SEX AND THE CITIES:

Urbanization's Influence on Sexual Dimorphism in the Post-Medieval Dutch

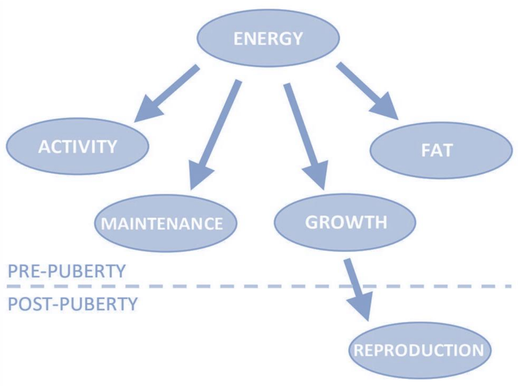
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INTRODUCTION

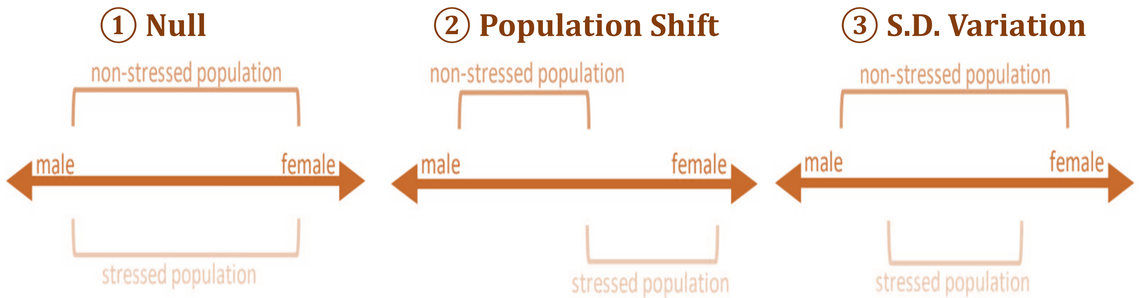
Sexual dimorphism in the human skeleton can be influenced by both *ultimate* (reproductive, ancestral, or climatic) and *proximal* (nutritional, genetic, or environmental) pressures [1]. Though an individual's **life history** is known to have an effect on skeletal morphology, and though **allocation theory** posits that any external pressures that influence the allocation strategy of an individual could create marked morphological changes [2], the extent of these changes and how/if they influence standard sex estimation procedures is unknown.

Urbanization has been shown to effect human health across the globe. Some hallmarks of urban living, such as high disease prevalence, nutritional stress, pollution, overcrowding, and socioeconomic divide, influenced the post-Medieval British population's health greatly [3].



Could the environmental stress of urbanization in the Netherlands influence the morphology of nonmetric skeletal traits used for sex estimation due to differential allocation strategies?

HYPOTHESES



SKELETAL MATERIALS

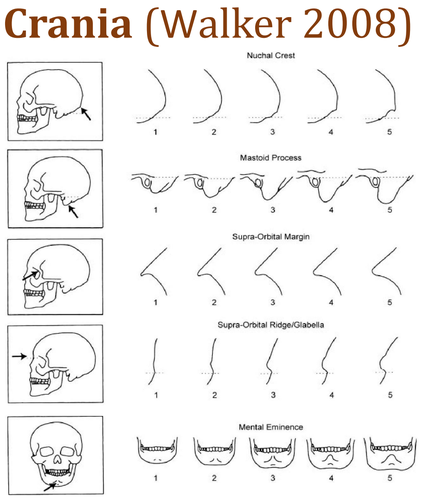
◆ **Middenbeemster** (MB11)
- Representing rural lifestyle
- post-Medieval (mid-19th century)
- n = 100 adults
  - 47 males, 49 females, and 4 indeterminates

■ **Arnhem** (ARJB)
- Representing urban lifestyle
- post-Medieval (15th-19th century)
- n = 99 adults
  - 49 males, 42 females, and 8 indeterminates

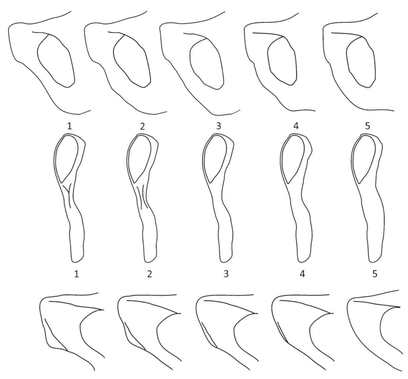


SEX ESTIMATION METHODS

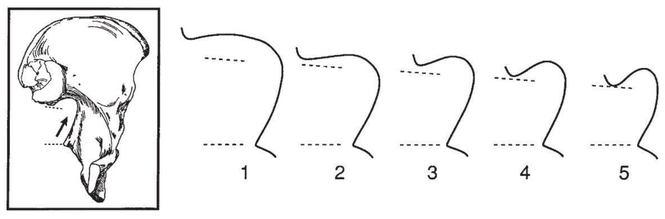
Crania (Walker 2008)



Pubis (Klales et al. 2012)

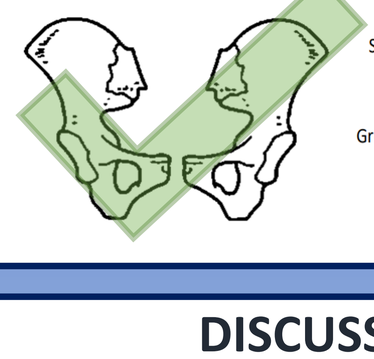


Greater Sciatic Notch (Walker 2005)



RESULTS

One-Way ANOVA Testing of Sexes between Populations

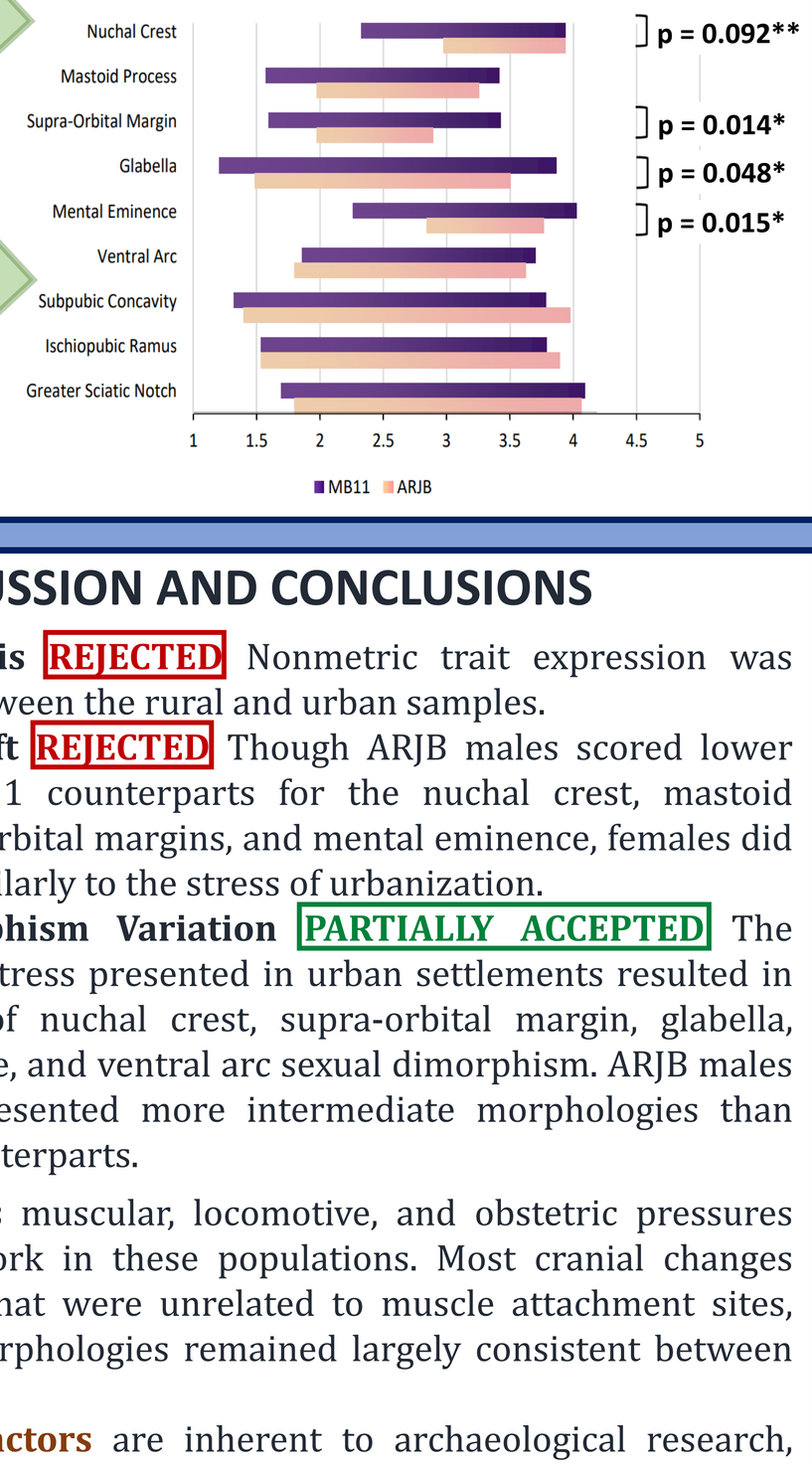


	MB11 M / ARJB M				MB11 F / ARJB F			
	n	df	F	p	n	df	F	p
Nuchal Crest	84	1	5.076	0.027*	88	1	0.000	1.000
Mastoid Process	79	1	2.768	0.100	91	1	0.277	0.600
Supra-Orbital Margin	84	1	3.119	0.081**	89	1	3.253	0.075**
Glabella	85	1	3.414	0.068**	86	1	1.644	0.203
Mental Eminence	82	1	5.151	0.026*	89	1	1.265	0.264

	MB11 M / ARJB M				MB11 F / ARJB F			
	n	df	F	p	n	df	F	p
Ventral Arc	57	1	0.047	0.828	65	1	0.063	0.803
Subpubic Concavity	59	1	0.193	0.662	66	1	0.317	0.575
Ischiopubic Ramus	58	1	0.000	1.000	67	1	0.094	0.760
Greater Sciatic Notch	87	1	0.296	0.588	91	1	0.021	0.884

*p < 0.05 **p < 0.10

Greene's (1989) T-Test of Sexual Dimorphism



DISCUSSION AND CONCLUSIONS

① **Null Hypothesis** **REJECTED** Nonmetric trait expression was inconsistent between the rural and urban samples.

② **Population Shift** **REJECTED** Though ARJB males scored lower than their MB11 counterparts for the nuchal crest, mastoid process, supra-orbital margins, and mental eminence, females did not respond similarly to the stress of urbanization.

③ **Sexual Dimorphism Variation** **PARTIALLY ACCEPTED** The environmental stress presented in urban settlements resulted in the reduction of nuchal crest, supra-orbital margin, glabella, mental eminence, and ventral arc sexual dimorphism. ARJB males and females presented more intermediate morphologies than their MB11 counterparts.

Buffers such as muscular, locomotive, and obstetric pressures appear to be at work in these populations. Most cranial changes occurred in traits that were unrelated to muscle attachment sites, while the pelvis morphologies remained largely consistent between ARJB and MB11.

Confounding factors are inherent to archaeological research, and this study is no exception. Occupational differences, migration, socioeconomic status and the embodiment of social stress, and "Netherlands specific" catastrophes could have influenced/equalized the samples.

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CONTACT

I'm sorry that I missed you! If you have any questions, comments, or feedback, I would love to hear from you.

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