How is your Voice Perceived?- A Perceptual Study

By Emily Galbraith [egalbraith@twu.edu] and June S. Levitt [jlevitt@twu.edu]
Department of Communication Sciences and Disorders

Introduction

- Voice conveys various information about people, including the emotional states, personality, and demographic information. Perceived voice characteristics influence job selection, friend selection, and other social interaction. [1]
- Voice contribute to the first impression of others, including, approximate ages, gender, competence, and relationships. [2]
- Therefore, voice improvement is the goal of various disciplines, such as singers, transgender voice therapy, voice over, politicians, and public speakers.
- Acoustical Analyses are important to Speech-Language Pathologists (SLPs) working on voice because they provide objective information about the pre- and post-therapy changes. [3]
- Also, perception studies are important to validate the effects of the information identified by the acoustical analyses. [3]

Method

Participants:
- 30 students of TWU (age range: 21-39; 3 males and 27 females).
  - Participants listened the recordings of voiced produce by 10 Texas citizens (Mean age: 40.5; age range: 21-68; 5 each of males and females).
  - The materials were the first half of the reading of the "North Wind and the Sun" passage.

- Participants rated each recording by using a 10-level Likert scale for four characteristics:
  - Gender
  - Age
  - Pleasantness
  - Smartness

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AGE	
26	Voice 1
27	Voice 2
28	Voice 3
61	Voice 4
68	Voice 5
21	Voice 6
23	Voice 7
31	Voice 8
58	Voice 9
62	Voice 10

Acoustical Analysis:
- The perceptual rating results were contrasted with the following acoustic measurements.
  - Intensity: dB SPL: perceived as "loudness."
  - Fundamental Frequency: F0: perceived as "pitch."
  - Duration: ms: perceived as "length."
  - Quality of voice: Acoustical Voice Quality Index (AVQI).
- Praat (v. 5.4.08) was used for analyses. [4]

Research Question and Predictions

Research Question: What aspects of a voice contribute to people's perception of them in regards to age, gender, pleasantness, and smartness?

Predictions:
- The speaker's pitch is the main cue to indicate gender.
- The speaker's rate of speech measured by the number of words per minute indicates age.
- The speaker's perceived pleasantness and smartness hinges on their intensity.

Results

Relationship between four perceptual measures
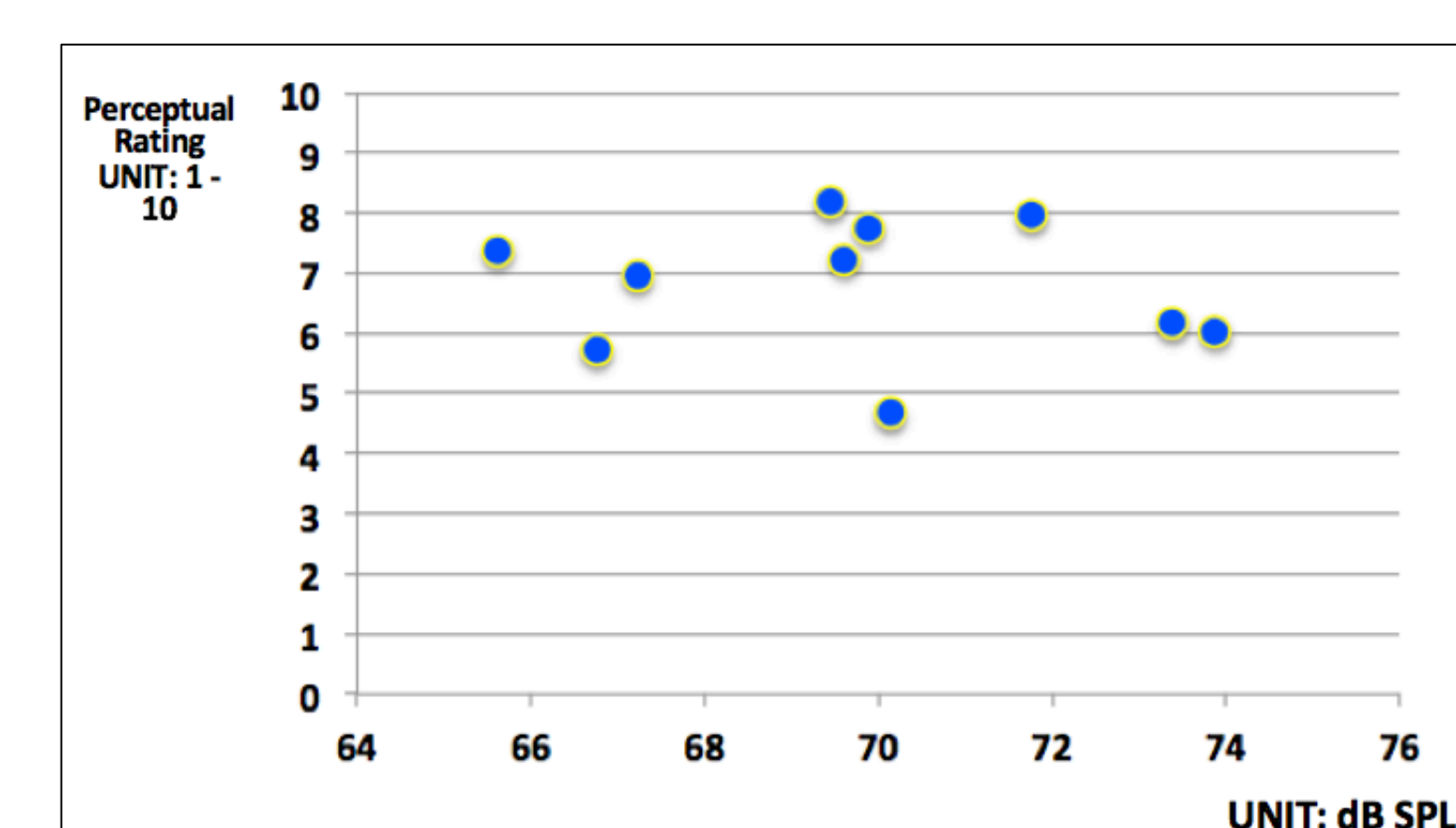

Sex; Age; Pleasantness; Smartness
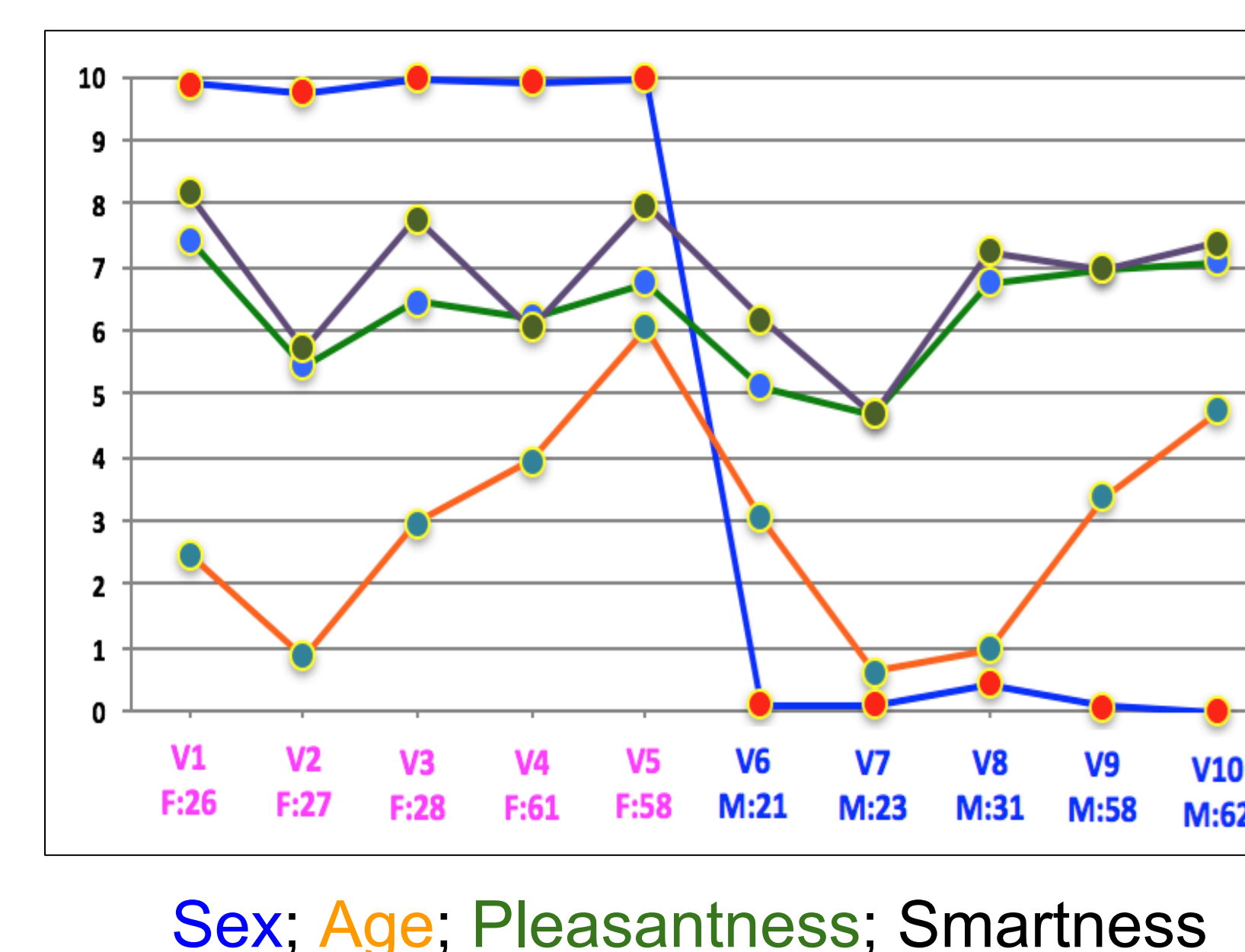
- As predicted the F0 was the clear cue for sex perception.
- There was a strong positive correlation between the ratings of PLEASANTNESS and SMARTNESS, $r = .881$. The correlation of these two variables is statistically significant ($p < 0.01$).
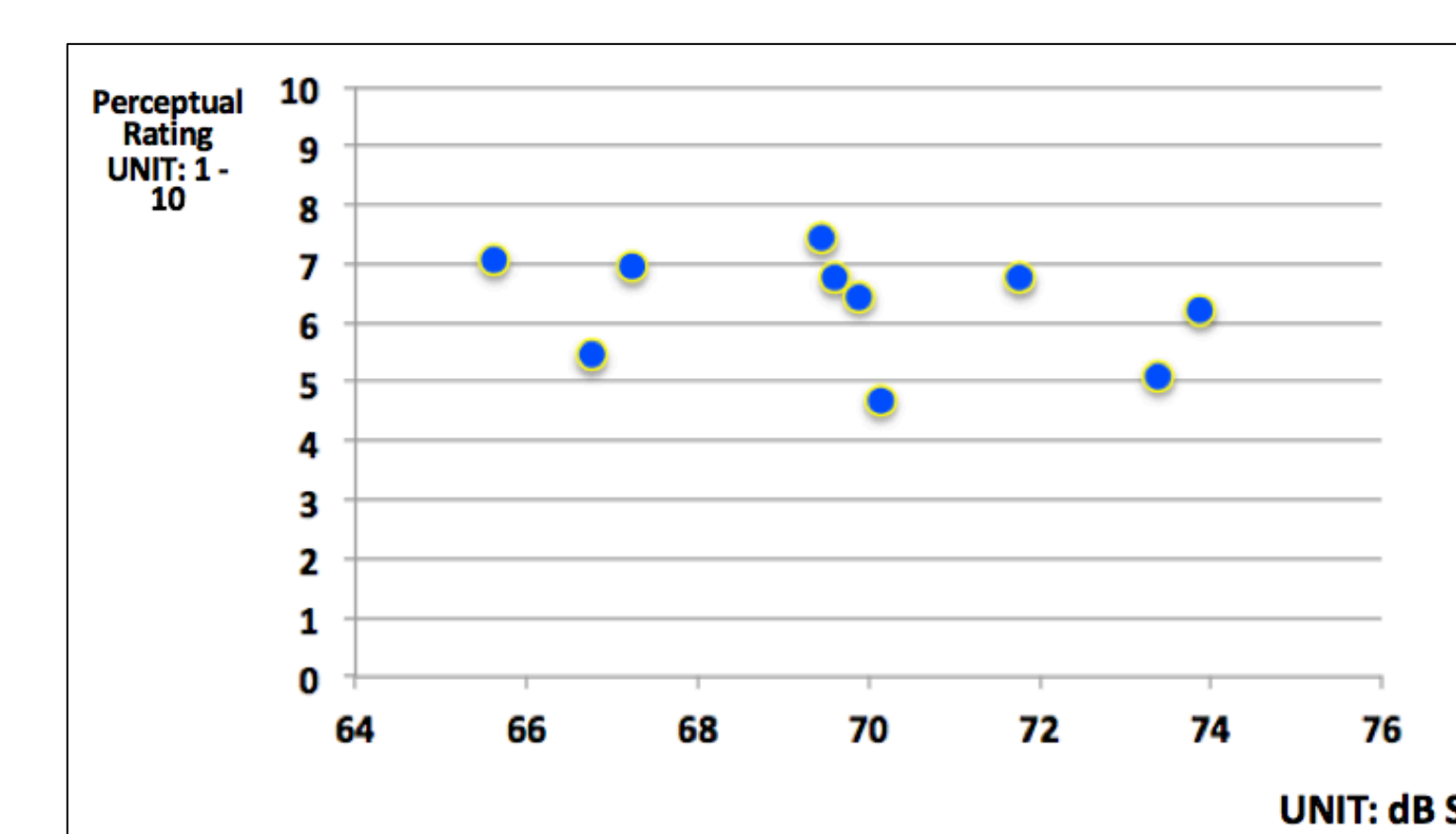
Relationship between the Age Perception and Rate of Speech
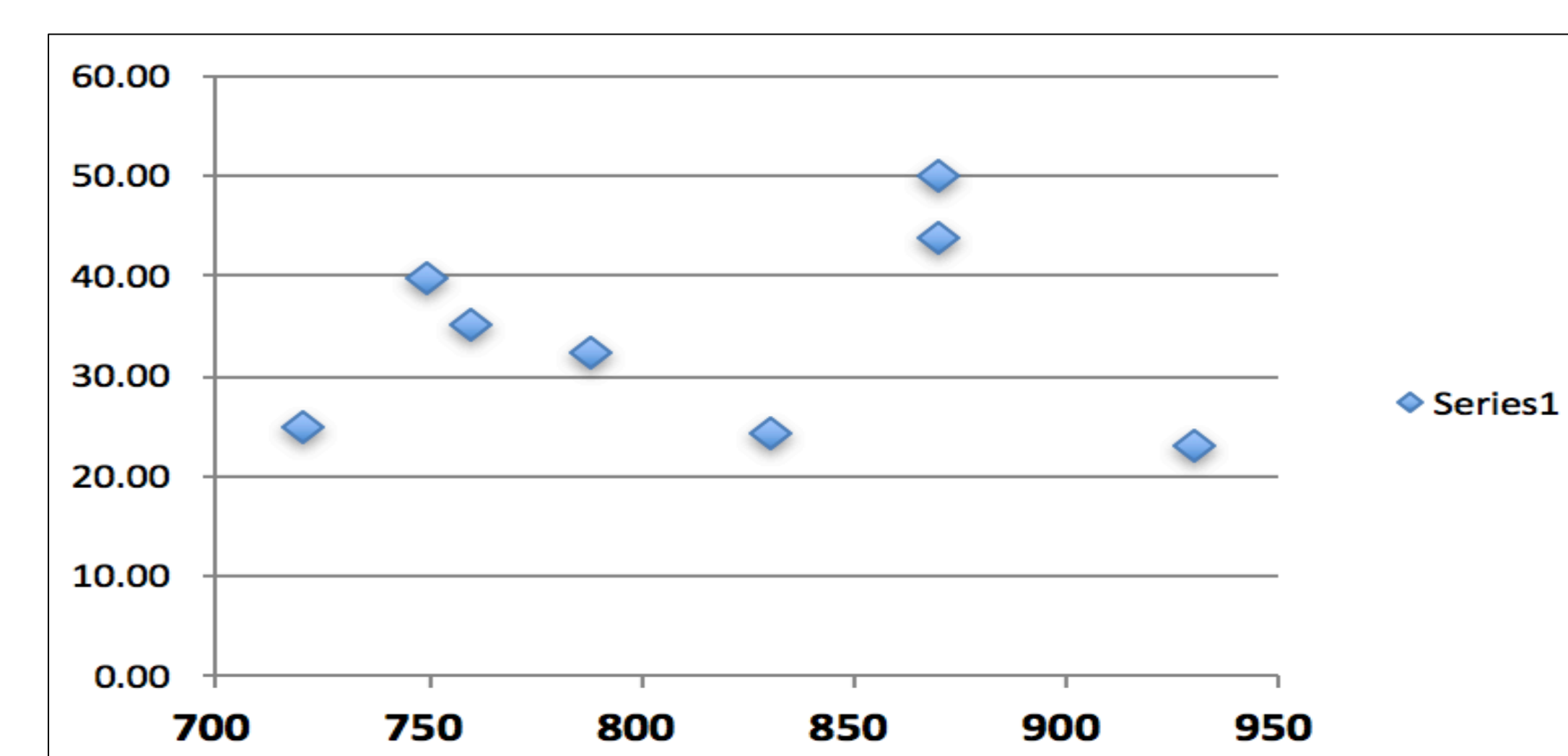
Relationship between the Age Perception and Rate of Speech

Intensity vs. Pleasantness   Intensity vs. Smartness

Discussion

Gender
- As predicted, the F0 was the main cue for sex identification. The other factors did not affect the identification. It suggests that the participants did not have the systematic patterns of perceiving age, pleasantness, and smartness based on the sex. The result is consistent with previously published data (e.g., [6]: p. 276).

Age
- The rate of speech does not statistically impact the listener's age perception, which is not consistent with Duchin and Mysak's research [5]. They found that the rate of speech is affected by the perception of age. Voice 1 and Voice 7's ages were perceived most accurately. The rate of speech of these participants were .79 and .93 words per second. It suggests that the rate of speech is not an important cue for age.

Pleasantness and Smartness
- The prediction that pleasantness and smartness hinged on the intensity of one's voice is not statistically accurate. There is no correlation between pleasantness and smartness and the intensity of one's voice.
- There is a strong correlation between the perception of pleasantness and the perception of smartness. The smarter a voice sounds, the more pleasant they were rated. These findings are consistent with McAleer's research [1].

Future direction
- The authors plan to replicate the present study with a more diverse group of individuals (i.e., young vs. old raters, and male vs. female raters).

Sources

[1] McAleer, P., Todorov, A., & Belin, P. (2014). How do you say 'hello'? personality impressions from brief novel voices. *PloS One, 9*(3), e90779.

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[3] Dilley, L. C., Wieland, E. A., Gamache, J. L., McAuley, J. D., & Redford, M. A. (2013). Age-related changes to spectral voice characteristics affect judgments of prosodic, segmental, and talker attributes for child and adult speech. *Journal of Speech, Language, and Hearing Research : JSLHR, 56*(1), 159-177.

[4] Boersma, Paul & Weenink, David (2018). Praat: doing phonetics by computer [Computer program]. Version 6.0.37, retrieved 3 February 2018 from http://www.praat.org/

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[6] Roseberry-McKibbin, C., & Hegde, M. N. (2006). An advanced review of speech-language pathology: Preparation for praxis and comprehensive examination. PRO-ED, Inc. 8700 Shoal Creek Blvd, Austin, TX 78757.

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