THE LINEAR MIXED EFFECT (LME) MODEL

We were interested in the treatment effects of the virtual character's body type and voice pitch as well as the effect of the participant's biological sex on the whole population and not on a specific participant. Thus, the participants were treated as if they were randomly selected from a larger collection of a population whose characteristics we would like to estimate, and the participant effect is random. A random effects approach to modeling effect was more ambitious in the sense that it attempted to infer something about the wider population beyond the particular sample. Blocking factors can often be viewed as random effects because these often arise as a random sample of those blocks potentially available. Thus, for our LME model we considered the following formulation:

$$y_{ijkl} = \mu + q_i + b_j + v_k + (qb)_{ij} + (qv)_{ik} + (bv)_{ik} + s_l + \epsilon_{ijkl}$$
(1)

where

$$s_l \sim \mathcal{N}(0, \sigma_s^2),$$
 (2)

$$\epsilon_{ijkl} \sim \mathcal{N}(0, \sigma_s^2), \text{ and}$$
 (3)

$$y_{ijkl} \sim \mathcal{N}(\mu + g_i + b_j + v_k + (gb)_{ij} + (gv)_{ik} + (bv)_{jk}, \sigma^2 + \sigma^2)$$
(4)

where y, g, b, and v denote our dependent variable (perceived audio-visual correspondence and believability), participant's sex, virtual character's body type, and virtual character's voice pitch, respectively.

MESH DIMENSIONS

Table 1: Relative mesh dimensions (cm) rounded to the nearest whole number with the fixed difference between each level. Values were approximated from the mean values of subjects in published literature [56, 65].

Somatotype	Neck	c Girth	Face	Width	Jaw 1	Length	Ches	t Girth	Wais	t Girth	Hip Girth		
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
Ectomorph	Sl	hort	Na	rrow	L	ong	Sl	nort	SI	nort	Short		
	38	31	19	16	14	12	95	85	73	65	90	90	
Mesomorph	Medium		Medium		Medium		Me	dium	Medium		Me	dium	
Mesonioi pii	42	35	20	17	13	11	98	89	83	75	100	100	
Endomorph	Long		Wide		SI	nort	L	ong	L	ong	Ē Ē	ong	
	46	39	21	18	12	10	101	93	93	85	110	110	

PITCH LEVELS

Table 2: Audio files were adjusted to three discrete pitch levels.

Levels	F0	(Hz)
	Male	Female
High	180.00	255.00
Medium	132.50	210.00
Medium	85.00	165.00

DESCRIPTIVE STATISTICS

Table 3: Mean (*M*) and Standard Deviation (*SD*) of the perceived audio-visual correspondence ratings by treatment levels of body type and voice pitch for female virtual characters.

			Ecton	norph					Body 7 Meson	Гуре norph		Endomorph						
	Voice Pitch																	
	Lo	w	Med	ium	Hi	gh	Lo	Low Med		ium High		gh	Low		Medium		High	
Participants	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Male	3.66	.77	3.97	.58	3.57	.89	3.61	78	3.53	.76	3.21	.86	3.61	.74	3.31	.84	3.11	.85
Female	3.73	.97	3.78	.74	3.48	1.10	3.90	.81	3.68	.77	2.82	.99	3.75	.68	3.61	.67	2.77	.80
Overall	3.68	.84	3.90	.64	3.54	.96	3.71	.80	3.58	.76	3.07	.92	3.66	.72	3.41	.79	2.99	.84

Table 4: Mean (*M*) and Standard Deviation (*SD*) of the perceived audio-visual correspondence ratings by treatment levels of body type and voice pitch for male virtual characters.

			Ectom	orph					Body Mesor	Type norph				Endomorph				
	Voice Pitch																	
	Lc	W	Med	ium	Hig	gh	Low		Med	ium	High		Low		Medium		High	
Participants	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	М	SD	M	SD
Male	3.26	1.02	3.69	.89	3.61	91	3.60	.84	3.83	.75	3.25	.81	3.43	92	3.62	.86	3.31	1.09
Female	3.31	1.06	4.00	.79	3.45	.87	3.74	.95	4.02	.71	3.04	1.08	3.77	.97	3.52	.78	3.41	1.12
Overall	3.28	1.03	3.80	.86	3.56	.90	3.65	.87	3.90	.73	3.18	.91	3.54	.94	3.58	.83	3.34	1.09

Table 5: Mean (*M*) and Standard Deviation (*SD*) of the perceived believability ratings by treatment levels of body type and voice pitch for female virtual characters.

			Ecton	norph					Body ' Mesor	Fype norph			Endomorph						
	Lo	w	Med	ium	Hi	eh	Lo	w	Voice I Medi	Pitch ium	Hi	eh	Lo	w	Medi	ium	Hig	rh	
Participants	М	SD	М	SD	М	SD	M SD		М	SD	М	SD	М	SD	М	SD	M	, SD	
Male	3.66	80	3.96	.61	3.46	.98	3.60	.78	3.52	88	3.04	.97	3.70	.86	3.22	.89	3.01	.95	
Female	3.48	.98	3.71	.74	3.20	1.16	3.68	.91	3.60	.88	2.56	1.04	3.68	.78	3.41	.90	2.47	.78	
Overall	3.60	.86	3.88	.67	3.37	1.05	3.63	.82	3.55	.87	2.88	1.02	3.69	.83	3.29	.89	2.82	.92	

Table 6: Mean (*M*) and Standard Deviation (*SD*) of the perceived believability ratings by treatment levels of body type and voice pitch for male virtual characters.

			Ector	orph					Body T Meson	Г уре norph			Endomorph						
	Lo	w	Med	ium	Hi	gh	Lo	w	Voice F Medi	itch ium	Hi	gh	Low		Medium		High		
Participants	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	
Male	3.11	1.16	3.68	.89	3.50	.89	3.50	1.02	3.83	.80	3.17	.92	3.35	.97	3.65	.98	3.21	1.14	
Female	3.11	1.05	3.81	.90	3.33	1.08	3.64	1.11	3.97	.78	2.84	1.21	3.65	.97	3.43	.93	3.19	1.21	
Overall	3.11	1.12	3.73	.89	3.44	.96	3.55	1.04	3.88	.79	3.06	1.03	3.45	.97	3.57	.96	3.20	1.15	

PLOTS OF OUR RESULTS



Figure 1: Interaction plot of the female virtual character's body type and participant's biological sex on the mean perceived audio-visual correspondence of the virtual character.



Figure 2: Interaction plot of the female virtual virtual character's body type and participant's biological sex on the mean perceived believability of the virtual virtual character.



Character's Body Type – Ectomorph – Endomorph – Mesomorph

Figure 3: Interaction plot of the female virtual character's body type and voice pitch on the mean perceived audio-visual correspondence of the virtual character.



Figure 4: Interaction plot of the female virtual character's body type and voice pitch on the mean perceived believability of the virtual character.



Figure 5: Interaction plot of the female virtual character's voice pitch and the participant's biological sex on the mean perceived audio-visual correspondence of the virtual character.



Figure 6: Interaction plot of the female virtual character's voice pitch and the participant's biological sex on the mean perceived believability of the virtual character.



Figure 7: Interaction plot of the male virtual character's body type and participant's biological sex on the mean perceived audio-visual correspondence of the virtual character.



Figure 8: Interaction plot of the male virtual character's body type and participant's biological sex on the mean perceived believability of the virtual character.



Figure 9: Interaction plot of the male virtual character's voice pitch and the participant's biological sex on the mean perceived audio-visual correspondence of the virtual character.



Figure 10: Interaction plot of the male virtual character's voice pitch and the participant's biological sex on the mean perceived believability of the virtual character.



Character's Body Type – Ectomorph – Endomorph – Mesomorph

Figure 11: Interaction plot of the male virtual character's body type and voice pitch on the mean perceived audio-visual correspondence of the virtual character.



Figure 12: Interaction plot of the male virtual character's body type and voice pitch on the mean perceived believability of the virtual character.