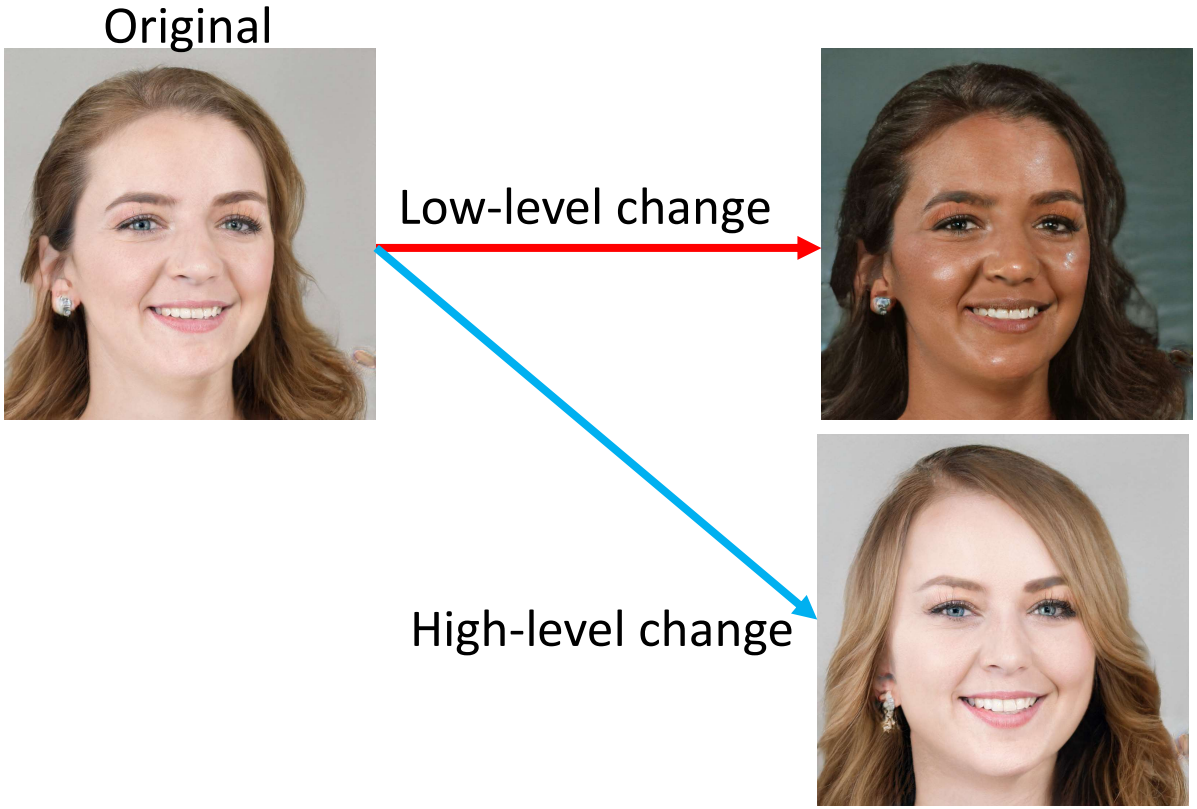
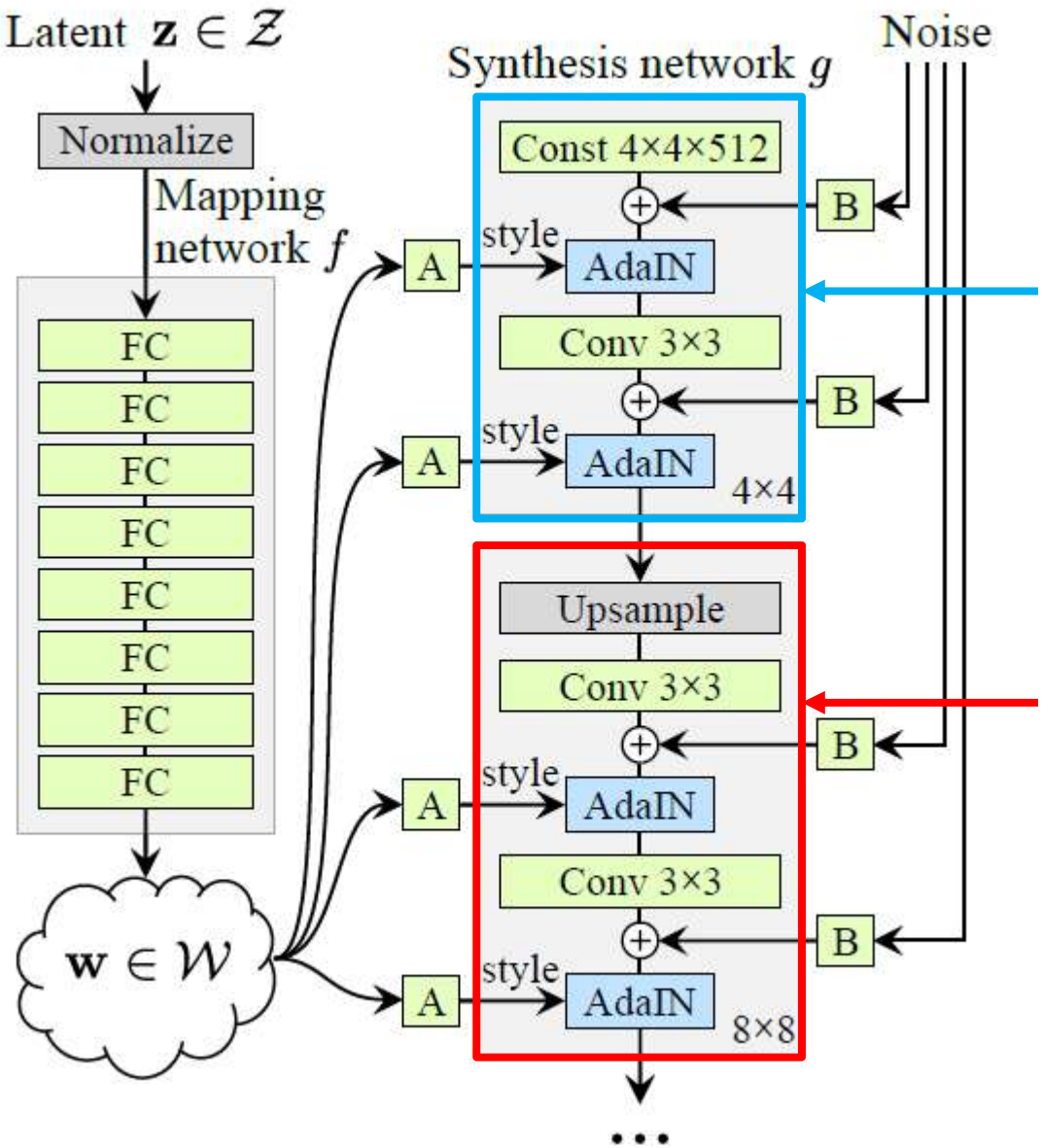
Change blindness

Challenge: manipulation of change type

- Previous studies show a high-level change is more easily detected than a low-level change.
- Ideal: change high-level features while keeping low-level features constant and vice versa.



style-GAN: separate levels of representation

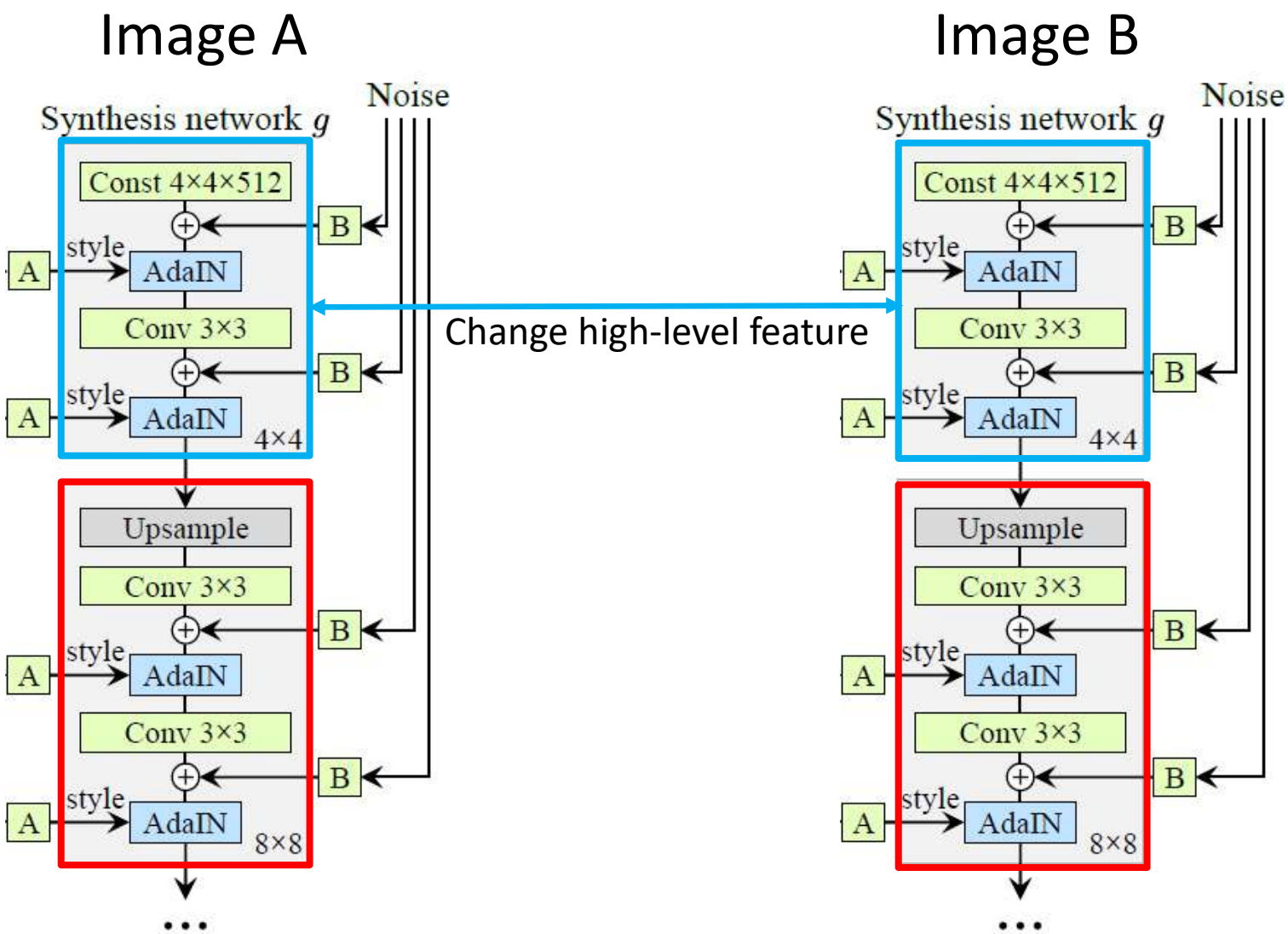


Low-resolution image: high-level feature

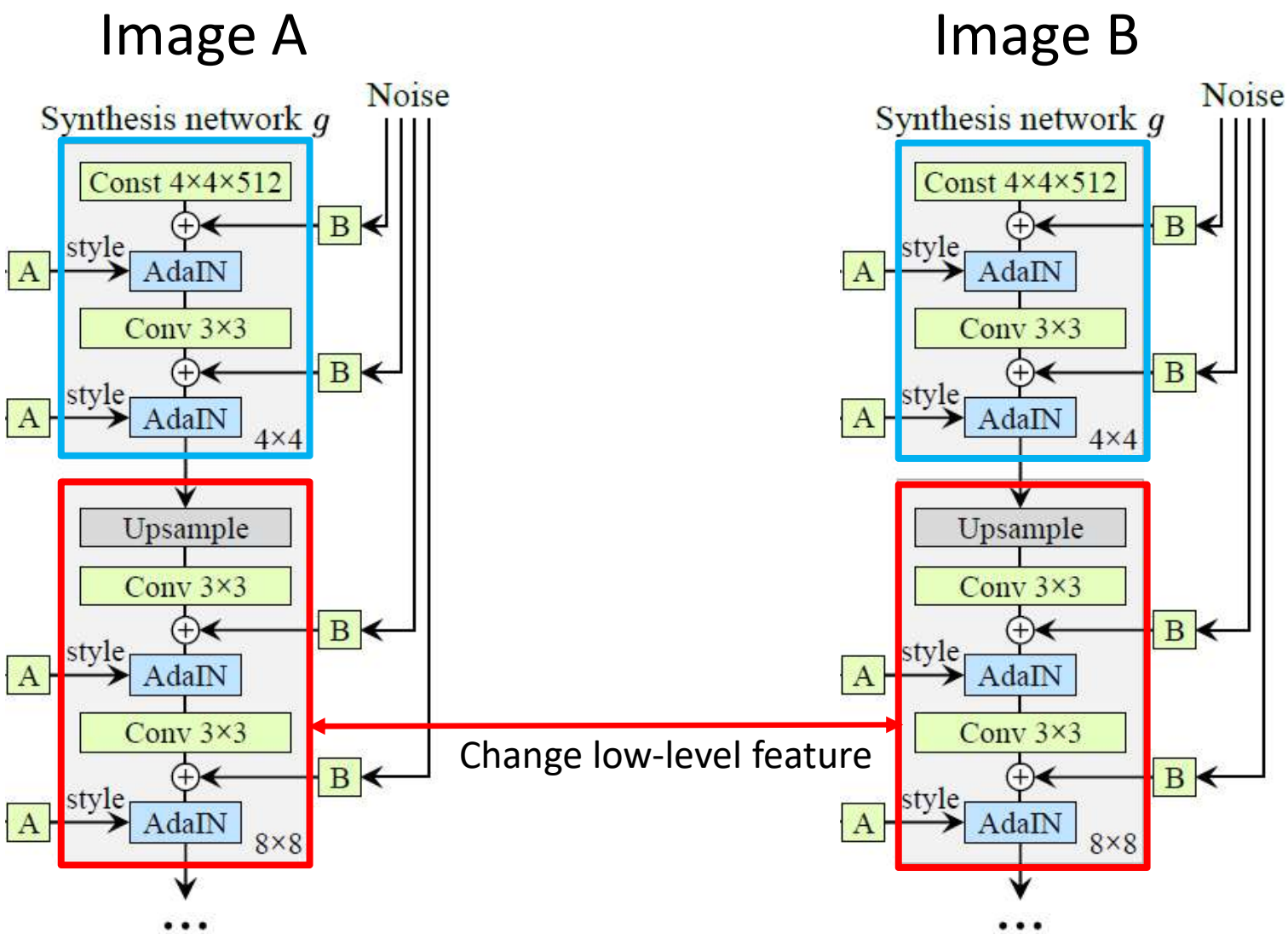
high-resolution image: low-level feature

Karras et.al. 2019

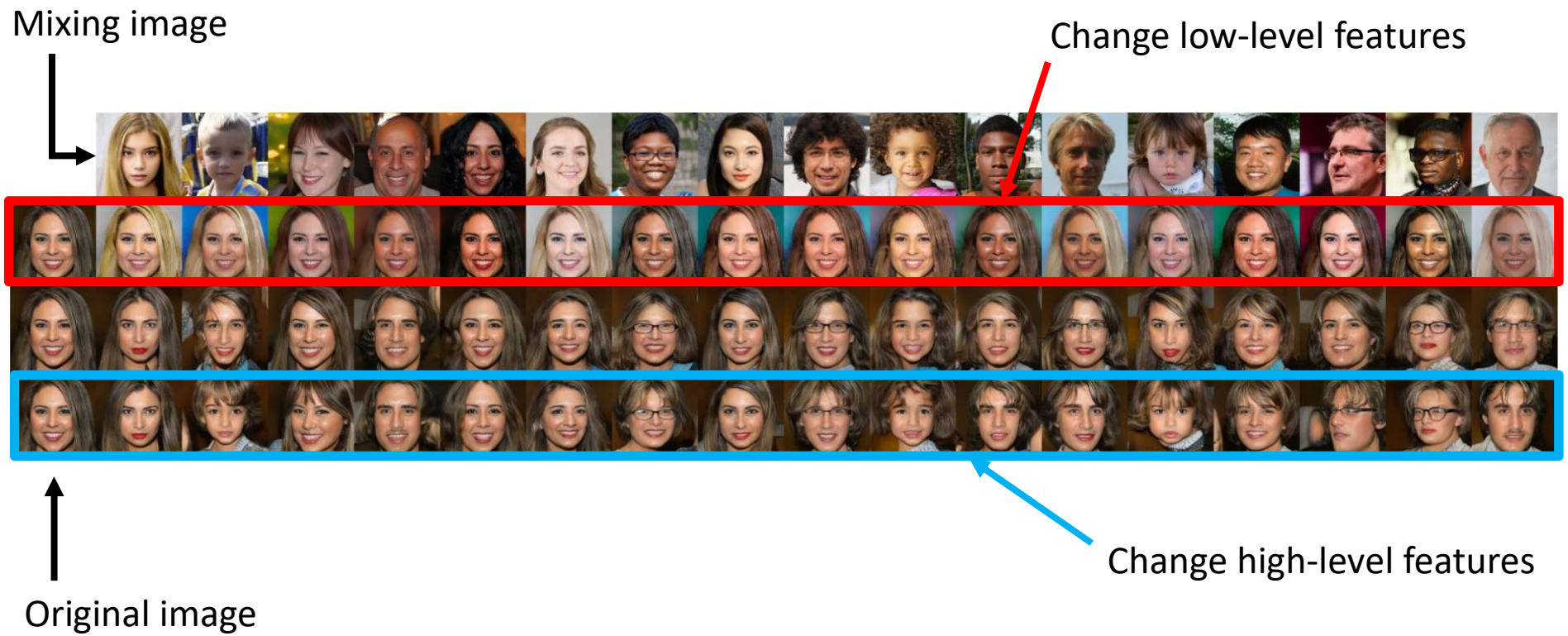
Manipulate different levels of style-GAN



Manipulate different levels of style-GAN

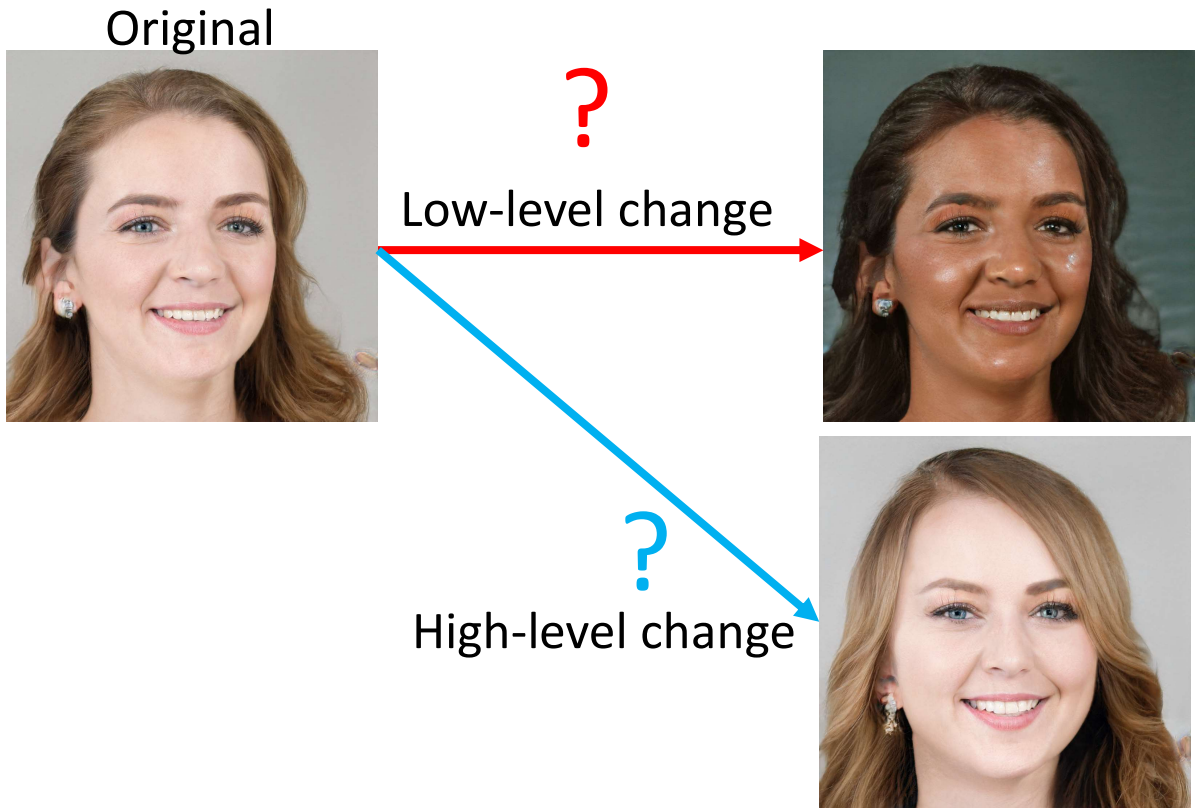


Example on face images



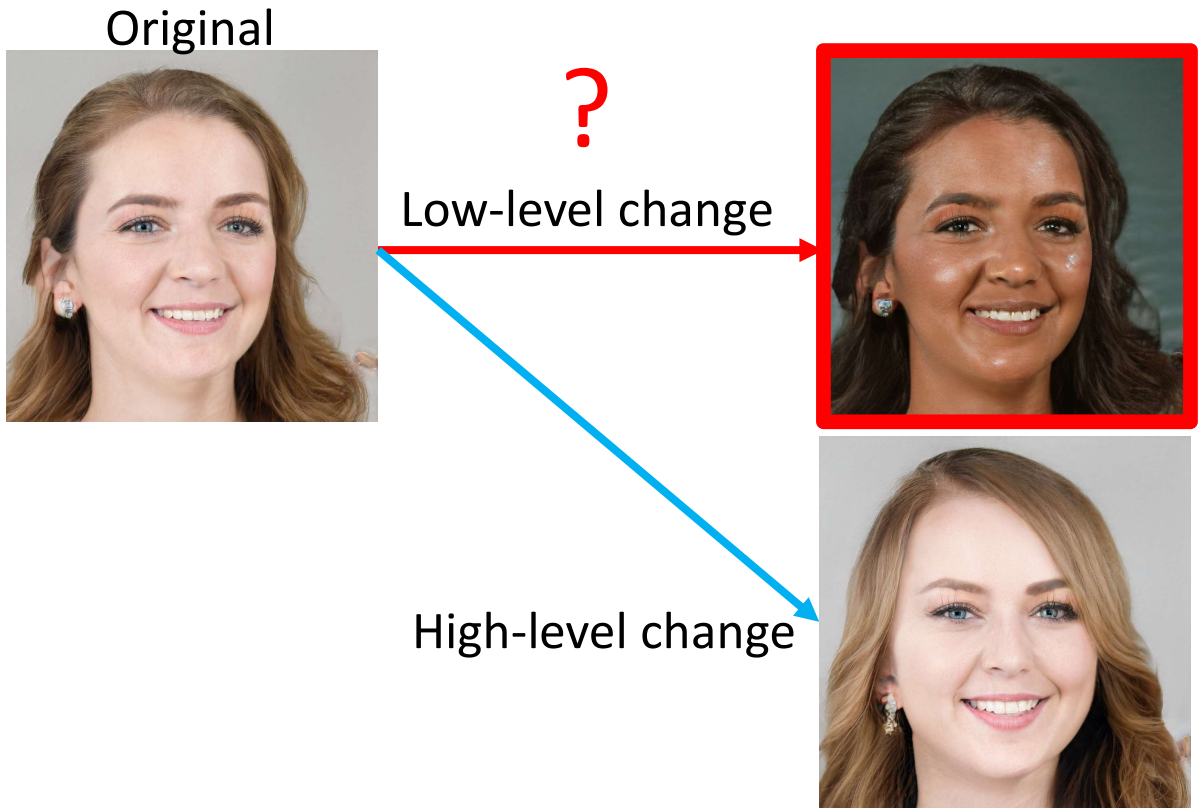
Quantifying the magnitude of change

- Visual inspection shows style-GAN works pretty well.
- Problem: Given the images generated by style-GAN, how can we quantify the magnitude of change at different levels?



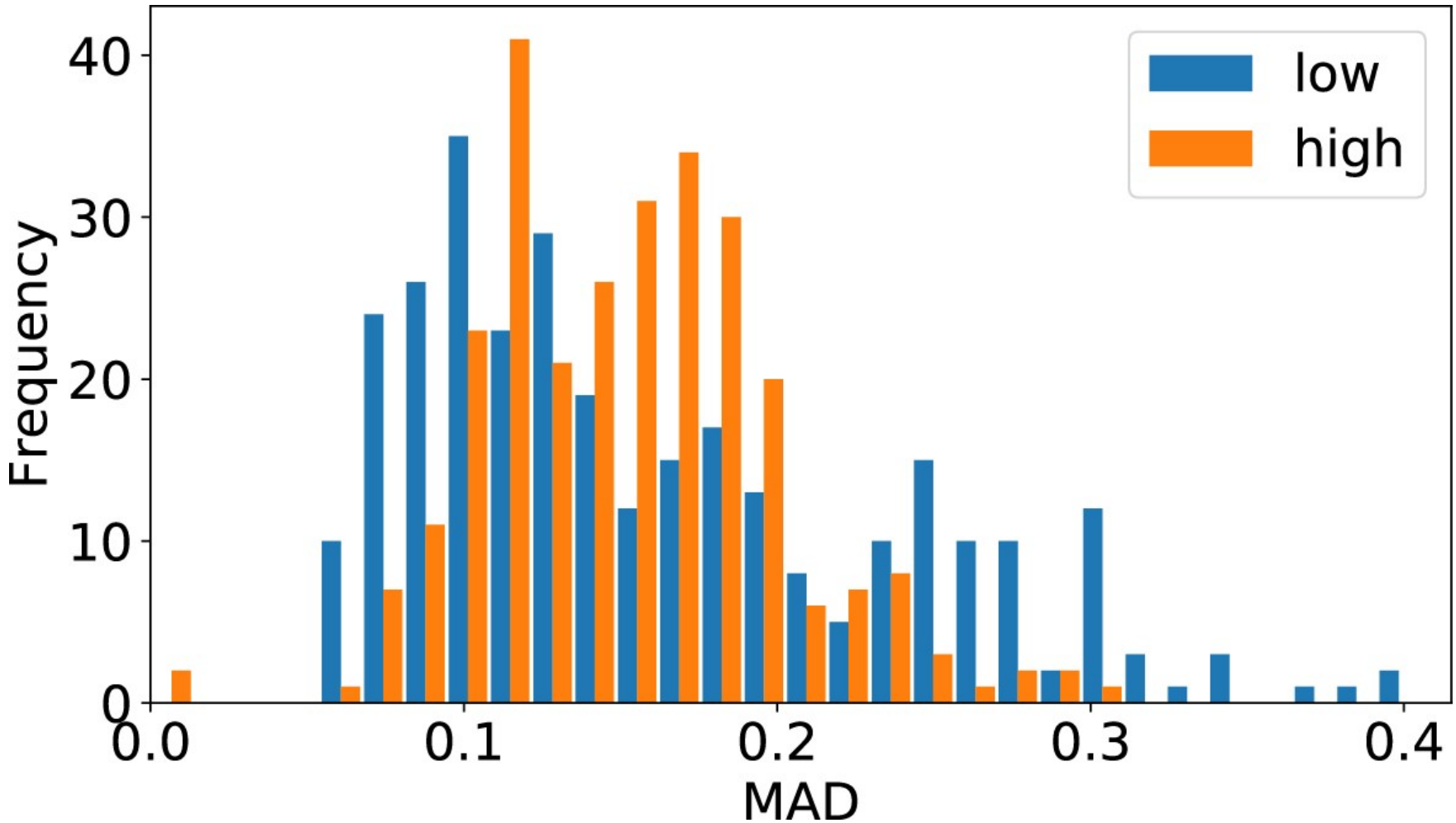
Quantifying low-level change

- Visual inspection shows style-GAN works pretty well.
- Problem: Given the images generated by style-GAN, how can we quantify the magnitude of change at different levels?



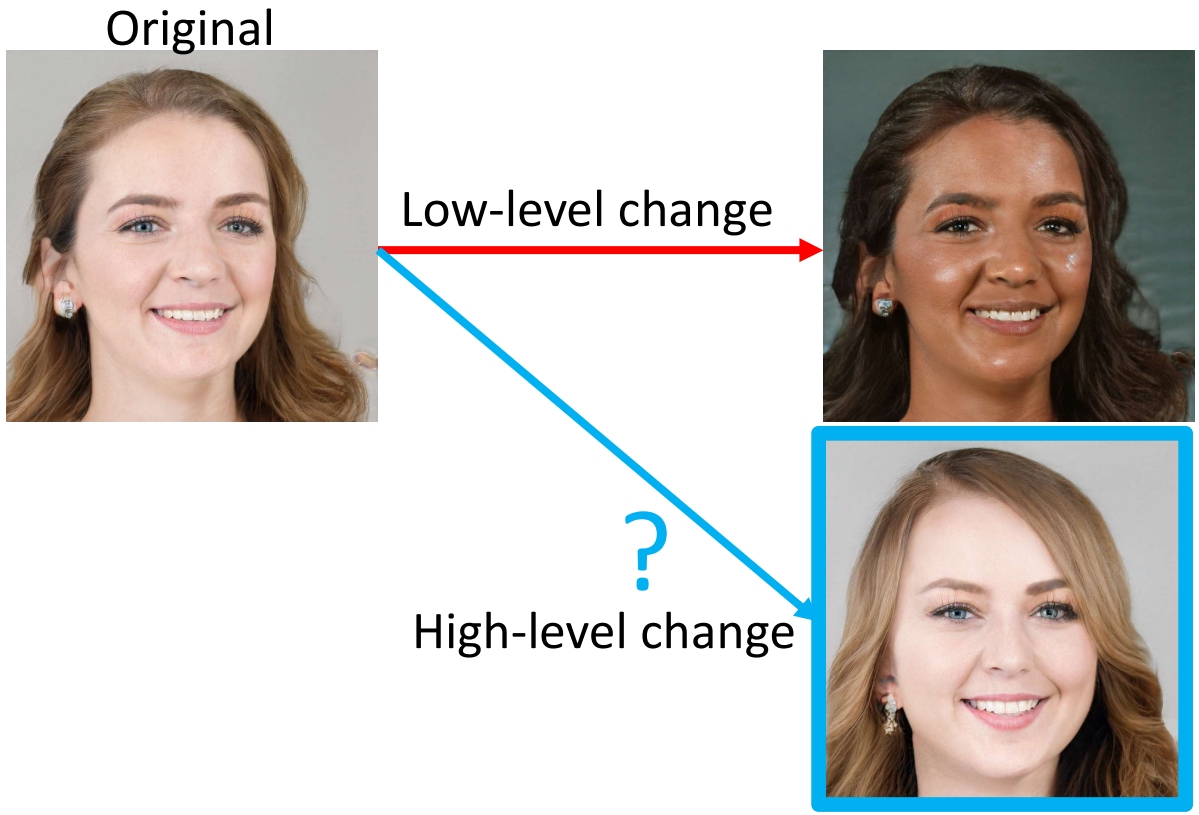
Quantifying low-level change

- Mean absolute deviation of pixel intensities between original and changed images.



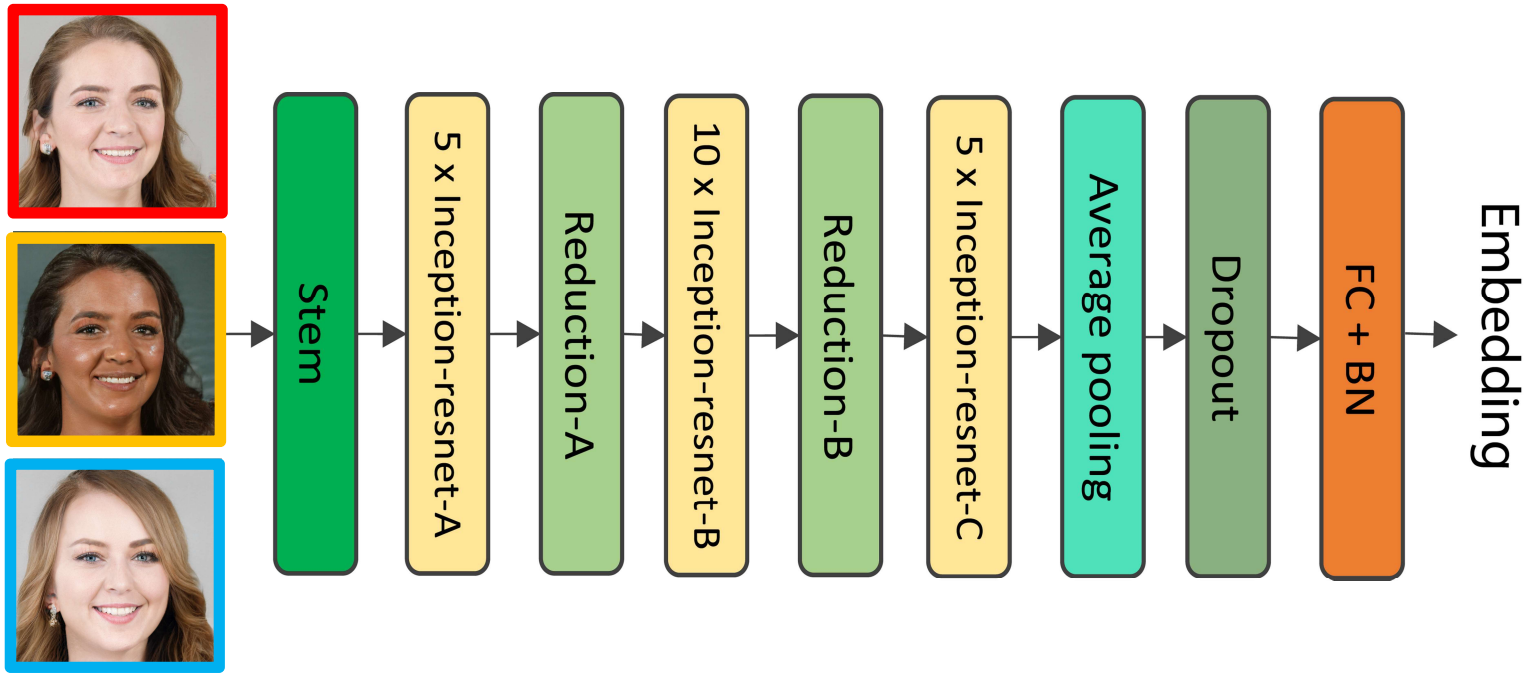
Quantifying high-level change

- Visual inspection shows style-GAN works pretty well.
- Problem: Given the images generated by style-GAN, how can we quantify the magnitude of change at different levels?



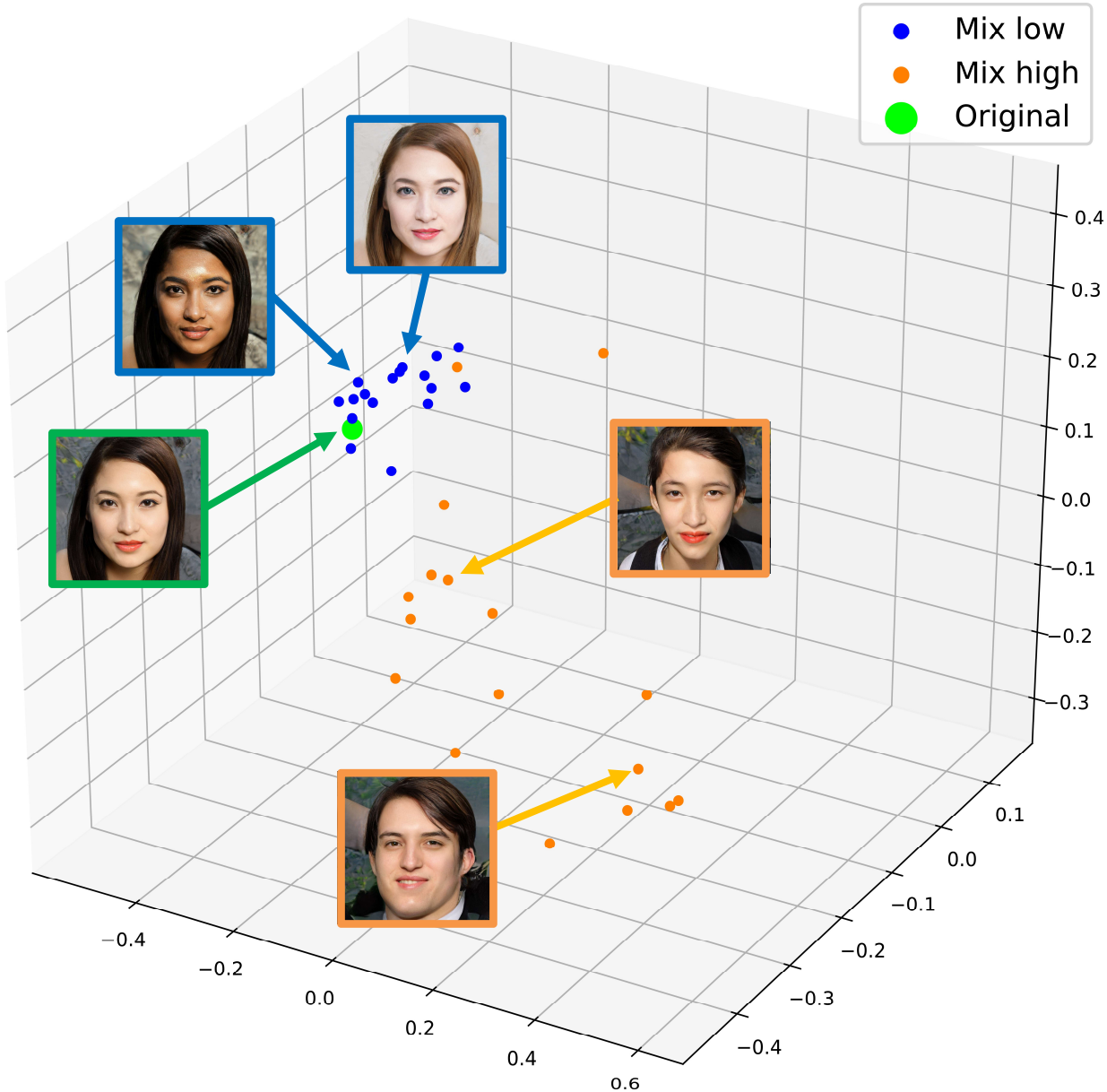
Quantifying high-level change: transfer learning

- Use InceptionResnet-v1 trained on MS-Celeb-1M dataset.

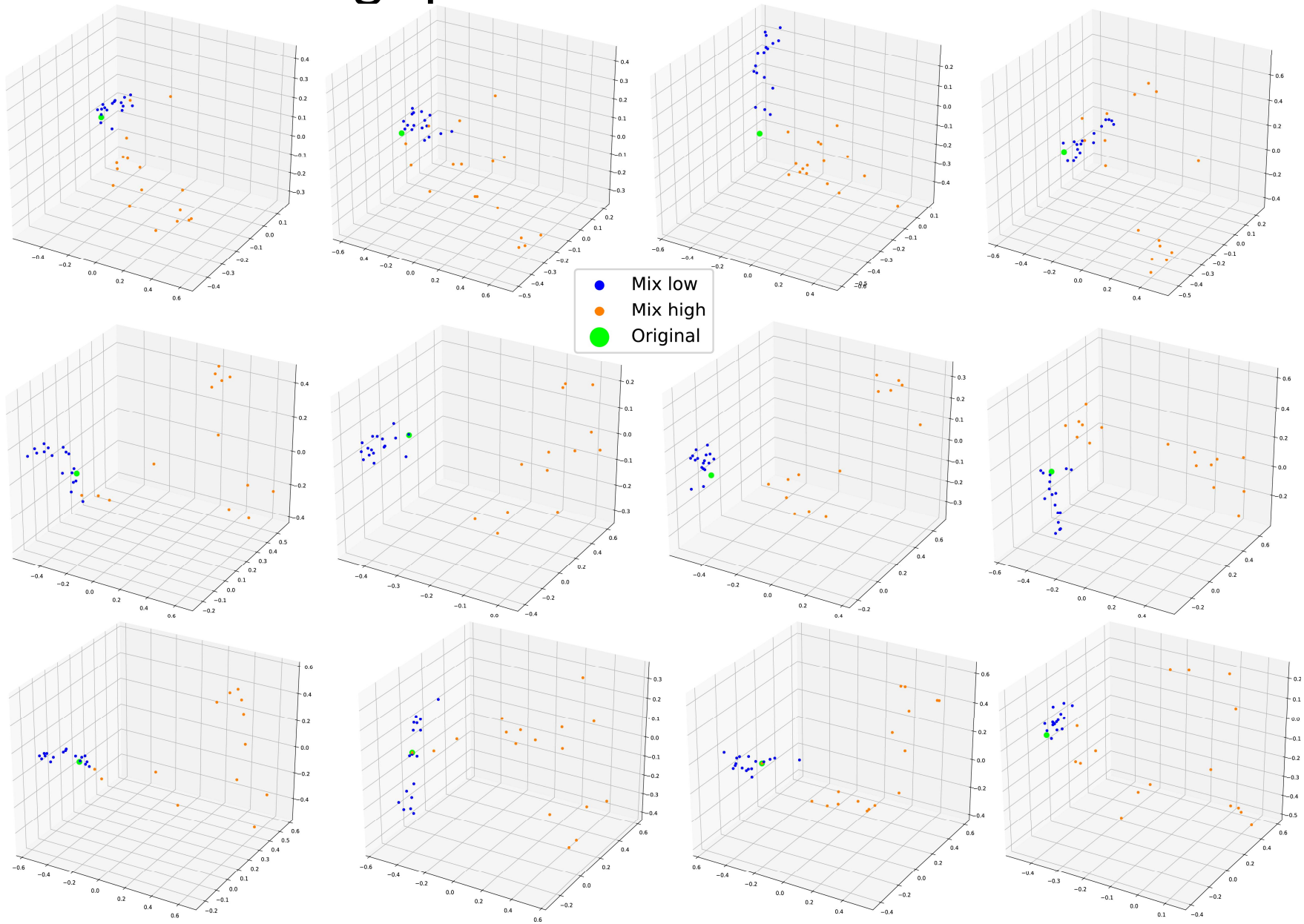
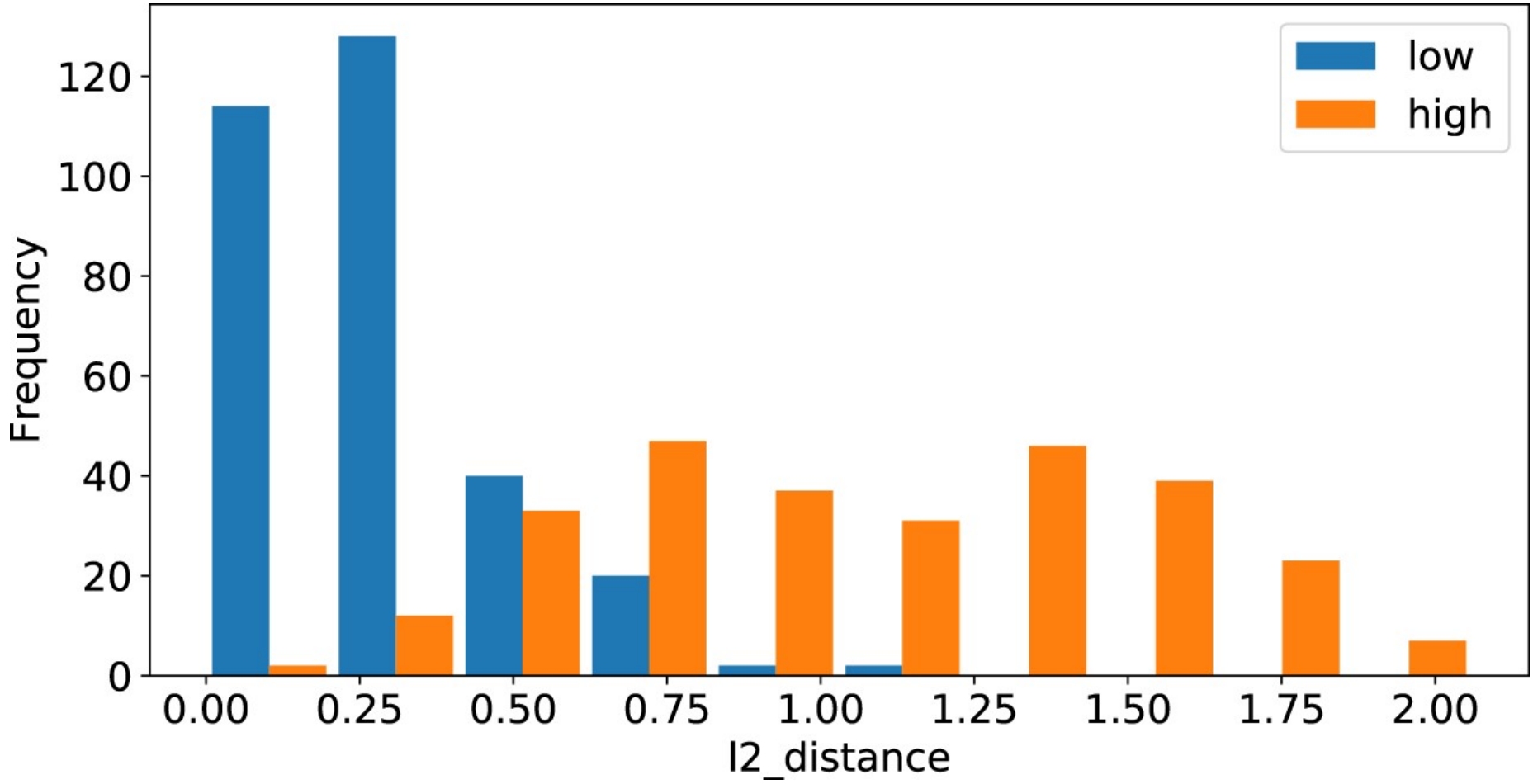


Szegedy et.al., 2016
Schroff et.al., 2015

Embedding space after PCA for 1 seed image



Embedding space after PCA for more seeds



L2 distance of low- vs. high-level change