

# The role of extraversion and neuroticism in non-native rounded vowel shadowing

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# Background

- Previous research on non-native speech acquisition highlights that non-native speech learning is not a one-size-fits-all process
  - Individual factors like **motivation to learn an L2** (Bongaerts et al., 1997; Moyer, 1999; Nance et al., 2016; Saito et al., 2017, 2018) and **amount of L2 input** (Flege, 1987; Flege & Liu, 2001; Moyer, 2009; Peltola et al., 2007) have been well-documented as contributors to non-native speech production
  - Other extralinguistic factors, like **personality**, have received less attention

## Overarching question

How is L2 speech acquisition affected by personality type?

# Background

- Studies that implement an imitation or shadowing paradigm in order to determine the role that personality plays in non-native speech convergence are also not prevalent in the literature
  - Personality has been demonstrated to affect English speech convergence of L2 learners (L1 German) (Lewandowski & Jilka, 2019)
  - Personality has been demonstrated to significantly impact L1 speech convergence (Yu et al., 2013)

## Current research question

How is **non-native** speech **shadowing** affected by personality type?

# Methods

## Participants

- 74 monolingual speakers of American English (15 male, 57 female, 1 non-binary, and 1 declined to answer; mean age 21.17 y.o., SD=3.27)

## Speech Materials

- Stimuli were recorded by a native speaker of French (male, 22 y.o.) in a sound-attenuated booth
- Stimuli were extracted and normalized for intensity in Praat
- Each stimulus item was a monosyllabic CV or CVC French word containing one of the target sounds: rounded vowels (**/y/** or **/u/**)
  - Ex: tu (/ty/), goût (/gu/)
  - Each target sound was represented across 6 stimulus items

# Methods

## Personality Assessment

- All takers completed the Big Five Inventory (John et al., 1991) online
- Assesses the personality dimensions of **Extroversion, Agreeableness, Conscientiousness, Neuroticism, and Openness**
  - Survey consisted of 50 Likert scale statements

	Disagree	Slightly disagree	Neutral	Slightly agree	Agree
I make people feel at ease.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am always prepared.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a rich vocabulary.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

# Methods

## Big Five Inventory Traits

- Extroversion- describes people who gain energy from being around others, are often talkative, gregarious, assertive, and easily excitable (Costa & McCrae, 1992)
- Agreeableness- describes those who are perceived as kind, sympathetic, cooperative, warm and considerate (Thompson, 2008)
- Conscientiousness- personality trait of being careful or diligent (Thompson, 2008)
- Neuroticism- describe a person who a person is more likely to feel anxiety, fear, anger, frustration, loneliness, etc. (Thompson, 2008)
- Openness- broadly defined as encompassing dimensions like imagination, adventurousness, curiosity, unconventionality, perceptiveness, higher communicative competence, and aesthetic sensitivity (Costa & McCrae, 1992)

# Methods

## Procedures

- Prior to their lab visit, talkers completed all background surveys (Big Five Inventory and language background questionnaire) online via Qualtrics
- The shadowing task took place in a sound-attenuated booth and was presented using PsychoPy (Peirce et al., 2019)
- Talkers listened to an item and after a 500 ms ISI were instructed to repeat the item they previously heard
- Items were randomized and presented across three blocks and two sessions

# Methods

## Data processing

- Annotated manually in Praat; vowels were identified using the onset and offset of periodicity
- Burg LPC-based algorithm extracted the first, second, and third formant at the midpoint of each vowel
- Formants were transformed to Barks using the PhonR package (McCloy, 2012) in R version 1.2.5033 (R Core Team, 2019)
- F1 and F2 Bark values for each item were used to calculate the amount of convergence to the model talker's production of the same value (F1 or F2) and the same item
  - Model talker production - Talker production = Distance measure



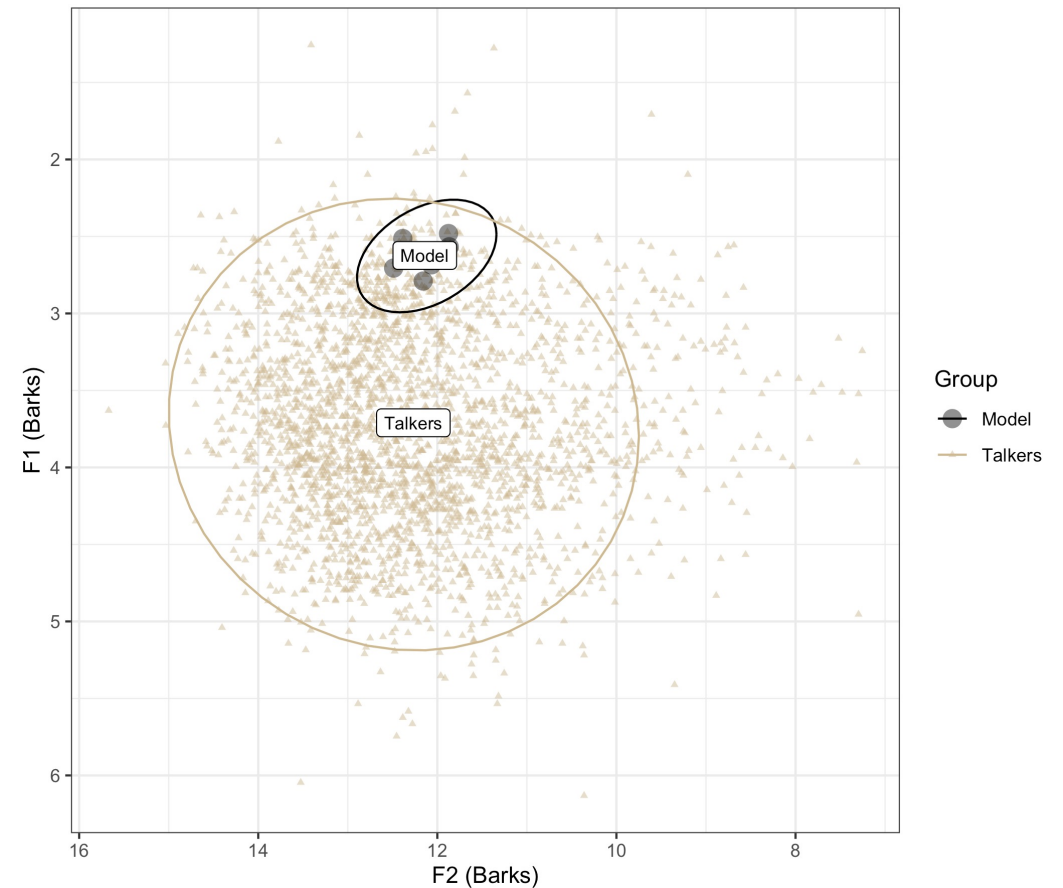
# Methods

## Analysis

- Statistical analysis was completed using the LME4 package (Bates et al., 2015) in R
- Distance values were each submitted to a linear mixed effects (LME) model with **Big Five Trait** (Extroversion, Agreeableness, Conscientiousness, Neuroticism, and Openness) as fixed factors
  - The random effects structure included **Subject** and **Item** as random intercepts
- A total of four models were run (one model per formant per vowel)
- T-values were used to determine significance ( $|t| > 2.00$ )

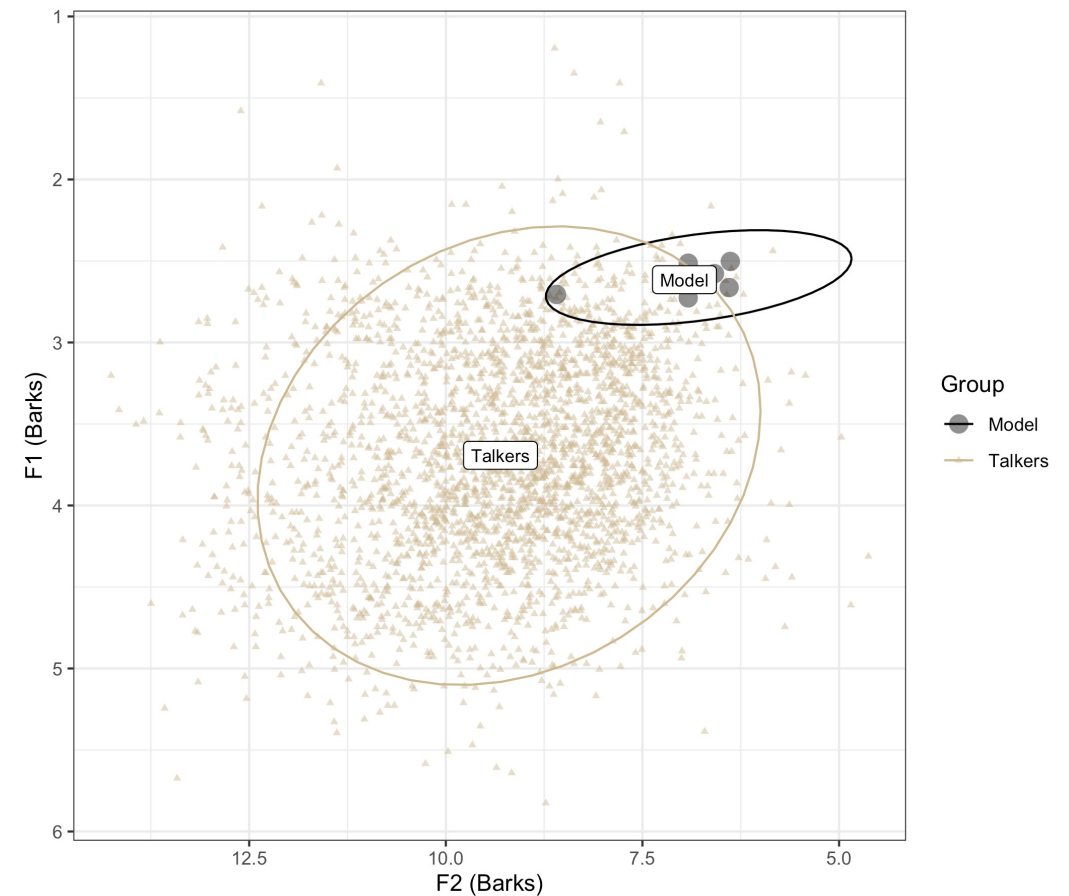
# Results: /y/

- Talkers on average produced /y/ lower (F1) than the model but did not greatly differ with regard to backness (F2)
  - There was a large amount of variation in shadowed productions
- /y/ F1 was significantly affected by Extroversion ( $t= 2.00$ ) and Neuroticism ( $t= 2.17$ ).
  - As a talkers' score in that trait increased, they exhibited higher degrees of convergence with the model talker
- No traits predicted convergence in /y/ F2 values



# Results: /u/

- Talkers on average produced /u/ lower (F1) and more front than the model
  - There was a large amount of variation in shadowed productions
- /u/ F1 was significantly affected by Extroversion ( $t= 2.20$ ) and Neuroticism ( $t= 2.27$ ).
  - As a talkers' score in that trait increased, they exhibited higher degrees of convergence with the model talker
- No traits predicted convergence in /y/ F2 values



# Discussion

- Results from the present study suggest that non-native shadowing of both the vowels in question, /y/ and /u/, were demonstrated to be significantly influenced by the personality trait **Extraversion**
  - As **Extraversion** has previously been shown in the literature to correlate with more target-like second language speech (Dewaele & Furnham, 2000; Hassan, 2001; Robinson, 2001; Rossier, 1976), this study provides additional evidence from a *different population* (non-native naïve monolingual talkers), a *different task type* (speech shadowing), and by *analyzing segmental speech* to strengthen these pre-existing claims

# Discussion

- Results of the present study also bolster previous, less-established claims that higher scores in **Neuroticism** aid in more target-like speech production (Lewandowski & Jilka, 2019; Robinson, 2001)
  - The impact of **Neuroticism** on L2 acquisition has been mixed and has even previously been demonstrated to negatively impact second language acquisition (Csizér & Dörnyei, 2005; Dewaele, 2013; Gardner et al., 1985)
- **Explanation #1:** The combination of Neuroticism and another trait, in this case Extraversion, gives talkers an extra boost when producing shadowed speech (Lewandowski & Jilka, 2019; Robinson, 2001)
- **Explanation #2:** Neuroticism (either in conjunction with Extraversion or not) is beneficial when shadowing segmental speech sounds

# Discussion

- Previous research on **Communication Accommodation Theory** suggests that speech accommodation to an interlocutor is done in order to maximize social comfort, reduce distance between speaking partners, and achieve social approval (Coupland, 2001; Giles, 2001; Giles & Powesland, 1975)
  - It is likely that talkers with higher Neuroticism scores, desire a higher level of social approval and comfort in communication and therefore try to create higher degrees of convergence with the person they are speaking to, or in this case, shadowing (Lewandowski & Jilka, 2019)
    - This may especially be true in the lab environment that the current study recorded talkers in, as talkers knew that they were participating in research and could be overheard by the researchers

# Discussion

- Personality did significantly affect shadowing of some aspects of production (i.e. F1) it did not play a role in others (i.e. F2) for either /y/ or /u/
  - **F2 values for /y/:** The overall trend of producing F2 in a target-like manner across all talkers masked a potential effect of personality
  - **F2 values for /u/:** L1 transfer effects? The challenge of producing /u/ caused *all* talkers to struggle, regardless of personality type

# Thank you!

**Questions?**

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# Openness?

- Openness, which has been found to correlate with higher levels of convergence (L1 and L2) (Lewandowski & Jilka, 2019; Yu et al., 2013) did not correlate with less distance from the model in any of the analyses
- Why?
  - Nature of the task chosen
    - Previous studies used conversation-oriented task types, while the present study was purely word-repetition
    - Talkers in the present did not have to tap into the traits that higher scores in openness correlate to (higher levels of communicative competence, perceptiveness, etc.) in a word-repetition task type (Hu & Reiterer, 2009)