

# Sound Symbolism: Abrupt amplitude change within male names

Christopher Kish, Sarah Korostoff, and Melanie Pangilinan, Professor Shigeto Kawahara  
Rutgers University Aresty Symposium  
April 20<sup>th</sup>, 2012

## INTRODUCTION & HYPOTHESIS

This project is a study of the acoustic properties and sound symbolism in names. Slater & Feinman (1985) and Wright et al. (2005) have shown that names with obstruents (consonants formed with a tight constriction in airflow) tend to sound more of the male gender, while sonorants (consonant formed without a strong constriction in airflow) sound more female.

**Hypothesis I:** Obstruents will be judged as more masculine than sonorants

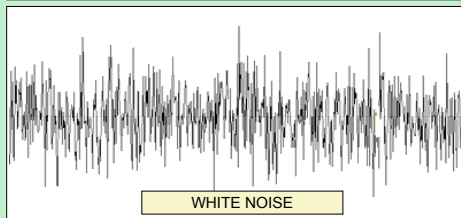
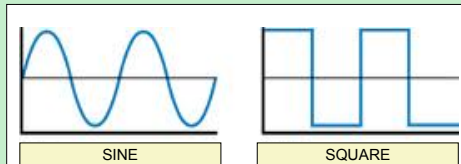
**Hypothesis II:** It is the sudden amplitude change in obstruents and gradual amplitude change in sonorants that lend to this perception

## TERMINOLOGY

**Obstruents:** consonants formed with a tight constriction in the oral cavity. Airflow is obstructed.  
Ex: p, t, k

**Sonorants:** consonants forms without a tight constriction in the oral cavity (to the extent that spontaneous voicing is possible)  
Ex: l, r

**Sine Waves:** periodic, gradual amplitude change  
**Square Waves:** periodic, abrupt amplitude change  
**White Noise:** aperiodic, abrupt amplitude change



## EXPERIMENT I: Speech Stimuli

The stimuli consisted of disyllabic nonce words following Consonant-Vowel-Consonant-Vowel order and were separated into 4 conditions:

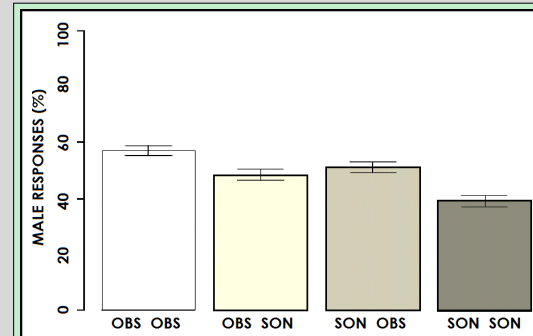
→Obstruent-Obstruent      →Obstruent-Sonorant  
→Sonorant-Obstruent      →Sonorant-Sonorant

The first vowels were [a, e, i, o, u], and the second vowels were [ə, I].

F0 and amplitude were controlled via resynthesis:

Female speaker: 300Hz-200Hz with linear interpolation  
Male speaker: 150Hz-100Hz Peak amplitude modified to 0.7

## RESULTS AND DISCUSSION



Results in Experiment I supported Hypothesis I (and previous studies): obstruents were considered more male than sonorants

## FURTHER RESEARCH

Research may be further explored to find a sound symbolic relationship between sounds and attractiveness, emotion, etc.

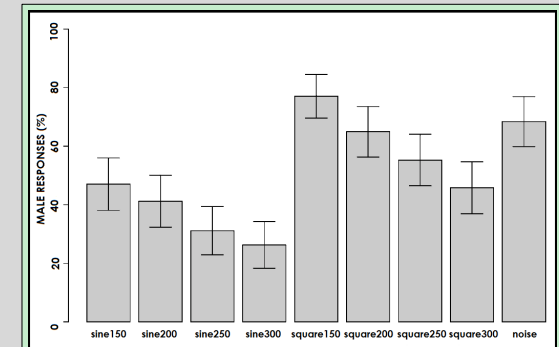
The Rutgers Phonetics Lab is currently discussing with Toshiba the possibility of using our research with sound symbolism in the creation of new vacuum cleaners that would produce comfortable noise.

## EXPERIMENT II: Non-Speech Stimuli

Participants were presented with a series of computer-generated non-speech sounds that consisted of different wave forms. These forms (roughly) mimic the amplitude change within obstruents and sonorants: Sine waves (stop bursts), Square waves (sonorants), and White noise (fricatives).

The sounds varied in frequency, from 150Hz to 300Hz, each sound having a 50Hz increment.

## RESULTS AND DISCUSSION



Experiment II supported Hypothesis II: wave forms with a more abrupt amplitude change were judged as masculine, while wave forms with a gradual amplitude change were judged to be less masculine.

Within sine waves and square waves, the sounds with higher pitch were considered to be more female-like.

Overall conclusion: sound symbolism exists—there are certain acoustic properties that are associated with gender.

## REFERENCES

Cassidy, Kimberly Wright, Michael H. Kelly, and Lee'at J. Sharoni. 1999. Inferring gender from name phonology. *Journal of Experimental Psychology: General* 128: 362–381.  
Cutler, Anne, James McQueen, and Ken Robinson. 1990. Elizabeth and John: Sound patterns of men's and women's names. *Journal of Linguistics* 26: 471–482.  
Jakobson, Roman. 1978. *Six lectures on sound and meaning*. Cambridge: MIT Press.  
Saussure, Ferdinand de. 1916/1972. *Course in general linguistics*. Peru, Illinois: Open Court Publishing Company.  
Slater, Anne Saxon, and Saul Feinman. 1985. Gender and the phonology of North American first names. *Sex Roles* 13: 429–440