WEBSITE REVIEW

NORM: The Vowel Normalization and Plotting Suite

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INTRODUCTION

In sociophonetic research investigating language variation, particularly with regard to the perception and production of vowels, vowel normalization methods have been developed to be able "to compare vowel realizations by different speakers in meaningful linguistic and sociolinguistic ways" (Thomas & Kendall, 2007, p. About Vowel Normalization). Ideally, the vowel normalization methods preserve phonemic and sociolinguistic variation while minimizing the physiological variation between speakers (Adank, 2003). Thomas (2010) listed four goals for normalizing formant data: "to eliminate variation caused by physiological differences among speakers (i.e., differences in vocal tract lengths); preserving sociolinguistic/dialectal/cross-linguistic differences in vowel quality; preserving phonological distinctions among vowels; [and] modelling the cognitive processes that allow human listeners to normalize vowels uttered by different speakers" (p. 161). Several vowel norming methods have been developed, and the tool being reviewed here allows one to implement nine normalization methods on formant data. Each normalization method is described in the application along with their advantages and disadvantages as well as the reason for using them.

The website was created to facilitate manipulation, normalization, and plotting of vowel formant data for sociophoneticians, phoneticians, and sociolinguists (Thomas & Kendall, 2007). The design of the website allows for the quick application of the methods for normalization so that the results from each manipulation can be compared and visualized. The website emphasizes knowing the purpose of one's research as well as the goals for vowel formant normalization. All of these aspects are discussed over the several tabs on the website, and the creators provide extensive detail for each part of the tool to help researchers be better informed as well as to make the tool, which is a bit inaccessible, easier to understand and use.

CREATORS OF THE WEBSITE

NORM: The Vowel Normalization and Plotting Suite was created by Tyler Kendall and Erik Thomas. Tyler Kendall is an associate professor at the University of Oregon. Kendall's research has been in sociolinguistics with interests in social and cognitive aspects of language variation and change. He tends toward quantitative research in sociolinguistics, although he also does research incorporating computational linguistics, corpus linguistics, lab phonetics, and psycholinguistics. Kendall also developed the Sociolinguistic Archive and Analysis Project (SLAAP) and the Online Speech/Corpora Archive and Analysis Resource (OSCAAR), which are web-based language archives. Erik Thomas is a professor at North Carolina State University whose interests involve sociophonetics focusing on acoustic analysis of language variation, cognition of language variation, and variation in English dialects. His current work is in new dialect formation.

WEBSITE CONTENT AND LAYOUT

The website has a fairly basic layout. A screenshot of the homepage can be seen in figure 1 below. There are six tabs that one can click on to navigate the site: About NORM, About Vowel Normalization, Normalization Methods, How to Use NORM, Bibliography, and NORMalize!.
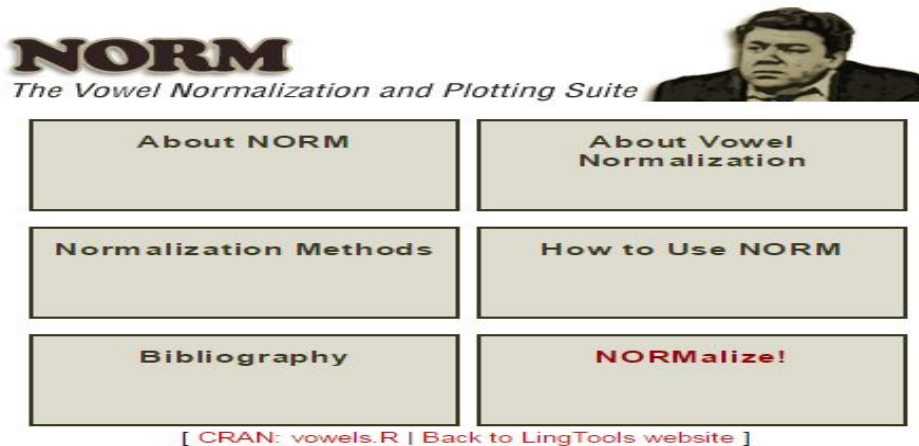

Figure 1. NORM homepage found at URL http://lingtools.uoregon.edu/norm/index.php.

The About NORM tab contains information describing the tool and what it is intended for. The headings under this tab are *About NORM*, *How NORM Works*, *About NORM's Scaling*, and *How to Cite NORM*. In each section there are hyperlinks to direct the user to other tabs within NORM and other websites. The About Vowel Normalization tab contains information under only the title of the tab. There, the creators provide information on vowel normalization, goals for normalization, how differing research may focus on certain goals over others, and two images showing the effect of one of the normalization methods on the acoustic vowel charts of two speakers. Under this tab, the creators provided citations of research that used and reviewed the normalization techniques. The Normalization Methods tab provides information on each of the normalization methods that the website allows users to apply to their data. Above it was mentioned that the website is able to carry out nine normalization methods; however, these nine methods were derived from five main methods: Bark Difference Metric, Labov, Lobanov, Nearey, and Watt & Fabricius. For each method, the creators provide information about the method and what it does; how the method affects formant data; advantages and disadvantages of the method; an image of the output data; and if there are multiple versions of a method, there is additional information on each. The How to Use NORM tab has two main headings: *Using NORM* and *Preparing Your Data*. The first heading forecasts that to use the NORM application, the data need to be in a certain format. The second heading, *Preparing Your Data*, describes the options one has when considering how to set up their data, and it provides two templates as well as several sample sets of data that can be used to test the application. The bibliography tab shows the sources that were used to inform the content of the other pages of the website. The last tab on

the NORM homepage is the NORMalize! tab. The screenshot below in figure 2 shows the layout of the part of the website that serves as the tool for normalizing formant data.

Figure 2. *NORMalize! Page Found at URL* http://lingtools.uoregon.edu/norm/norm1.php.

The NORMalize! page above shows the options and steps available to normalize or manipulate. Step one allows the user to choose the files to use with the application. The section reminds the user of the formatting requirements for using the tool, and it provides hyperlinks to other sections of the website where the user can find the templates for setting up the data and how to use the tool. The second step in the process asks the user to select the type of results the user wants, whether the user seeks to analyze individual vowels, speaker means, or group means. The third step gives the user the option to select the normalization method for the data. It provides links to the page that provides information on the different types of normalization methods, and it allows the user to select more than one normalization method to apply to the data. Step four allows the user to select the additional options for the output of the website, starting with the layout of the webpage, inclusion of the third formant and information to guide that decision, scaling of results, and different plotting options. Step five serves to carry out the selected normalization method, and it completes the process.

EVALUATION

In evaluating this website, three criteria will be discussed based on an evaluation of website content and structure—content, interaction, and navigation (Bauer & Scharl, 2000). The content of the website is very specialized, and the tool is clearly marked as appropriate for sociophoneticians, phoneticians, and sociolinguists. One without prior knowledge about normalization of formant data or why one might seek to compare vowel formant data would likely become overwhelmed quickly by the amount of information about each method and the discussion about advanced manipulation through creating R scripts. The advanced programming knowledge is not required for using this tool, but there are other requirements for using the tool such as knowledge about acoustic analysis and acquiring formant data. The tool assumes much of that knowledge in its users. The tool provides detailed information about each normalization method and the advantages and disadvantages of each as well as sources for additional reading. Without those resources, this tool would be very difficult to use meaningfully. The interaction between the user and the tool involves the user being conscious of the website's abilities. The user has the opportunity to download templates and sample data sets to test with the tool. The user must upload data in the form of a tab-delimited text document, then select from the several options that the tool provides. The website also allows the user to select the layout of the output as well as labelling and color coding options. The navigation aspect could be improved, although with some experience with the website, the user can learn how to navigate the tool more easily. The first area for improvement could be in the difference between the tabs on the tool's homepage and the tabs on the rest of the pages. The homepage contained six main buttons; however, the top of each page after the homepage has seven buttons, and the labels vary from the labels on the homepage. This seems to be only a minor inconvenience. As a new user, navigation was difficult primarily because the tool would suggest that, to find additional/clarifying information regarding more advanced topics, to click on link that would show another page on the website creating a bit of a rabbit hole feel to the website.

Considering the audience for this tool, which was stated as sociophoneticians, phoneticians, and sociolinguists, it seems that the tool facilitates quick and meaningful processing of vowel formant data. The tool seems to be valuable, although user training would likely be needed and very beneficial especially to less experienced researchers.

REFERENCES

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