Gender perception influences speech processing[1]

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Introduction

This work addresses the way in which gender-coded expectations, based on cultural assumptions, affect one of the so-called very lowest levels of cognitive processing, the basic auditory processing of speech. Through a set of speech perception experiments, this work explores the effect of gender stereotypes on speech perception, as well as the relationship between gender stereotypes for faces and audiovisual integration in speech perception.

To this point, little work has been done to explore the impact of socially-mediated gender stereotypes on low-level speech processing. In fact, most current theories of speech perception, as well as modular theories of cognition, have by definition implied that the process of speech perception is necessarily insulated from the influence of such higher-level information as stereotypes. But recent results obtained in the linguistics laboratory at Ohio State University suggest that gender stereotypes most definitely affect speech perception. These results deserve consideration in the quest to develop more fully explanatory theories of speech perception and cognition, as well as a better understanding of how we perceive gender in our every-day interactions with others.

Background

As social psychologists remind us, sex and gender distinctions are very pervasive and quite central to any given culture. For example, social psychologist Florence Geis (1993:12) points out that:

> (...) both perceivers and actors bring gender-coded expectations for themselves and their partners into their interactions (...) [and] these unacknowledged gender stereotypes unconsciously influence our perceptions, inferences, and memory of women and men. In general, they enhance perceptions, interpretations, and memories that are consistent with stereotypical attributes and obscure, diffuse, or cause us to disregard or forget information that is inconsistent with them (...). Thus, even when women and men behave alike, we see them as different.

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Geis adds that not only do gender expectations shape interpretations of every-day events, but they also cause selective perception. "We are more likely to see what we expect to see, sometimes even if it is not actually there, and not see or reinterpret what we do not expect, sometimes even if it is there" (13).

Additionally, social psychologists have repeatedly suggested that the recognition of others' gender is perhaps the primary cognition made in response to individuals, and further that such recognition occurs automatically (see Cross/Markus 1993:58-59, "Gender as a central category for understanding the world"). Therefore, it is reasonable to assume that this most salient categorization may have marked effects on other types of processing, such as low-level speech processing.

But interestingly, very little work has been done regarding the impact of stereotypes on low-level cognitive processing systems like speech processing. But as social psychologist William von Hippel and his colleagues point out:

> (...) any evidence that perceptual processes influence and are influenced by stereotypes and prejudice would have profound implications. People view their senses as documentary devices that faithfully translate the environment into understandable and manageable units (...) they *accept* what they see and hear. (von Hippel et al. 1995:181)

The results described here suggest that these "documentary devices" necessarily translate the environment through the filters of our stereotypes. And in the case of the present research, the process of translating the physical speech signal into a bit of perceived speech is filtered through stereotypes about gender.

This work specifically aims to explore the relationship between audiovisual integration in speech perception and gender stereotypes about faces. While it is widely understood that visual information has an influence on speech perception, as in the famous McGurk Effect (McGurk/MacDonald 1976), the scope of this influence has largely been limited to visual information about the place of articulation of the speech sound in question.

Strand/Johnson (1996), which is a study on audiovisual fricative perception, however, first suggested that beyond just visual information about the segments produced, information about the gender of the talker (which could be drawn from the talker's face) also influenced speech perception. It has since been speculated that socially-constructed beliefs, or "stereotypes", about how speakers "should" sound based on how they appear affect speech perception (Strand 1999). The following sections present a brief discussion of background information relevant for consideration of the effect of gender information on audiovisual speech processing.

The McGurk Effect

Since the development of hearing aids in the early- to mid-twentieth century, there has been a great deal of attention paid to the influence of visual information on the perception of speech, and the perception of audiovisual stimuli (see Summerfield et al. 1989). A good deal of this work has taken place in light of an interesting phenomenon known as the McGurk Effect, originally reported in 1976. This effect is a