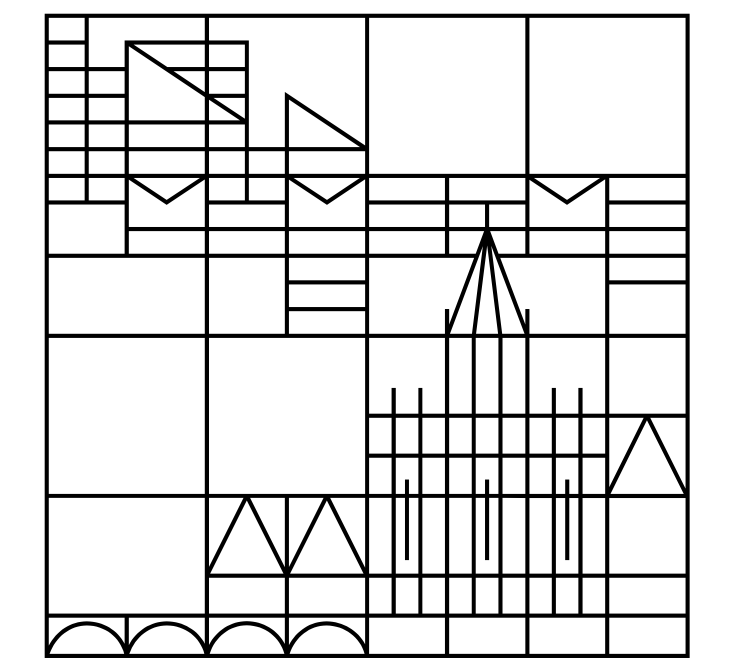


# Can Instagram Likes be used as a proxy for the aesthetic appeal of photographs?

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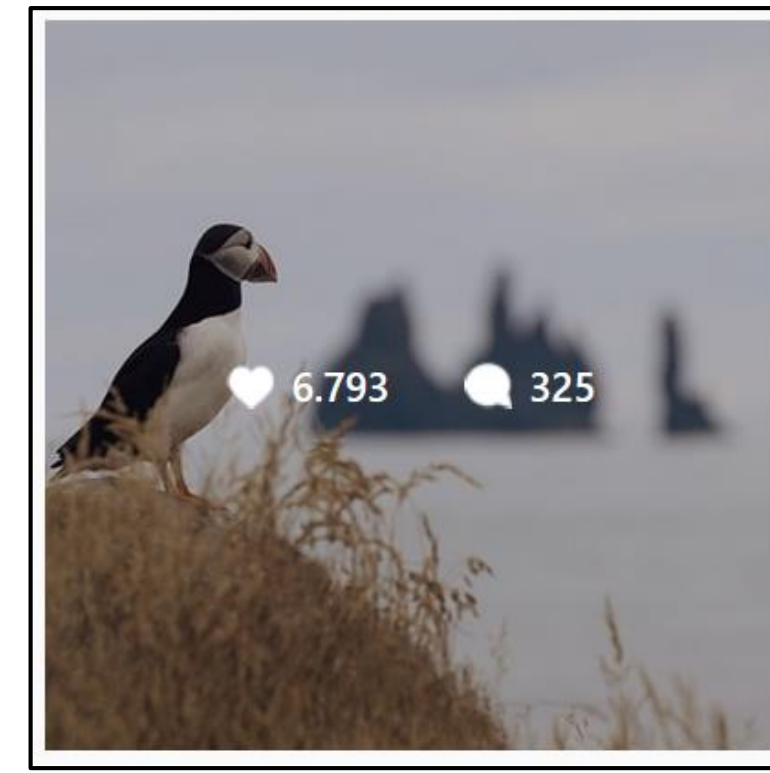
## Introduction: Why did we ask that question?

### What is the aesthetic appeal of a photograph?



- Objectivist approach: aesthetic appeal can be measured and investigated psychophysically (Fechner, 1876)
- However, we have to rely on aesthetic behavior of the appreciator (Berlyne, 1971)
- To avoid biased results aesthetic behavior should be observed in a large and diverse group

### Making use of 'aesthetic behavior' on social media



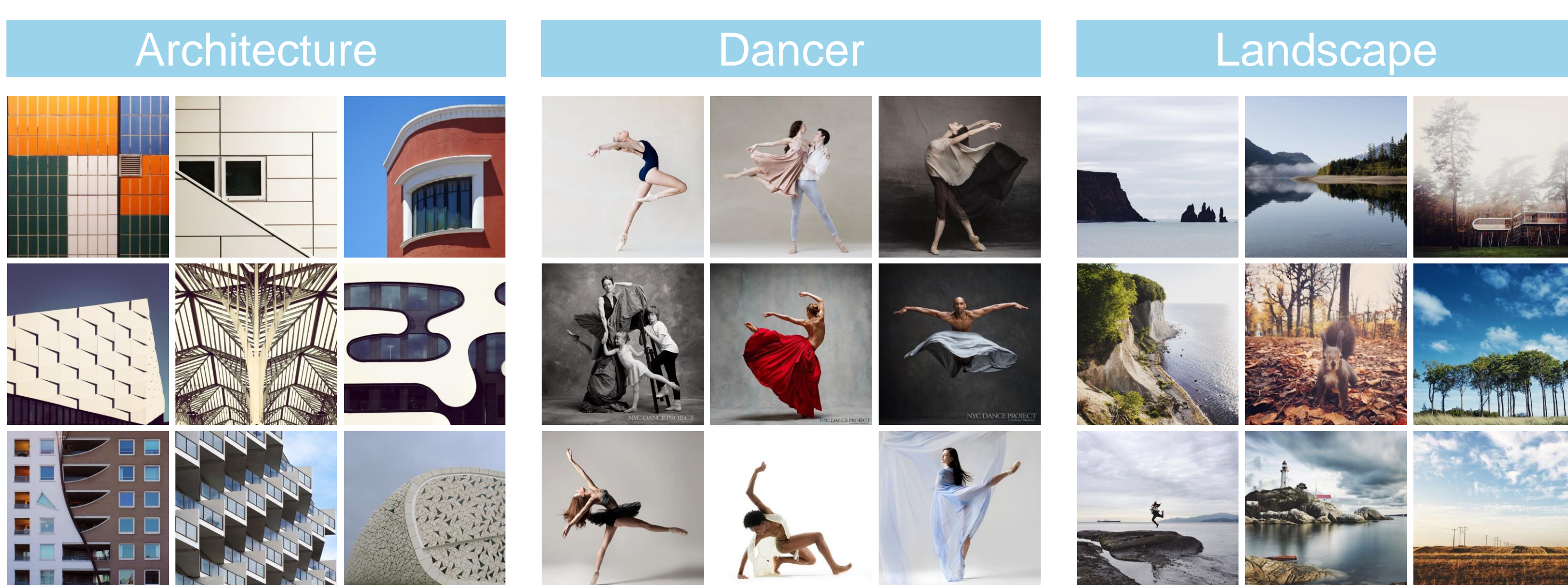
- 1 billion users watch and like photos (June 2018)
- Almost limitless source of data
- There are specialists for all sorts of content
- We use data of professional photographers
- How to handle Instagram Likes?

Instagram

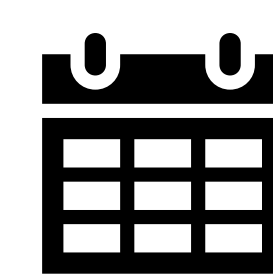
## Methods: How did we try to answer it?

### The Instagram database

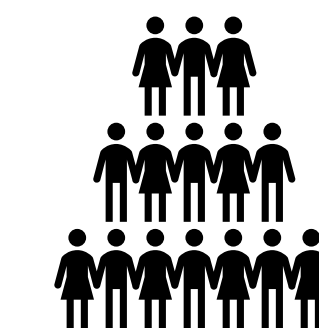
- 15,000 images from three genres (nine complete accounts)
- Image data: number of likes, posting date
- Account data: number of posted images, number of followers



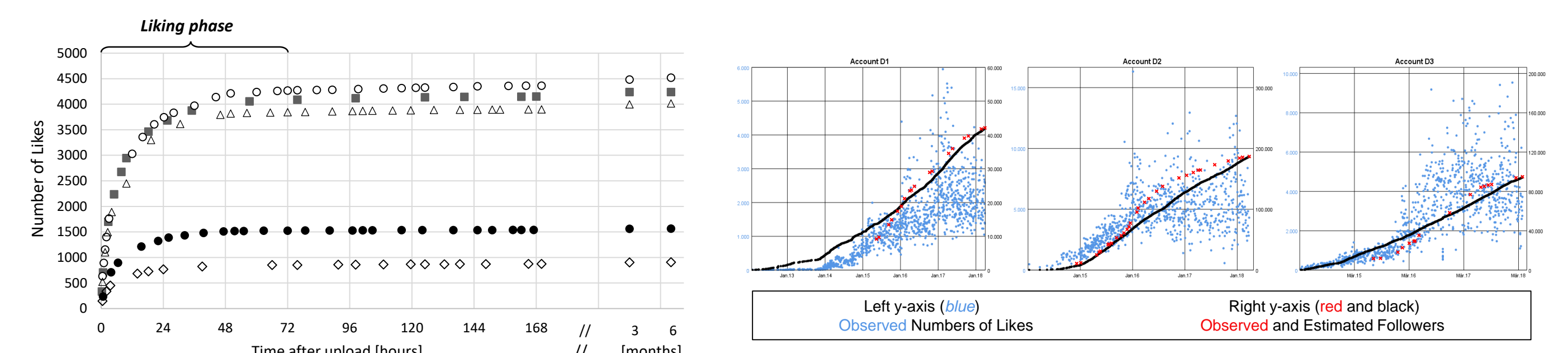
### Two major confounds: time and followers



1. Are there time effects on Likes?



2. Are there follower effects on Likes?

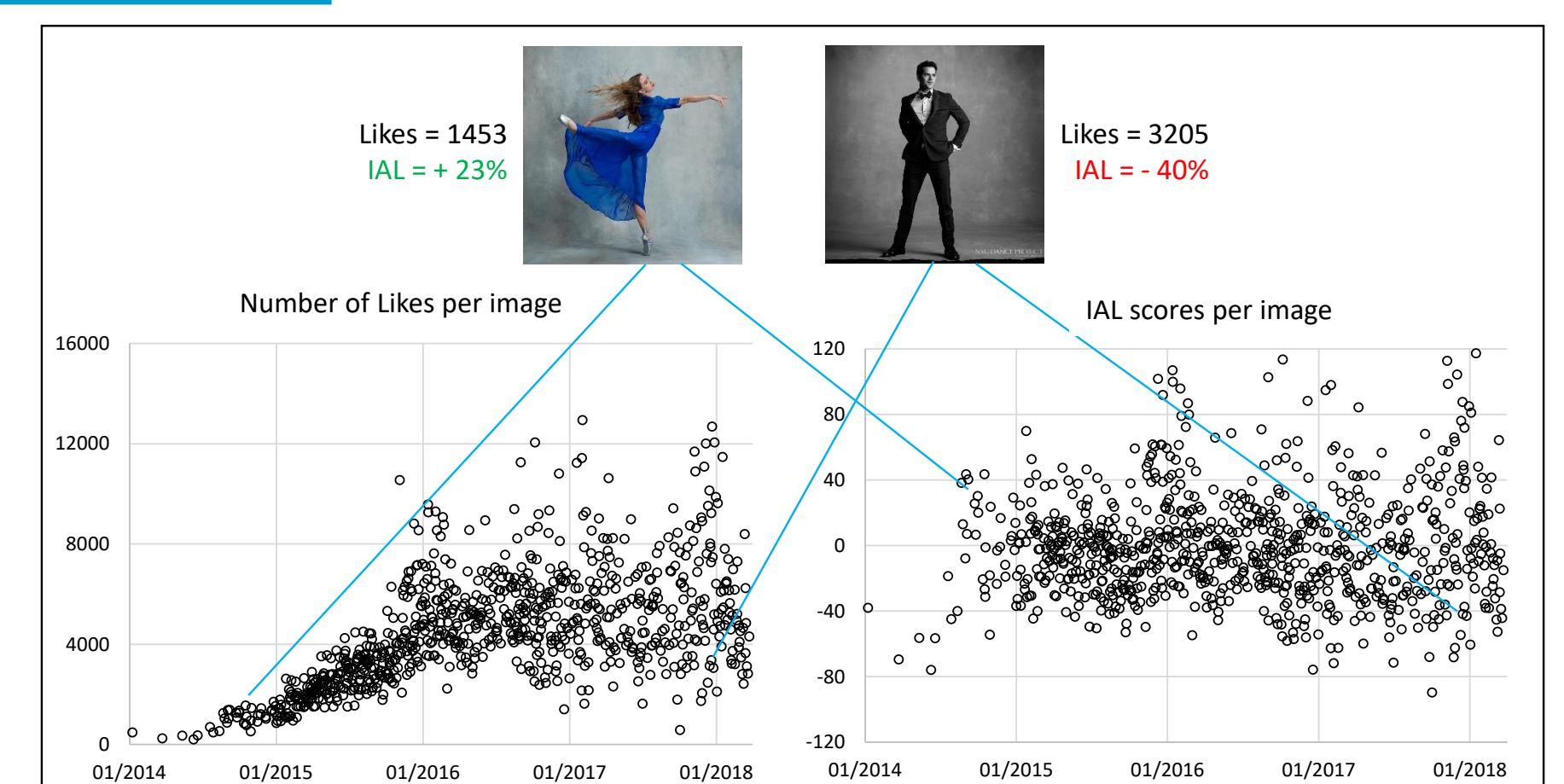


- The *Liking phase* is rather short: Likes remain stable after three days
- 2a. Historical followers can be effectively estimated assuming linear follower growth over posts (Pearson correlations with observed followers range from .96 to .99)
- 2b. Followers strongly determine Likes (quadratic  $R^2$  ranging from .417 to .718,  $p < .001$ )

### Computing IAL (*Instagram Aesthetic Liking*) scores

- IAL scores are percentage deviations from quadratic follower predictions (calculated *per account*)
- $L_i$  observed Likes for image  $i$
- $L_i'$  predicted Likes for image  $i$
- IAL scores are positive for images that received more Likes and negative for images that received less Likes than followers alone would predict.

$$IAL_i = \frac{L_i - L_i'}{L_i'} 100$$



## Validation: Did it work?

### Are IAL scores reliable?

- Some images were posted twice: same caption, often one year apart
- IAL scores ICC = 0.754 (95%-KI .48 to .92,  $p < .002$ ) indicates good test-retest reliability
- Better reliability compared to traditional KPIs (e.g. Engagement Rate, with an ICC = 0.378,  $p = .02$ ) with very poor reliability

### Are IAL scores valid?

- Experiment 1: experimental liking for random subsets from the Instagram database *within genre* (180 images per genre)
- Experiment 2: experimental liking for a random subset from the Instagram database *across genres* (270 images, 90 per genre)

Can IAL scores predict experimental liking?

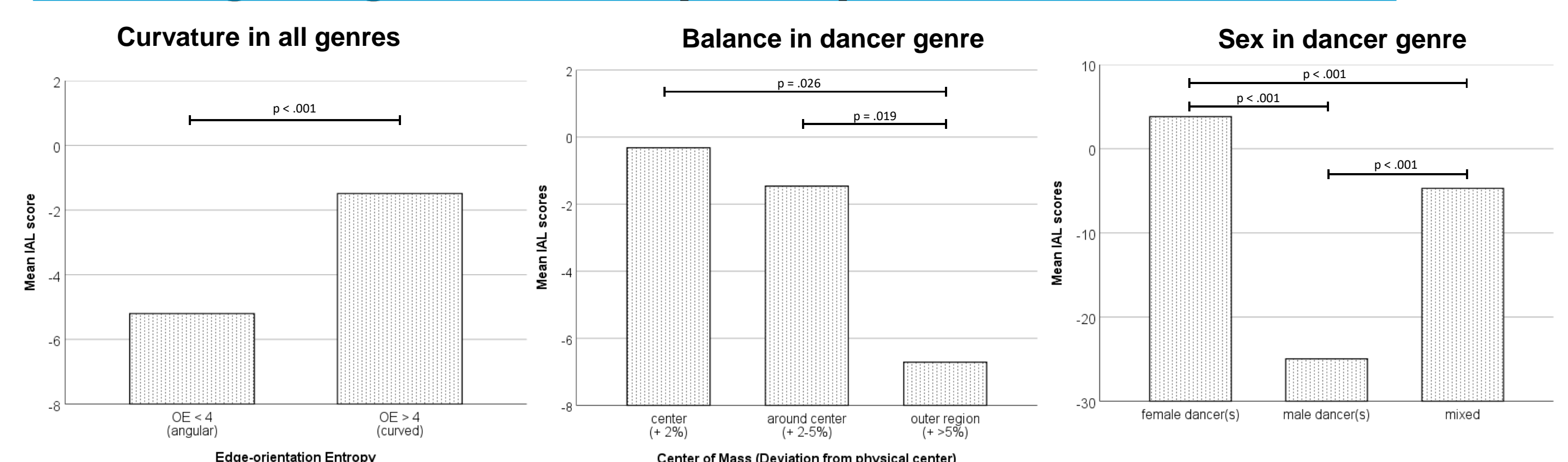
Pearson r	Exp. 1	Exp. 2	Exp. 1	Exp. 2
Architecture	0.280 **	0.277 **		
Dancer Portraits	0.402 **	0.575 **	0.419 **	0.347 **
Landscape	0.547 **	0.477 **		

- IAL scores explain 8 to 33 % of variance in ratings
- Genres differ: landscape > dancer > architecture



## Discussion: Is that useful?

### Investigating aesthetic principles with IAL scores



- Significant preference for curvature [1] across all photographic genres (Cohen's  $d = 0.12$ ,  $p < .001$ , effect is less strong in dancer genre)
- Significant preference for well-balanced composition [2] in dancer genre ( $\eta^2 = .008$ ,  $p = .004$ , subset: square format photos)
- Significant preference for female dancers over male dancers ( $\eta^2 = .117$ ,  $p < .001$ )

How to interpret the effect sizes compared to one another and given the uncontrolled nature of Instagram data?

## Acknowledgements

### Photographers

I am grateful to the following photographers for granting me permission to use their Instagram account data: @fernsehturm\_ @le\_blanc @Macenzo @karolinakuras @nycdanceproject @rachelnevillephoto @janske @jn @othellonline.

### References

- [1] Grebenkina, M., Brachmann, A., Bertamini, M., Kaduhm, A., & Redies, C. (2018). Edge-Orientation Entropy Predicts Preference for Diverse Types of Man-Made Images. *Frontiers in neuroscience*, 12, 678.
- [2] McManus, I. C., Stöver, K., & Kim, D. (2011). Arnheim's Gestalt theory of visual balance: Examining the compositional structure of art photographs and abstract images. *i-Perception*, 2(6), 615-647.