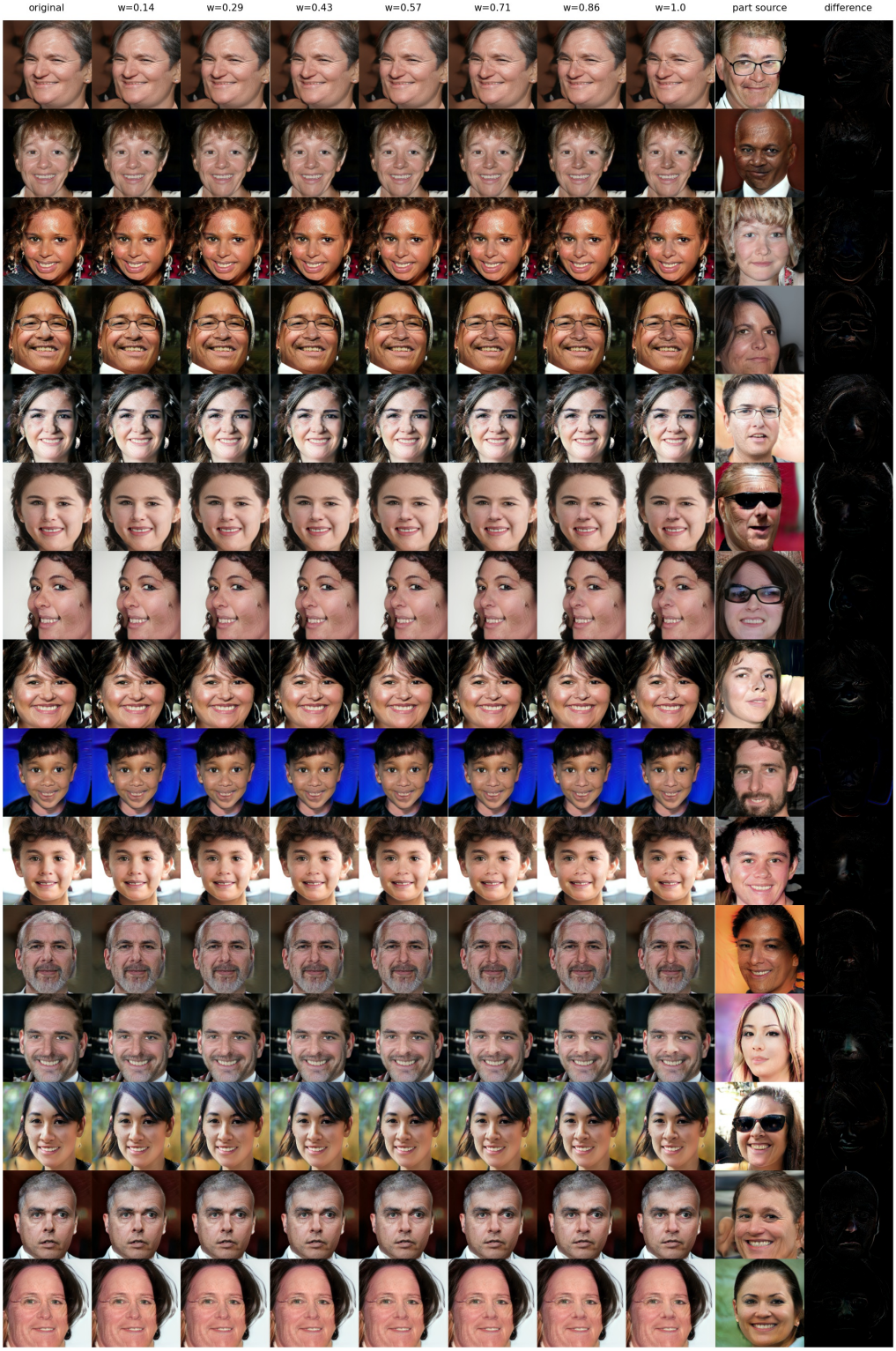

Figure 21: **Keypoint appearance embedding interpolation.** We show the interpolation of noses for faces previously shown in Figure 4.

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Figure 23: **Editing on LSUN Bedroom The 1st column**: original image; **the 2rd column**: part source images; **the 3th column**: swapping all parts; **the 4th column**: changing bed; **the 5th column**: removing bed.

Figure 24: **Editing on LSUN Bedroom**, with the same settings as in previous figures.

Figure 25: **Failure cases on LSUN Bedroom**. Note that 10% of the original images are closeups, very cluttered rooms, or merely empty shots from rendered bedroom advertisements, i.e., images with similar image statistics to some of our failure cases. Hence, some selection before editing is inevitable.

Figure 26: **Qualitative comparison with SEAN (Zhu et al., 2020)** The first five columns show our results and the last five columns show the results of SEAN (Zhu et al., 2020). **Note that for SEAN, the first and the second columns are reconstructed image instead of edited images.** For two combined columns: **The 1st column**: original image; **the 2nd column**: part appearance source image used to swap appearance; **the 3rd column**: the combined image with shape from the original images and the appearance from the part appearance source image; **the 4th column**: only changing mouth & jaw; **the 5th column**: only changing eyes.

Figure 27: **Qualitative comparison with SEAN (Zhu et al., 2020)**, with the same settings as in previous figures.

Figure 28: **Qualitative comparison with SEAN (Zhu et al., 2020)**, with the same settings as in previous figures.

Figure 29: **Qualitative comparison with SEAN (Zhu et al., 2020)**, with the same settings as in previous figures.

Figure 30: **Qualitative comparison with SEAN (Zhu et al., 2020)**, with the same settings as in previous figures.

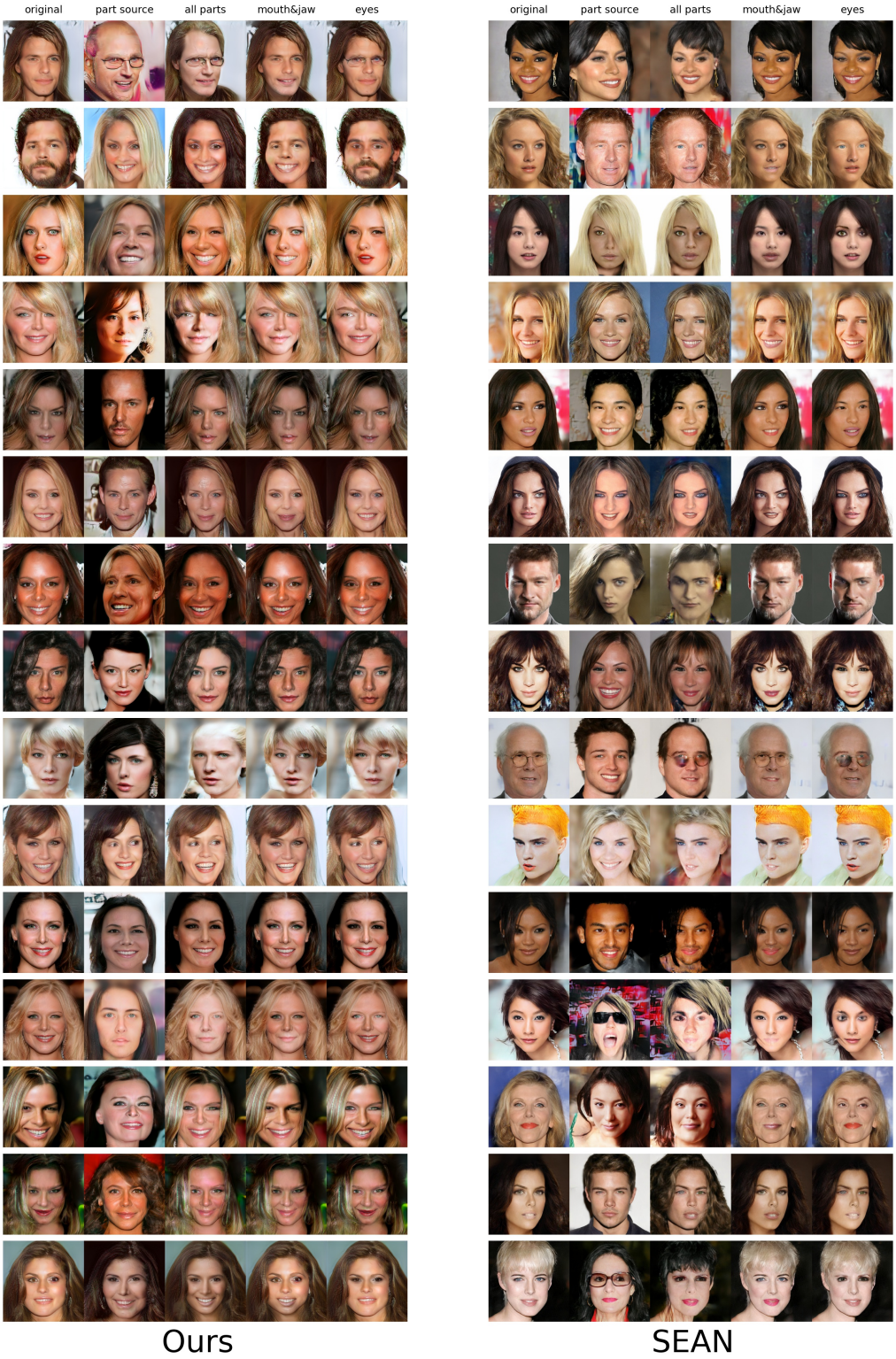

Figure 31: **Qualitative comparison with SEAN (Zhu et al., 2020)**, with the same settings as in previous figures.

Figure 32: **Qualitative comparison with SEAN (Zhu et al., 2020)**, with the same settings as in previous figures.