

According to Morikawa et al. (2022), fashion specialists posit that polka dots create an illusion of increased body size, while some psychologists disagree. To examine this question, virtual models were generated in batches, with and without polka-dots, ensuring no other clothing differences. Experimental sessions were

conducted using a JavaScript application. Analyses revealed a highly significant main effect of dot size, with the intermediate dot sizes increasing the apparent waist circumference by one to four centimeters. Body size and color variations created their own illusions but did not interact significantly with dot size.

General method

Session 1, question 1 / 14. Confirmer la réponse

Measures

- “Use slider and buttons to match body shapes”.
- High resolution (2,3mm waist circumference).
- All dimensions but colors and patterns identical on stimulus and reference models.
- Max 14 questions at a time.
- Variable slider range to prevent memorization of slider position.

Stimuli

- Victoria 2, an old 3D character created by Zygote.
- Rendering by DAZ-Studio.
- Diagonal black dots on white background.
- Identical morphs in target and reference.
- No fabric thickness.

Trials

- With and without variations in target body size.
- One reference color & one pattern in a single trial.
- All other variations counterbalanced within each trial.
- Randomization, blinding, presentation, measures and recording managed by a Javascript application.

Subject

- One single senior subject with diagnosed myopia, presbyopia, and photophobia, using a computer screen that was tuned to accommodate those conditions.

Seven dots sizes

Seven target waist circumferences (among 100)

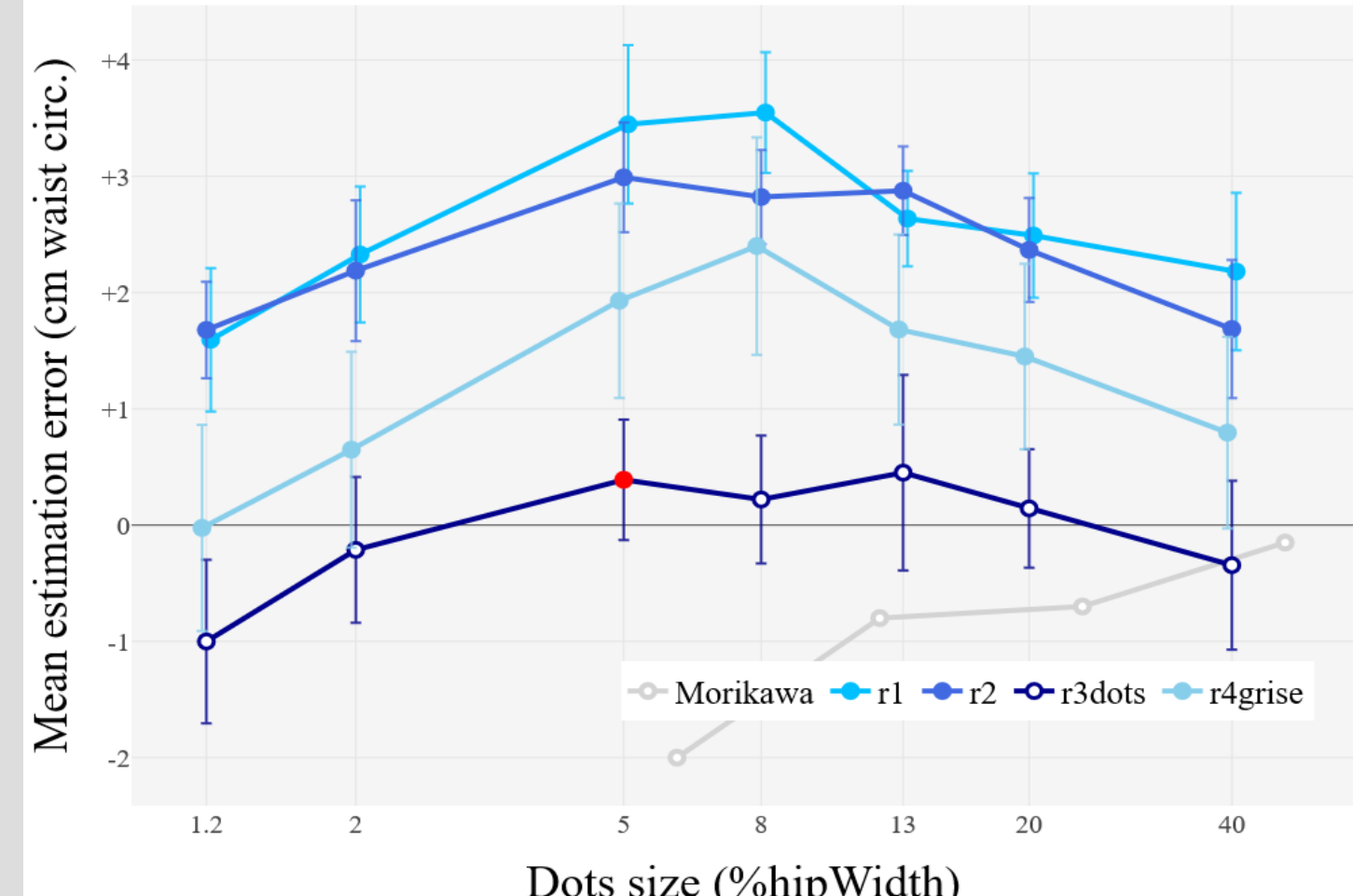
Four reference patterns

Seven trials

Trial	64.9	67.2	68.3	69.5	71.8	75.3	78.8	Tot.
r1	30	-	-	-	-	-	-	-
r2	30	-	-	-	-	-	-	-
r3	30	-	-	-	-	-	-	210
r4	30	-	-	-	-	-	-	-
r5	10	-	-	10	-	-	10	-
r6	10	10	-	10	-	-	-	-
r7	10	-	10	-	10	10	10	350

Results 1 : single body size

Body size illusion from color and polka dots



Body size illusion. Line height: illusion due to reference color and pattern; line shape: illusion due to polka dots size (largest and smallest dots do not look like polka dots); red dot: identical dots on model and reference. Each dot shows the mean of 30 measures. Whiskers: 95CI. Gray line: transposition of the results from Morikawa et al. (estimated).

- Four trials, 840 measures.
- Both dots and reference color highly significant and cumulative.
- Limited effect (maximum one clothing size when cumulated).
- Low reliability as shown by high standard deviation and low proportion of variance explained by dots size.
- Tested on one “model size” only.
- High contrasts are unpleasant.

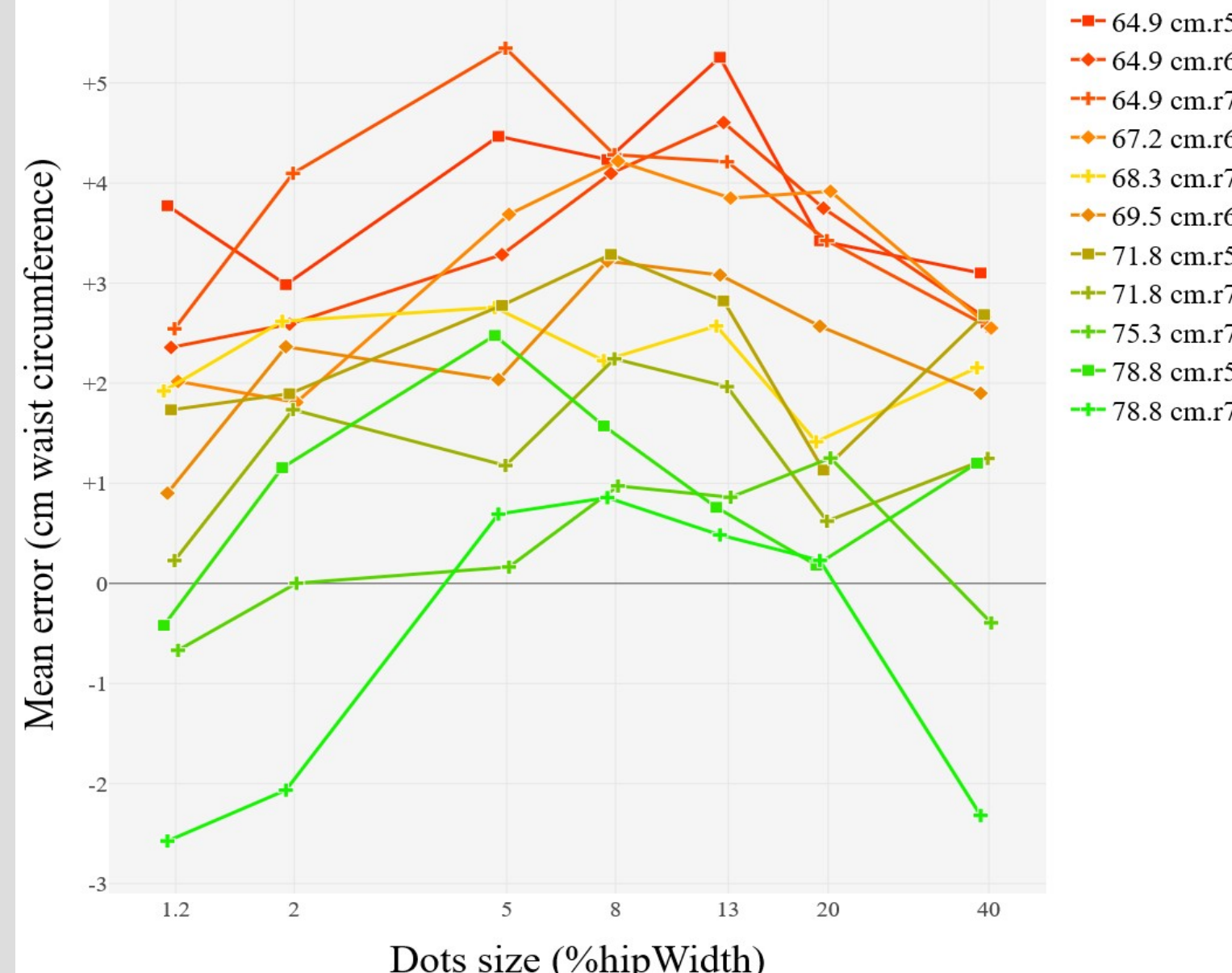
The answers could have been attracted to some memorized mean, reducing the effects of the dots. This effect could be limited by varying the body shape of the model to be Rated.

Summary by R : aov(illusion ~ couleur * dots, data[1:840,1])

	Df	Sum Sq	%var	Mean Sq	F value	Pr(>F)
Reference	3	929,0	23,5	309,95	92,64	<2e-16 ***
Dots Size	6	279,1	7,0	46,52	13,90	2e-15 ***
Interaction	18	35,7	0,9	1,98	0,59	0,907
Residuals	812	2716,8	68,6	3,35		

Results 2 : multiple body sizes

Illusion from color, body size, and dots size



Body size illusion. Line height : illusion due to color and body size; line shape : illusion due to polka dots size (larger and smaller dots not looking like polka dots). Each dot shows the mean of 10 measures.

- Three trials, 770 measures.
- Slimmer models more overrated, by up to 5 cm waist circumference, dots accounting for half of the illusion size.
- Three highly significant and largely cumulative illusions from:
 - the body size of the rated model,
 - the color and pattern on the reference model,
 - the size of the polka dots.
- Interaction bodySize*dotSize statistically non significant, but explains nearly half as much of the variance as dot size.
- Interaction bodySize*reference color statistically significant, but explains only 0,8% of the variance.
- Low reliability as shown by the low proportion of variance explained.

Explaining weaker illusions for heavier models

- Not related to polka dots size.
- Confirmed attraction to the mean ?
- Courtesy bias ?
- Easier discrimination of external curves ?

Subjective evaluation

- The rating task was pleasant at first, but it slowly became boring and unpleasant.

Summary: aov(illusion~reference*body*dotsSize, data[841:1610,1])

	Df	Sum Sq	%var	Mean Sq	F value	Pr(>F)
Reference	2	336,5	6,6	168,27	38,556	<2e-16 ***
Body	6	1125,4	22,2	187,6	42,976	<2e-16 ***
Dots Size	6	300,2	5,9	50,04	11,464	3e-12 ***
RColor*Body	2	42,5	0,8	21,26	4,872	0,008 **
RColor*DotSize	12	58,0	1,1	4,83	1,108	0,350
Body*DotSize	36	132,8	2,6	3,69	0,845	0,728
Rcolor*Body*DotSize	12	60,6	1,2	5,05	1,158	0,310
Residuals	693	3024,6	59,5	4,36		

Conclusions

Relative impact of polka dots

- Polka dots can visually increase body size perception, adding to other illusions.
- High-contrast clothing can be visually taxing, especially for individuals with specific visual sensitivities.
- Polka dots may affect attractiveness in ways other than just changing perceived body size.

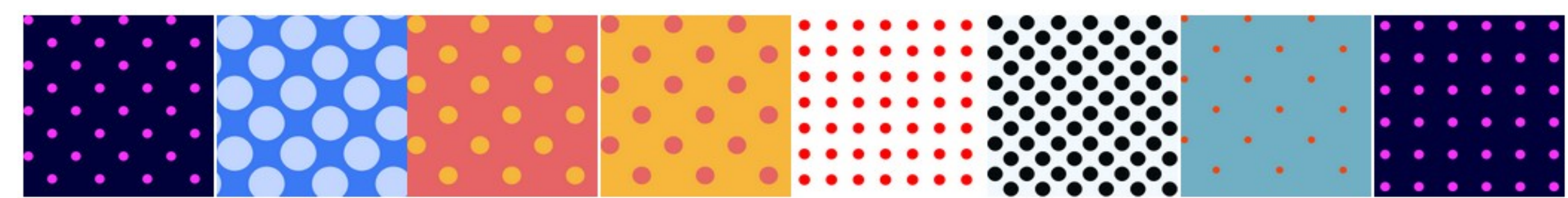
Limitations

- Single-subject design.
- Single dot pattern, seemingly typical yet unrepresentative(see picture below).
- Uncontrolled screen contrast.

- Potential contamination between replications.

Future research

- The more accurate rating of heavier models might be searched for in different contexts, and on different subjects.
- Different colors, contrasts, backgrounds, and polka dots patterns could trigger different perception mechanisms and could be further studied in similar settings.
- More detailed recording and analysis of the rating behavior could give more insights into the involved visual processes and strategies.



Ethics

- No ethics approval is necessary for home programming.
- All data were collected during the development and fine tuning of the program.
- No ethical approval should be sought or granted for the exact design presented here as it produced eye and visual fatigue, as well as a persistent aversion towards the experimental situation.

References

Litterature

- Morikawa, K., Tomita, A., & Katsuki, R. (2022). Body size illusions caused by polka-dot dresses.

Full size PDF:

- www.belpsicho.be/polkadots/poster.pdf

Software

- R, Plotly.js, jStat.
- DAZ-Studio: <https://www.daz3d.com/>

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