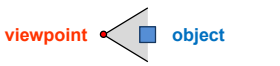
Modest effect of perspective distortion on object recognition

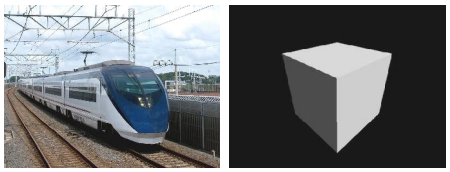
Ryosuke NIIMI (Department of Psychology, The University of Tokyo)

Viewing distance alters object image distortion, not only image size.

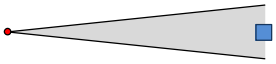
▶ **Close: strong distortion**
(wide angle)



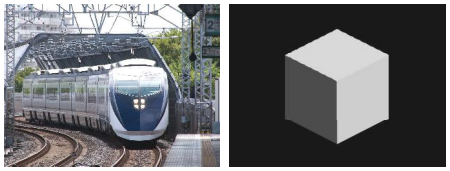
→ strong perspective



▶ **Far: weak distortion**
(telephoto)



→ flat, weak perspective



Strength of perspective distortion influences object perception.

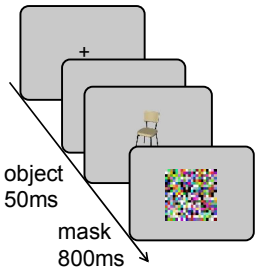
e.g., which one looks more trustworthy?

(Bryan, Perona, & Adolphs, 2012)

Question: Does perspective distortion influence object recognition?

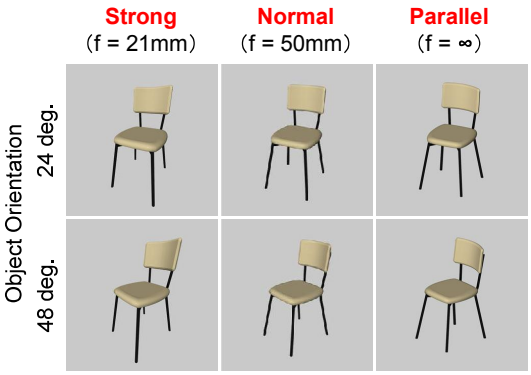
Experiment 1: Perspective distortion did matter.

Task – object naming

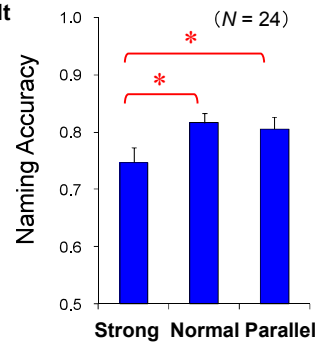


"Identify the briefly shown object and write down its name on the sheet."

Stimuli – 40 objects in 6 viewing conditions



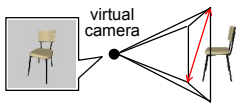
Result



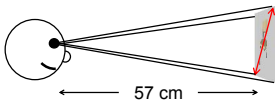
Strong perspective impaired recognition performance.

Experiment 2: The effect was independent of the participants' observing distance.

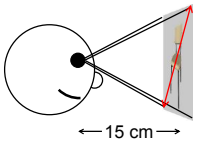
Simulated viewing angle for the ***Strong*** condition was **91.7 deg.**



However, the stimulus viewing angle in Experiment 1 was **15.2 deg**.



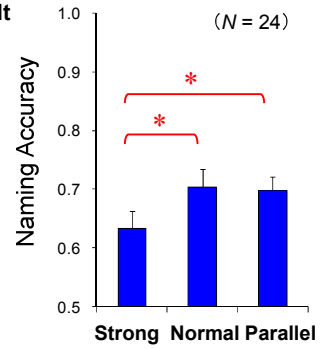
In Experiment 2, **the stimulus images were observed in 91.7 deg** with viewing distance of 15 cm.



- Task was the same.
- Another eye was occluded by eyepatch.
- Head fixed by chinrest

If the disadvantage of *Strong* condition in Exp 1 was due to the mismatch in viewing angle, the disadvantage would disappear.

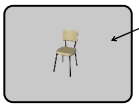
Result



Experiment 3: View goodness rating

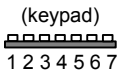
Parallel condition did not affect recognition. Do observers feel nothing strange with the *Parallel* stimuli?

Task – view goodness rating



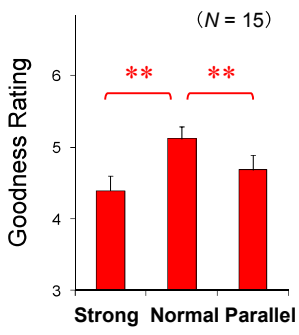
Experiment 1&2 object stimuli (until response)

"Rate how well does the image depict the object."



7-point scale
(1:very bad ~ 7:very good)

Result



Conclusions

Strong perspective
→ Looks strange, hard to recognize.

Normal perspective
→ Looks good, easy to recognize.

Weak/parallel perspective
→ Looks strange, **but** easy to recognize.

- View goodness can be dissociated from recognition efficiency.
- Normal distortion looks "normal" not because of the ease of recognition alone.

APCV 2015 (Singapore), Poster session 5, July 10th

Contact: niimi@L.u-tokyo.ac.jp