

SUPPLEMENTARY MATERIAL

Cao, GW., Cheung, H. and Mok, P. (2025) The effects of ethnic bias and face on identification, accentedness judgements and intelligibility of Cantonese accents in Hong Kong. *JASA*, 157 (2).

A. Cantonese Stimuli

Table VIII. Cantonese stimuli.

No	Sentence	No	Sentence
1	健仔後悔無去衝浪	24	出面有一隻靚馬
2	學大提琴好有魅力	25	佢並冇拜佛嘅習慣
3	唔好成日都咁厭世	26	山腳下面係個碼頭
4	伯公有十幾個老死	27	小慧唔見咗啲珍珠
5	公司有資格去投標	28	冇人知道佢想離婚
6	嗰個男人唔係詩人	29	阿輝準備抵制疫苗
7	個鬼佬上過報紙	30	阿哥覺得人工好低
8	王婆婆唔習慣影相	31	阿婆每日買藥材
9	我同謙仔反對欺凌	32	阿妹想要去做推拿
10	阿勇要乾淨嘅藥棉	33	華仔費事睇指南
11	阿杰畫咗一座山	34	呢隻牛成日嚟呢度
12	阿金識得唱梵文	35	二樓有間香燭舖
13	採礦工作好鬼危險	36	嗰隻狗望實個包
14	佢哋見到條水蛇	37	強仔居然咁鬼敗家
15	呢個島好似隻煎蛋	38	一班人睇緊煙花
16	佢搵緊人生嘅意義	39	宜家唔興講電話
17	禮金都有南北差異	40	我以為呢個係甜嘅
18	潘生自己整藥酒	41	我唔想學整雪櫃
19	政府拒絕出口礦產	42	明仔嘅阿爸係逃犯
20	我老豆未試過買馬	43	佢好似唔想被打攞
21	司機攞咗兩個蘋果	44	祥仔冇時間做手術
22	呢隻香水竟然致癌	45	我姑丈被控偷渡
23	隻貓咬爛左塊樹葉		

B. A linear mixed effect model was run separately for the ratings in the post-experiment test on images: Attractiveness/Friendliness/Approachability ratings ~ ethnicity + (1 | ID) + (1 | Face)

TABLE IX. Model results for 40 people's ratings on South Asian faces and White faces.

		Est.	SE	t value	p
Attractiveness	Intercept	6.25	0.42	14.9	<.001
	Ethnicity (South Asian)	-1.0	0.53	-1.89	0.067
Friendliness	Intercept	6.36	0.43	14.83	<.001
	Ethnicity (South Asian)	-0.11	0.46	-0.23	.81
Approachability	Intercept	6.07	0.42	14.56	<.001
	Ethnicity (South Asian)	-0.01	0.46	-0.02	.98

C. The scree plot of the PCA results.

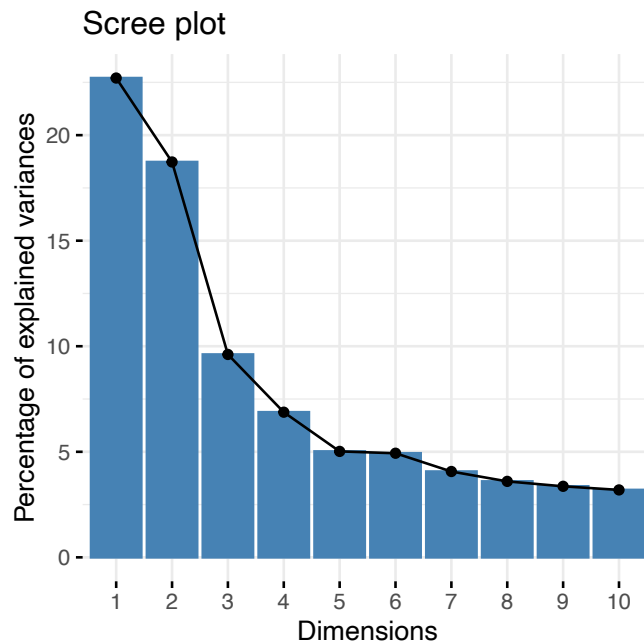


FIG.5 The scree plot of the PCA results.

D. The face effect: the results of generalised logistic mixed effect models for MAN and CAN.

CAN/MAN/ENG base model: `glmer(cbind(correct,incorrect) ~ Face + (1|group)+(1|image) + (1|trial), data= CAN/MAN/ENG, family = binomial(), control = glmerControl(optimizer = "bobyqa"))`

Table X. Results of logistic mixed effect models for the face.

Accent = CAN	Est.	SE	z-value	p
(intercept)	3.87	0.19	20	<.001
Face (South Asian vs Silhouette)	0.10	0.13	0.08	0.93
Face (White vs Silhouette)	0.03	0.13	0.26	0.79
Face (White vs South Asian)	0.02	0.11	0.21	0.84
Marginal/Conditional R ²	0.0001/0.73			
Accent = MAN	Est.	SE	z-value	p
(intercept)	1.73	0.21	8.41	<.001
Face (South Asian vs Silhouette)	0.14	0.10	1.33	0.18
Face (White vs Silhouette)	0.17	0.10	1.61	0.11
Face (White vs South Asian)	0.03	0.07	0.40	0.69
Marginal/Conditional R ²	0.003/0.78			

E. The item analysis of face images for South Asian and White faces

To test whether there is an effect of the image, a generalised logistic mixed effect model was run separately for the white faces and the South Asian faces using the formulas below. The reference level of images changed to test all the comparisons. Only the significant comparisons were shown in the table.

$\text{glmer}(\text{cbind}(\text{correct}, \text{incorrect}) \sim \text{image} + (1 | \text{Accent}) + (1 | \text{trial}), \text{data} = \text{White/SouthAsian}, \text{family} = \text{binomial}), \text{control} = \text{glmerControl}(\text{optimizer} = \text{"bobyqa"})$

Table XI. Results of the logistic mixed effect models for the image.

Face = white	Est.	SE	z-value	<i>p</i>
(intercept)	2.83	0.70	4.06	<.001
Image (Face_W01 vs Face_W04)	-1.03	0.52	-1.98	0.048*
Face = South Asian	Est.	SE	z-value	<i>p</i>
(intercept)	2.99	0.69	4.35	<.001
Image (Face_SA01 vs Face_SA04)	-1.31	0.50	-2.62	0.0087*

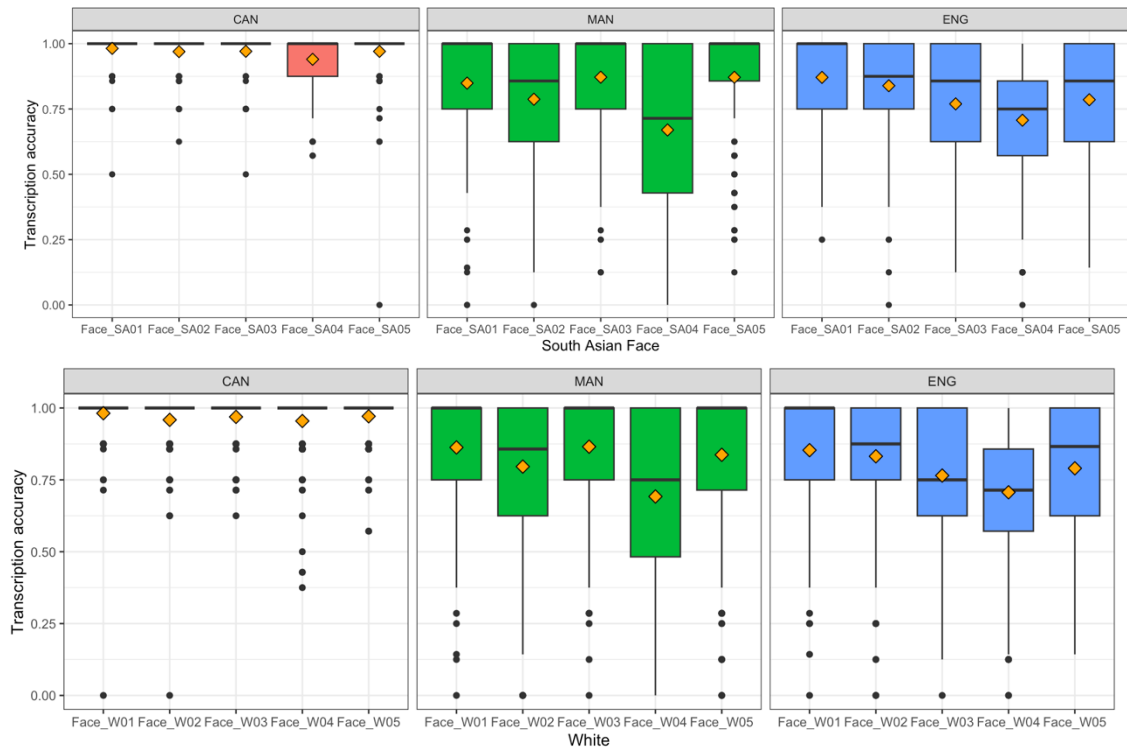


FIG. 6. Transcription accuracy by image across three accent conditions in boxplots with means (the diamond in the bar).

F. Logistic mixed effect models for the interaction between attitude factors and face for each accent.

Table XII. The results of model comparisons between the base model and the model with an interaction between face and attitude factors.

	CAN			MAN			ENG		
	χ^2	df	p	χ^2	df	p	χ^2	df	p
Factor 1	40.74	3	<.001	35.41	3	<.001	13.4	3	0.004
Factor 2	5.03	3	0.17	4.15	3	0.25	5.93	3	0.115
Factor 3	10.27	3	0.016	46.42	3	<.001	5.93	3	0.115
Factor 4	2.73	3	0.44	6.04	3	0.11	8.62	3	0.035

Table XIII. The summary of pair-wise comparisons for the interaction between face and attitude factors.

	Comparisons	CAN	MAN	ENG
Factor 1 (Status)	Silhouette vs South Asian	0.005	ns	ns
	Silhouette vs White	ns	<.001	0.046
	White vs South Asian	0.006	<.001	0.013
Factor 2 (Friendliness)	Silhouette vs South Asian	0.024	ns	ns
	Silhouette vs White	ns	ns	0.0501
	White vs South Asian	ns	ns	ns
Factor 3 (Competence)	Silhouette vs South Asian	ns	<.001	ns
	Silhouette vs White	0.02	<.001	ns
	White vs South Asian	0.026	ns	ns
Factor 4 (Energetics)	Silhouette vs South Asian	ns	ns	ns
	Silhouette vs White	ns	ns	ns
	White vs South Asian	ns	ns	ns

G. Summary of *p* values in pair-wise comparisons for the interactions between face and attitude factors.

Table XIV. Summary of *p* values in pair-wise comparisons for the interactions between face and attitude factors. A significant *p*-value indicates a significant improvement in model fit by adding the interaction. “ns” represents no significance.

	Comparisons	CAN	MAN	ENG
Factor 1 (Status)	Silhouette vs South Asian	0.005	ns	ns
	Silhouette vs White	ns	<.001	0.046
	White vs South Asian	0.006	<.001	0.013
Factor 2 (Friendliness)	Silhouette vs South Asian	0.024	ns	ns
	Silhouette vs White	ns	ns	0.05
	White vs South Asian	ns	ns	ns
Factor 3 (Competence)	Silhouette vs South Asian	ns	<.001	ns
	Silhouette vs White	0.02	<.001	ns
	White vs South Asian	0.026	ns	ns
Factor 4 (Energetics)	Silhouette vs South Asian	ns	ns	ns
	Silhouette vs White	ns	ns	ns
	White vs South Asian	ns	ns	ns

H. A list of model formulas for all the models used in this paper

Model	formula	marginal R ² / conditional R ²
Table IV. Accentedness	lm(accentedness~Face*Accent, data=All_data)	0.71
Table V. Face effect on Attitudes	Local Cantonese: lm(Factor 1 factor scores ~ Face)	0.002
	Local Cantonese: lm(Factor 2 factor scores ~ Face)	0.0003
	Local Cantonese: lm(Factor 3 factor scores ~ Face)	0.002
	Local Cantonese: lm(Factor 4 factor scores ~ Face)	0.03
	Mandarin accent: lm(Factor 1 factor scores ~ Face)	0.098
	Mandarin accent: lm(Factor 2 factor scores ~ Face)	0.12
	Mandarin accent: lm(Factor 3 factor scores ~ Face)	0.006
	Mandarin accent: lm(Factor 4 factor scores ~ Face)	0.027
	English accent: lm(Factor 1 factor scores ~ Face)	0.071
	English accent: lm(Factor 2 factor scores ~ Face)	0.002
	English accent: lm(Factor 3 factor scores ~ Face)	0.026
	English accent: lm(Factor 4 factor scores ~ Face)	0.038
Table VI. The full dataset	glmer(cbind(correct,incorrect) ~ Face*Accent + (1 group)+(1 image) + (Accent trial))	0.36/0.85
Table VII. The face effect	Local Cantonese accent: glmer(cbind(correct,incorrect) ~ Face + (1 group)+(1 image) + (1 trial))	0.0001/0.73
	Mandarin-accented Cantonese: glmer(cbind(correct,incorrect) ~ Face + (1 group)+(1 image) + (1 trial))	0.003/0.78
	English-accented Cantonese: glmer(cbind(correct,incorrect) ~ Face + (1 group)+(1 image) + (1 trial))	0.008/0.78
Table VIII. Models used for comparison	Local Cantonese: glmer(cbind(correct,incorrect) ~ Face*Factor1_status + (1 group)+(1 image) + (1 trial))	0.04/0.74
	Local Cantonese: glmer(cbind(correct,incorrect) ~ Face*Factor2_friendliness + (1 group)+(1 image) + (1 trial))	0.005/0.73
	Local Cantonese: glmer(cbind(correct,incorrect) ~ Face*Factor3_competence+ (1 group)+(1 image) + (1 trial))	0.011/0.73
	Local Cantonese: glmer(cbind(correct,incorrect) ~ Face*Factor4_energetics + (1 group)+(1 image) + (1 trial))	0.003/0.73
	Mandarin accent: glmer(cbind(correct,incorrect) ~ Face*Factor1_status + (1 group)+(1 image) + (1 trial))	0.01/0.78
	Mandarin accent: glmer(cbind(correct,incorrect) ~ Face*Factor2_friendliness + (1 group)+(1 image) + (1 trial))	0.004/0.78

	Mandarin accent: glmer(cbind(correct,incorrect) ~ Face*Factor3_competence+ (1 group)+(1 image) + (1 trial))	0.01/0.78
	Mandarin accent: glmer(cbind(correct,incorrect) ~ Face*Factor4_energetics + (1 group)+(1 image) + (1 trial))	0.004/0.78
	English accent: glmer(cbind(correct,incorrect) ~ Face*Factor1_status + (1 group)+(1 image) + (1 trial))	0.01/0.78
	English accent: glmer(cbind(correct,incorrect) ~ Face*Factor2_friendliness + (1 group)+(1 image) + (1 trial))	0.009/0.78
	English accent: glmer(cbind(correct,incorrect) ~ Face*Factor3_competence+ (1 group)+(1 image) + (1 trial))	0.009/0.78
	English accent: glmer(cbind(correct,incorrect) ~ Face*Factor4_energetics + (1 group)+(1 image) + (1 trial))	0.008/0.78