Psycholinguistic Indicators of Anxiety During White Self-Reflection on Racial Privilege

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Abstract: Stress-based anxiety is connected to changes in prosodic elements of speech such as fundamental frequency, jitter, and shimmer. Emotional dysregulation and White racial anxiety surrounding racial confrontation (e.g. DiAngelo, 2011; Liebow & Glazer 2019; Matias et al. 2016) have been well observed. Despite this, deeper analysis on an interdisciplinary, biopsychosocial level remains limited. Moreover, the relationship between emotional dysregulation, race, and linguistics has not been sufficiently interrogated. This study aims to determine if there are observable psycholinguistic differences seen when White people engage in racial self-reflection as opposed to general self-reflection. This study includes 24 White, liberal participants randomly assigned to give a speech about race and privilege (treatment) or an unrelated control topic. Audio data were collected and analyzed for fundamental frequency, jitter, and shimmer and compared across treatment and control groups. These data provide a more detailed understanding of linguistic changes that arise in White people when discussing race by contextualizing their associated anxiety. Psycholinguistic indicators of anxiety (fundamental frequency, jitter, and shimmer) can provide important routes to study emotional regulation on a psychological and linguistic level. Additionally, these indicators can provide a mechanism to explain how emotional dysregulation manifests on a material level within a racial discussion. To facilitate more productive dialogue, White individuals must be aware of, and actively combative against their disengagement from productive discussion. Psycholinguistic analyses such as these may provide insight into White people's strategies when avoiding racial discussion. It is critical to look deeper at microscopic aspects of discussion such as psycholinguistics to raise awareness about uninterrogated biases to intervene and change these engagements.

Introduction:

Although there have been some advances in prioritizing discussions of racial inequity within media outlets, educational spaces, and more general social discussions, many White people are deeply uncomfortable with discussions of race. An increasing number of White individuals acknowledge that racism is still heavily prevalent in society. Despite this, general self-reflection on the privileges associated with being white remains limited. Eduardo Bonilla-Silva defines racism as the 'ideological apparatus of a racialized social system' wherein racism exists as a structural antagonism that arose out of a socialized racialization (1994). It is important to note that political progress in racial equity cannot be sufficient to fully interrogate the existence of racism. Rather, an analysis of socialization is required to comprehend how racism is integrated into our daily lives and psyches. Within the structure of racism, Whiteness exists as an additional antagonism that perpetuates racial divides. Specifically, within White, liberal populations, deeper bias undergirding racial assumptions must be interrogated. Within the context of the study "liberal" refers broadly to those who are interested in advancing racial equity in a political context.

One of the metrics for the socialization of racism is language. Language and discourse exist in a dialectical relationship with racism. On a macro-level, discourse is a mechanism by which racialization is both sustained and perpetuated through meaning-making (Van Dijk 1993). On a micro level, analyses of utterances and phonetics can reveal a great deal about a speaker's psychological state (Juslin and Laukka 2003). When a speaker is experiencing heightened emotional arousal, there are changes in a speaker's prosody. The American Psychological Association defines Prosody as "the rhythm, stress, and intonation of speech" (2014). Prosody can reveal deeper insights into a speaker's emotional state that the words they say might not elucidate. Essentially, physiological, and psychological stress can be observed through speech production. Affective prosody is a category of prosody that includes the elements of speech impacted by heightened effect. Affect can be understood as the cognitive and bodily implications of feelings or emotions (Barrett & Bliss-Moreau 2009). Affective prosody is a tool to understand emotional arousal and changes in speech are connected. Previous research has found that greater levels of affective prosody were correlated with higher parasympathetic indicators such as heart rate (Heponiemi et al. 2006). However, this is not a definitive relationship as other factors such as cardiac activity may also play a role in reactivity. Within affective prosody, several measures including fundamental frequency, pitch, tone, and quality, have been shown to accurately classify and reflect the emotional states of the speaker (Lausen & Hammerschmidt 2020). Despite the advancements in linguistic analysis of stress and observation of White stress surrounding racism, the work connecting psycholinguistics to race-based discussions is minimal. Most of the arousal seen in discussions of race are observational and lack significant data to break them down further on a bio-psychological level. In facilitating more productive discussions about race it is

imperative to consider the role that language plays in emotions and perceptions. Linguistic emotionality and avoidant strategies take the focus off take the onus off the substance of the discussion and re-focuses it on the speaker's emotions and feelings. Generating a deeper understanding of the psycholinguistics underlying white racial self-reflection can provide concrete quantitative measures to understand how affect, color-blind racism, and white fragility are connected within a speech. To facilitate more productive discussion, White individuals must be aware of the ways we are not engaging in productive discussion and take action to intervene in these engagements. Psycholinguistic analyses such as these may provide insight into the White strategies to avoid racial discussion. More importantly, while many liberal individuals believe they desire racial equity and have interrogated their biases cognitive elements such as affective prosody can trouble these assumptions. It is critical to look deeper at microscopic aspects of discussion such as psycholinguistics to raise awareness about uninterrogated biases, to intervene and change these engagements.

It is important to develop an interdisciplinary perspective to study the ways that racism has been socialized into many aspects of life. Linguistics, psychology, and Whiteness studies all undergird interpersonal conversation, self-reflection, and racial speech/discussion. Understanding the concrete data and mechanisms by which White people discuss race are necessary to provide a clearer view of the causes and implications of specific phonetic strategies that incentivize avoidance of racial confrontation. It also creates a spotlight on ways that bias has integrated itself into daily acts such as speech and discussion. Linguistic measures also provide a metric of evaluation to understand how the socialization of racism more broadly impacts psychological processes. The affective qualities of speech influence these connections and provide a deeper understanding of emotionality in the context of racially reflective speech and discussions more broadly. To address these intersections, speech data was collected and analyzed from white, liberal participants to determine if there were observable psycholinguistic differences seen when white people engage in racial self-reflection as opposed to general self-reflection.

Methods:

This study consisted of 24 White, Liberal participants (N=24). The participants were not screened for public speaking phobias or impairments. Of those, twelve were randomly assigned to the treatment condition and twelve were randomly assigned to the control condition based on Stratified random assignment (on sex). To compare racial self-reflection to general self-reflection, participants were put into one of two speech conditions: (1) race topic (treatment) or (2) non-race topic (control). The race topic asked participants to engage in self-reflection about their racial privilege, while the control topic asked participants to engage in general self-reflection about

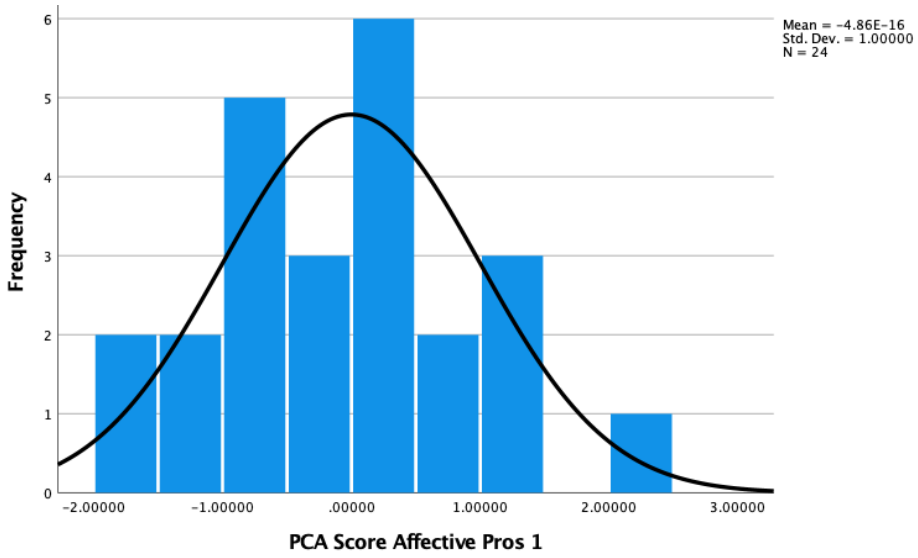

Figure 1. Graphical Distribution of Affective Prosody Data Under a Principal Component Analysis.

leadership. The study was conducted entirely over Zoom and speeches were recorded with Zoom's 'record' functionality. During the Zoom session, participants were given five minutes to prepare a speech on their given condition, which they would deliver to a panel of judges. After five minutes, the participant was moved into a breakout room with a panel of judges where they received pre-scripted instructions to give their speech. The judge panels consisted of a mix of non-White-presenting individuals (e.g., Black-presenting, Asian-presenting, Latinx-presenting). Two of the judges were live people with their cameras on and two were fake alias accounts using the images and names of previous study members. Judges were a part of the study team and were aware of the purpose of the study. They were asked to remain non-reactive and carry a neutral facial expression throughout the speech. The purpose of these measures was to produce a sense of social evaluation. Audio segments were converted and processed in Audacity (1999-2021) This was done to remove external noise and dialogue at the start and end of the speech. After editing, PRAAT (Boersma & Weenink, 2021) was used to extract speech data using cross-correlation analysis. The data were analyzed using IBM SPSS Statistics (Version 28.0).

Results:

To create a variable to measure affective prosody a Principal Component Analysis (PCA) was performed, and two components were generated (Figure 1). Data sets included (1) having high variability in fundamental frequency, modest maximum pitch, large measurements of jitter and shimmer, and (2) a measure of low variability in fundamental frequency, small maximum pitch, and small measurements of jitter and shimmer. Based on the principal components and the scree plot, component one was the model chosen as the independent variable where affective prosody was driven mainly by measures of standard deviation, jitter, and shimmer. As seen in Figure 1, data under the PCA was found to be relatively normally

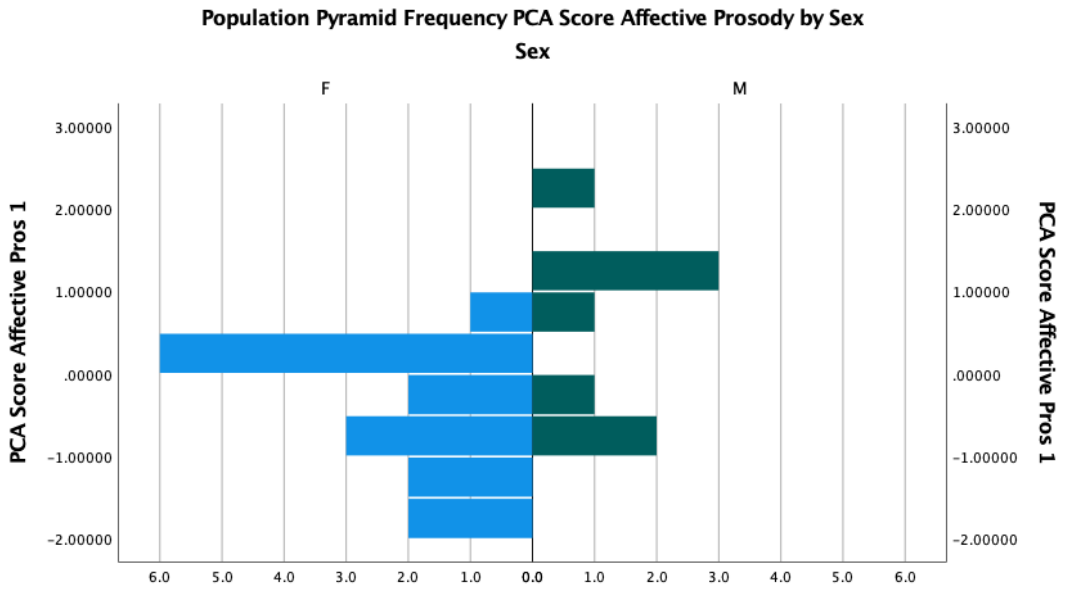

Figure 2. Population Pyramid Frequency of Affective Prosody Separated by Sex.
Note: Males are represented by green and labeled 'M' and female participants are shown in blue and labeled 'F'.

distributed and explained 40.481% of the variance in the data.

To understand how treatment differed as a function of sex, we fitted multiple regression models. Hierarchical Regression Equations were performed, three groups were assigned (1) tested the main effect of Treatment, (2) added the main effect of sex, (3) added the treatment-sex interaction. Model 1, measuring the main effect only, explained very little variation ($R^2 = 0.027$, $\beta = 0.165$, $p = 0.440$), however the addition of sex to the second model was not a statistically significant change in the model,

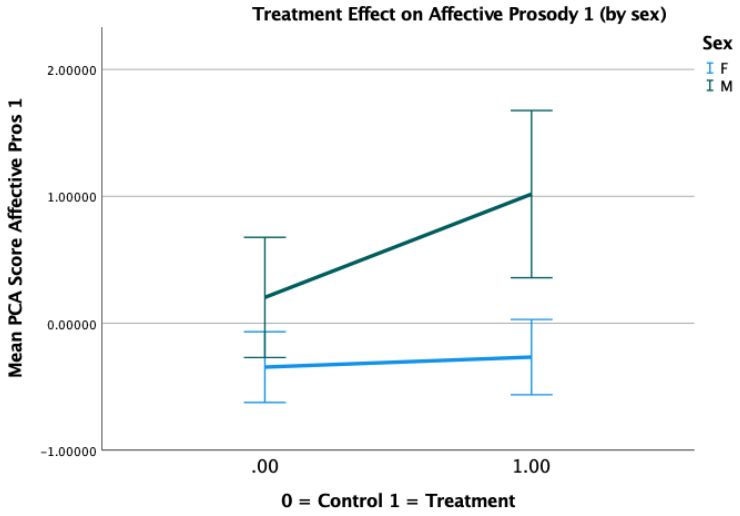

Figure 3. The Treatment Effect on Affective Prosody as a Function of Sex When Giving Speeches About General Self-reflection (control) vs. Racial Self-reflection (treatment).
Note: Higher values indicate larger values of affective prosody measurements. Error bars represent one standard error.

but it did provide metrics to evaluate the variation in the data ($R^2 = 0.222$, $\beta = 0.441$, $p = 0.072$). Model 3, involving the treatment-sex interaction demonstrated the highest variation ($R^2 = 0.253$, $\beta = 0.280$, $p = 0.112$).

Discussion:

In line with the hypothesis, affective prosody values were, on average, higher for the treatment group than the control group, but not by a statistically significant amount. This was expected given the low sample size (N=24). However, despite being statistically underpowered, our data indicate that affective prosody variability is highly influenced by sex differences. While the simple slope in females was very small, men had a simple slope of 0.81, slightly less than one standard deviation of the difference (Figure 3). Although methodologically this is not statistically significant, it is substantively significant. The simple slope among men indicates that there is likely a connection between higher affective prosody and racial discussions at least within this data set. This could provide important information about the ways that stress, racial bias, and sex implicate each other.

Conclusion:

Generating integrated and interdisciplinary research about Whiteness and racism is necessary to interrogate racism as both a socialized process and a structural element of U.S culture. The results indicate that further research could be pertinent to identifying the relationship between racial discussion and linguistic prosody. It is not enough to facilitate discourse about racism and White self-reflection. Discursive interactions need to be investigated to understand the ways that racism has morphed to be unintelligible on a material level, but deeply present on an emotional level. Greater research on the linkages between affective prosody and racism can aid in interrogating these antagonisms. Despite the trends indicated in the data, more research involving larger, more diverse populations is required to understand the relationship between stress and affective prosody in the context of racial self-reflection.

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