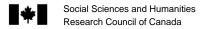# Application for a Grant

Identification

This page will be made available to selection committee members and external assessors.

Funding opportunity
Insight Grants

Joint or special initiative

Application title

The Spoken English Lexicon: Massive auditory lexical decision

Applicant family name	Applicant given name	Initials
Tucker	Benjamin	V.

Org. code	Full name of applicant's organization and department
1480111	University of Alberta Linguistics

Org. code	Full name of administrative organization and department
1480111	University of Alberta Linguistics

Scholar type   Established ◉   Emerging ◯   Research Group

If "Emerging", specify category   1 ◯   2 ◯   3 ◯   4 ◯   435-2

Does your proposal require a multidisciplinary evaluation?   Yes ◯   No ◉

Is this a research-creation project?   Yes ◯   No ◉

Does your proposal involve human beings as research subjects? If "Yes", consult the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* and submit your proposal to your organization's Research Ethics Board.   Yes ◉   No ◯

Does your proposal involve activity that requires a permit, licence, or approval under any federal statute; or physical interaction with the environment? If 'Yes', complete Appendices A and B.   Yes ◯   No ◉

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total funds requested from SSHRC	37,700	108,243	122,862	75,943	66,993	411,741

Personal information will be stored in the Personal Information Bank for the appropriate program.

Application WEB
2013/10/11

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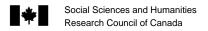
Family name, Given name
Tucker, Benjamin

Participants

List names of your team members (co-applicants and collaborators) who will take part in the intellectual direction of the research. Do not include assistants, students or consultants.

| Role | Co-applicant ◯ | Collaborator ⬤ |

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| Role | Co-applicant ◯ | Collaborator ⬤ |

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Department/Division name
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| Role | Co-applicant ◯ | Collaborator ⬤ |

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Department/Division name
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Department/Division name
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Application WEB

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Canada

Social Sciences and Humanities
Research Council of Canada

Conseil de recherches en
sciences humaines du Canada

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Participants (cont'd)

Role
Co-applicant ○   Collaborator ●

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Department/Division name
New Zealand Institute of Language, Brain and Behaviour

Role
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Family name	Given name	Initials

Org. code	Full organization name

Department/Division name

Role
Co-applicant ○   Collaborator ○

Family name	Given name	Initials

Org. code	Full organization name

Department/Division name

Role
Co-applicant ○   Collaborator ○

Family name	Given name	Initials

Org. code	Full organization name

Department/Division name

Role
Co-applicant ○   Collaborator ○

Family name	Given name	Initials

Org. code	Full organization name

Department/Division name

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Application WEB

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Research Activity
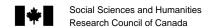
The information provided in this section refers to your research proposal.

Keywords

List keywords that best describe your proposed research or research activity. Separate keywords with a semicolon.

linguistics; phonetics; psycholinguistics; speech recognition

Priority Areas   - Priority area(s) most relevant to your proposal.

Disciplines   - Indicate and rank up to 3 disciplines that best correspond to your activity.

Rank	Code	Discipline	If "Other", specify
1	62400	Linguistics	
2	63000	Psychology	
3			

Areas of Research

Indicate and rank up to 3 areas of research related to your proposal.

Rank	Code	Area
1	360	Science and technology
2	150	Elderly
3		

Temporal Periods

If applicable, indicate up to 2 historical periods covered by your proposal.

From	To
Year BC AD _____ ○ ○ _____ ○ ○	Year BC AD _____ ○ ○ _____ ○ ○

Application WEB
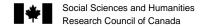
Family name, Given name
Tucker, Benjamin

Research Activity (cont'd)

Geographical Regions
If applicable, indicate and rank up to 3 geographical regions covered by or related to your proposal. Duplicate entries are not permitted.

Rank	Code	Region
1		
2		
3		

Countries
If applicable, indicate and rank up to 5 countries covered by or related to your proposal. Duplicate entries are not permitted.

Rank	Code	Country	Prov./State
1	1100	CANADA	
2	1200	UNITED STATES	
3	7200	NEW ZEALAND	
4			
5			

Application WEB

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Family name, Given name

Tucker, Benjamin

Response to Previous Critiques - maximum one page

Applicants may, if they wish, address criticisms and suggestions offered by adjudication committees and external assessors who have reviewed previous applications.

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Application Web

Canada

	Social Sciences and Humanities Research Council of Canada	Conseil de recherches en sciences humaines du Canada

Family name, Given name

Tucker, Benjamin

Summary of Proposal

The summary of your research proposal should indicate clearly the problem or issue to be addressed, the potential contribution of the research both in terms of the advancement of knowledge and of the wider social benefit, etc.

OBJECTIVES

How do humans recognize speech? How do factors such as native language, age, and dialect have an effect on the way in which words are recognized? A common concern among people as they get older is age related decline; in other words, does our cognitive ability decline with age? Ramscar et al. (submitted) show that it may not be the case that older readers are slower due to cognitive decline. Will similar result be found for listeners when they hear language? Additionally, interactions with speakers of other dialects can be a relatively common occurrence. How is it that there are some dialects that are easy to understand and that other dialects are more difficult to understand? Are there aspects of these dialects that are more difficult to adapt to than others (Clarke & Garrett, 2004)? The present proposal seeks to investigate these and other questions regarding spoken language recognition. There are many ways in which answers to these questions can be found, one way is by creating and conducting large studies.

In linguistics and psycholinguistics, databases constructed from large studies with tens of thousands of words are rapidly becoming an important new source of information on the processing and representation of language in the mind, in conjunction with focused experiments using careful designs. For example, the English Lexicon Project (http://elexicon.wustl.edu/), the first major database of psycholinguistic data, provides information on silent reading and reading aloud. Recently, other similar projects have been completed on British English, Dutch and French (http://crr.ugent.be/programs-data/lexicon-projects/). These large, 'megastudies' have several important advantages including: statistical power, minimization of strategic effects, comprehensiveness, and multi-functionality complementing traditional small factorial experiments. There is currently no equivalent resource for the processing of spoken language, even though speech precedes reading developmentally and historically. The current project seeks to remedy this gap.

RESEARCH PLAN

The first phase of this megastudy, with 26,000 words and 9,600 non-words from a male speaker of Western Canadian English, is currently underway. Based on the experience gained from this first phase we plan to expand this megastudy by increasing the number of speakers providing the recordings by including a female speaker, in addition to an older speaker. The participants will largely come from Edmonton, AB; including participants ranging from 20-70 years in age. Participants will also be expanded to include additional dialect regions (Arizona, USA; Nova Scotia; New Zealand).

CONTRIBUTIONS

This project will contribute to the ongoing investigation of language comprehension. Novel and theoretical contributions emerging from this research program:
- testing and creation of models of spoken word recognition
- creation of an open source dataset which can be used by a wide range of researchers
- insight into how age related anatomical changes in the voice affect spoken word recognition
- insight into how aging affects spoken word recognition
- insight into how dialect affects spoken word recognition

Personal information will be stored in the Personal Information Bank for the appropriate program.

Application WEB

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Detailed Description

OBJECTIVES:

How do humans recognize speech? What is involved in the process of recognizing spoken words? How do factors such as the speaker, participant age, and dialect have an effect on the way in which words are recognized? While much has been learned regarding these questions many questions still remain. The present proposal seeks to investigate these and other questions by creating and conducting large-scale studies of spoken language recognition.

In psycholinguistics, databases constructed from large-scale studies with responses to tens of thousands of words are rapidly becoming an important new source of information on lexical processing and representation, in conjunction with focused experiments using careful controlled designs. The first such study, the English Lexicon Project (http://elexicon.wustl.edu/, Balota et al., 2007), contains responses on silent reading and reading aloud. More recently, similar studies have been completed, or are in progress for British English, Dutch, and French (http://crr.ugent.be/programs-data/lexicon-projects/, Ferrand et al., 2010; Keuleers et al., 2010; Keuleers et al., 2012). The number of these types of projects is slowly beginning to increase. These large-scale studies or 'megastudies' (Siedenberg & Waters, 1989) have several important advantages, including: statistical power, minimization of strategic effects, comprehensiveness, and multi-functionality complementing traditional small factorial experiments. There is currently no equivalent resource for the processing of spoken language, even though speech is phylogenetically and ontogenetically prior to reading, and most of our daily interaction involves the use of language in the form of speech, rather than reading/writing. The main objective of the current project, the "Spoken English Lexicon Project" (following Balota et al., 2007), is to remedy this gap allowing us to ask questions not previously possible.

The results of the proposed megastudies will be made available to the research community, following the example of the English Lexicon Project (Balota et al., 2007). This proposed resource will contain responses to over 26,000 words produced by three speakers and will allow researchers to address specific research questions through statistical analysis (virtual experiments; Keuleers et al., 2012) and will serve as a resource to filter subsequent construction of targeted experiments with more controlled, labor-intensive and/or expensive experimental techniques such as Electroencephalography (EEG) and functional Magnetic Resonance Imaging (fMRI).

The first phase of this research project (Experiment 1) is currently in progress. Based on the experience gained from developing the first phase, we propose to expand the number of speakers providing the recordings, as well as participants (covering a larger age range and additional dialect regions) performing the auditory lexical decision task. The expansion will include preparing recordings of two new speakers and the recruitment of participants from 20 to 70 years of age. It will also include listeners from different dialect regions (Alberta, Canada; Nova Scotia, Canada; Arizona, USA; South Island, New Zealand). Recent research on auditory and visual comprehension has indicated that there are substantial differences, not only quantitatively, but also qualitatively, in how processing constraints affect different subpopulations (e.g., Clopper & Pisoni, 2008; Le et al., 2007; Ramscar et al., submitted; Scharenborg & Janse, 2013). The proposed work seeks to investigate questions of cross-dialect processing and age related factors in processing. This work will test existing models (e.g., Shortlist B, Norris & McQueen, 2007) and assist in the creation of new models of spoken word recognition.

CONTEXT:

An understanding of spoken language comprehension has been the objective of many decades of research (Jusczyk & Luce, 2002; for a review) and much work has focused on various aspects of

spoken language comprehension. Models of spoken word recognition, like Shortlist B, have been created based on the results of these experiments (e.g., Luce & Pisoni, 1998; Massaro, 1987; McClelland & Elman, 1986; Norris, 1994; Norris & McQueen, 2008). However, as noted above, there currently is no megastudy of auditory word recognition responses which can be used to compare and contrast these models. Comparisons have had to rely on other methods. Table 1 outlines existing large studies (more than 900 items of interest) in research on spoken word recognition; most studies (not summarized here) contain fewer than 200 items of interest.

Reference	Number of items	Participants	Language	Task
Luce & Pisoni, 1998	918 CVC words	90	English	Rating, ALD, Word Naming
Smits et al.,, 2003	1179 diphones	18	Dutch	Gating
ten Bocsh et al., 2013	5541 words/non-words	20	Dutch	ALD
Warner et al., submitted	2288 diphones	28	English	Gating

Table 1: List of large datasets in spoken word recognition. ALD (Auditory Lexical Decision).

The Dutch and English gating experiments are by far the largest with more than 400,000 thousand individual responses for each language (Smits et al., 2003, Warner et al., submitted). The Shortlist B model is based on the results of the Dutch gating experiment (Norris & McQueen, 2008). In what follows, I briefly discuss three reasons for the need of megastudies using auditory lexical decision responses.

First, speech unfolds over time. Consequently, the way in which language is processed visually (in chunks) is not directly comparable to auditory processing. Thus, the existing large visual processing studies (Balota et al., 2007; Ferrand et al., 2010; Keuleers et al., 2010; Keuleers et al., 2012) are inadequate for understanding how auditory language comprehension occurs. For example, the lexical competition processes that take place during auditory comprehension are very different from those in reading. Conclusions about lexical processing based on reading often do not provide a satisfactory description of auditory comprehension. Further, the visual signal cannot address the inherent variation in the spoken signal, within individual speakers, across speakers, and across dialects. While letters are invariant across words (for a given font) the acoustic realization of phonemes is substantially variable (this continues to pose major challenges to computer speech recognition programs).

Second, Existing models of spoken word recognition need to be tested against large datasets. Much of the research performed thus far has focused on specific research questions. While this technique is extremely useful in finding answers to specific questions or testing hypotheses based on predictions from existing theories or models, it is not always sufficient for testing more general modeling questions. One of the challenges of these focused experiments is that item selection is not generally independent of the criterion imposed by the question (Cutler, 1981; Forster, 2000). Large datasets will allow researchers to find shortcomings and make revisions to existing models. If the goal is to create a new model that predicts the way in which words are recognized, then a large database of word recognition responses can be extremely useful (ten Bosch et al., 2013; Arnold et al., in progress).

The third reason is that compared to reading experiments, auditory experiments are extremely labor-intensive. This is perhaps the most relevant reason that the psycholinguistic aspects of auditory comprehension are under-researched compared to visual comprehension. It is relatively easy to create and control stimuli in a visual based experiment; whereas an experiment requiring the creation of auditory stimuli is often a complex multistep process. The labor-intensive nature of generating auditory

stimuli (described in Experiment 1) serves as a disincentive to perform such work; the data collected for the proposed megastudies will provide a resource for researchers engaging in such work.

The megastudies will contain responses from participants in an auditory lexical decision task (Goldinger, 1996; for a review), which has been an important experimental tool in language comprehension research for decades. Participants in this task judge whether an auditorily presented word is a real word of English (e.g., 'hand': yes; 'flark': no). This task generates two response variables: response latency (the time between stimulus onset and a button press response), and response accuracy (correct versus incorrect). These response variables are then used to infer how the brain processes and stores information about language.

Experiment 1 comprises productions of 26,000 words and 9,600 pronounceable pseudo-words by a male speaker of Western Canadian English for the auditory lexical decision task. Currently, a series of one-hour sessions are running in which participants listen and respond to subsets of 800 items. Sixty-five participants will be required to obtain one response for each real word item. With a minimum of four responses to any given item, a minimum of 260 native English speaking participants are required for data analysis and are being recruited from the Department of Linguistics subject pool.

The current project seeks to respond to the issues described above by extending and expanding the beginnings of the proposed megastudies. The resulting datasets will then be made publicly available to interested researchers as an open-source tool. There are 4 ways in which the proposed project builds on the existing project: (1) include recordings from additional speakers (age and gender), (2) include mark-up of acoustic signal from recordings, (3) include participants from additional dialects, and (4) include participants from more diverse ages. Each of these areas is discussed briefly below and the *Example Analyses* section briefly describes a few of the planned analyses which will make use of the data generated from this project.

Speakers: In addition to within speaker variation in the auditory domain, there is additional variation provided by different genders (male vs. female voices) and as a result of aging voices (young vs. old voices). Male and female voices cover different pitch ranges and make use of different acoustic space (e.g., Hillenbrand et al., 1995) to convey information about some speech sounds. As a result of aging the general physiology changes and the acoustic characteristics of the voice also change (Shock, 1962; Ramig & Ringel, 1983; Ryan & Burk, 1973). For example, older speakers have been reported to have slower speaking rates (Winkler et al., 2003), sex-dependent changes in F0 (pitch), shifts in formant frequencies, changes in voice onset time, and increased variability (e.g., Torre & Barlow, 2009). These changes introduce additional variation and indicate speaker age that are processed as part of the task of speech recognition (Walker & Hay, 2011). Stimuli recorded by a male and female speaker and by younger and older speakers will allow differences in the recognition of words produced by these voices to be investigated and models verified for speech from multiple speakers.

Acoustic mark-up: The database will include a text data frame with words and participant responses, as well as other variables of interest (e.g., frequency, neighborhood density, phonotactic probability). Importantly, for spoken stimuli, it will also include the audio files used to create the database along with a time-aligned markup indicating boundaries for the individual segments. The time-aligned markup along with the audio files will allow researcher to analyze the acoustic characteristics of specific items and investigate how they influence the recognition of the individual words. By providing the stimuli in such a way, we, as well as other researchers, can perform acoustic analyses and use them with other experimental tasks, when addressing a specific question.

Participant dialect: In existing visual studies differences in dialect do occur (Keuleers et al., 2012), though these are largely superficial and can be attributed to different lexical choice. However, much of the dialect differences reside in the actual speech signal. In Western Canadian English it is common to produce the words *Mazda* and *pasta* with the vowel /æ/ in the first syllable while in US English this vowel is generally produced as /ɑ/ (Boberg, 2009). Most of what we know about dialect differences resides in the acoustic analysis of dialect production (e.g., Clopper & Pisoni, 2006). However, an increasing amount of work has focused on the perception and processing of dialect (e.g., Clopper & Pisoni, 2008; Hay & Drager, 2010; Le et al., 2007; Niedzielski, 1999, Sumner & Samuel, 2009). The inclusion of participants of other dialects, will allow for investigation of aspects of how dialect affects word recognition. For example, we might predict that over the course of a one hour experiment participants will adapt to the foreign dialect, resulting in an improvement in their speed and accuracy (e.g., Clarke & Garrett, 2004)

Participant age: Research on aging often shows that older listeners are slower than their younger counterparts. This is often attributed to some sort of cognitive decline (e.g., Salthouse, 2011), though it is not always the case (e.g., Scharenborg & Janse, 2013; Ramscar et al., submitted). It is important that models of processing address language comprehension at all ages and not just the standard "university student" group, allowing for a more ecologically valid sample of the actual population being investigated (Libben & Libben, 2004). Thus, responses from a diversity of participant ages will allow for the investigation of how age affects spoken word recognition.

Example analyses: Megastudies of this sort allows for many possible analyses. I provide here a few examples that are currently planned. As a first example analysis, we have noted in my lab group that stop final devoicing seems to be a common characteristic in female speakers in the Edmonton area and is common in the speaker recorded for Experiment 2 (described briefly below). Items containing voiced and devoiced word final stops could be isolated from the database and analyzed to see how word-final devoicing affects recognition of words.

Generally, in a lexical decision experiment, experimenters have a fairly homogenous group of participants or if they have two groups (older or younger) word frequency is calculated as a characteristic of the word. However, if the older group is on average 60 years old and the younger group is 20 years old, the older group will have 40 years of additional experience compared to the younger group. It would then be reasonable to assume that word frequencies in the lexicon of this older group would be different than frequencies for the younger group. Using a corpus like the Corpus of Historical American English (Davies, 2010) age relevant frequencies will be calculated and compared to responses from the various ages proposed for Experiment 4. Results reported in Ramscar et al. (submitted) for visual processing (the English Lexicon Project) and Walker & Hay (2011) for auditory lexical decision indicate that age-adjusted measures do have an effect on modeling comprehension.

METHODOLOGY:
Each proposed experiment is briefly described in this section. "Experiment" here is used broadly to subdivide parts of the larger project.

Experiment 1: This experiment has stimuli recorded, extracted and is ready to begin running. Participants are being recruited from the Department of Linguistics participant pool. Modeled after the English Lexicon Project, participants are able to participate in up to 3 hours (3 experimental sessions or 2400 responses). This requires a large number of participants to reach sufficient power for statistical analysis. However, as Keuleers et al. (2010) point out, it is also experimentally valid for one participant to respond to all the words in the experiment. So that direct comparisons can be made between the two

methods of participant recruitment, 40 paid participants will be recruited who will respond to half of the total items in the experiment. We estimate that this will require about 33 hours per participant.

Item preparation: Speakers (one male and one female) were employed for approximately 20 weeks, and came to the Alberta Phonetics Laboratory daily for approximately two to three hours each day. In each recording session speakers produced between 1,500 and 3,000 words. Recording sessions for non-words were much slower and usually less than 1,000 were recorded in one two-hour session. This was due to the necessity of repeating the items multiple times in order for the speaker to develop some familiarity with producing each item. A researcher was present during the recordings to monitor production errors, hesitations (e.g. *a-apple*) or misreadings (e.g., *fodgey* instead of *fogey*). Care was taken to monitor and control for factors changing a speaker's voice, recordings were performed at the same time each day, if a speaker was sick recordings were not resumed until all symptoms were gone.

Once the recordings were completed, it was necessary to extract the individual words from the sound files. The Penn Phonetics Lab Forced Aligner (Yuan & Liberman, 2008), was used to automatically annotate the recordings and extract the individual files, which were then manually verified and corrected, to be sure that no errors were made. Funding for the item preparation was provided by a University of Alberta, Killam Cornerstone Grant. The final step, which has yet to be completed, is to use this alignment system to locate the segment boundaries within each of the stimuli, making additional phonetic information about the items available. This again will need to be verified to make sure errors do not exist.

Experiment 2: This experiment is an extension of Experiment 1. Stimuli for this experiment were recorded at the same time and from the same word list as the stimuli in Experiment 1 with a female speaker of Western Canadian English. Time and resources dictated that we focus on processing and preparing the stimuli for Experiment 1. As described above the individual items need to be isolated and extracted from the original recordings and the segmental mark-up needs to be done. Once complete, these items can then be used in the existing experimental setup. As in Experiment 1, 260 native English speaking participants will be recruited from the Department of Linguistics participant pool.

Experiment 3: This experiment will take the two existing experiments and run them both in three new locations. The first location will be in Tucson, Arizona, USA, the second will be the South Shore in Nova Scotia and the third location will be in Christchurch, New Zealand. Each location introduces different degrees of dialectal variation. There are strong differences between Western Canadian English and the English spoken in the Southwestern United States, though they carry more commonalities than differences. The differences between Western Canadian English and South Shore Nova Scotia allow for an investigation within a political boundary but for dialects that also have strong differences. However, the dialectal differences between Western Canadian English and New Zealand English are likely the largest. Thus we would predict different degrees of distinction in the reaction times and response accuracy between the dialects, partly due to experience with the dialect of the speaker. As in the previous experiments, participants will generally be students in their early 20s so that the data will be comparable to the data from the previous experiments. A total of 260 participants are planned to be run for each dialect (130 for each speaker in Experiments 1 and 2).

Experiment 4: The fourth experiment is designed to address the questions related to age differences in responses. In this experiment, we will recruit native English speaking participants from the greater Edmonton area with a focus on recruiting participants between the ages of 30 and 70 years of age. Ages will be divided by decade giving us 4 age groups (30s, 40s, 50s, and 60s). For each age group 260 participants will be recruited so that the numbers are comparable to Experiment 1, totaling 1,040

participants. We expect to be able to test for effects of age related cognitive decline and other possible age-related differences in this experiment such as experience and frequency.

Experiment 5: The final experiment will again replicate the basic design of the preceding experiments but with recordings of a new speaker in their 50s or 60s. This new set of recordings will be made following the procedures described in Experiment 1. In this experiment, we will investigate the effects of the aging voice (Shock, 1962; Ramig & Ringel, 1983; Ryan & Burk, 1973) on the spoken word recognition. This experiment will provide another dataset to compare to the data gathered from the first two speakers and may also show differences due to age related changes. Most research up until this point has focused on the recognition of words by older speakers (as in Experiment 4), but the work is limited for investigations of how different voices and more specifically older voices affect the recognition of speech. Ryan & Burk (1973) show that vocal age is reflected in the acoustic signal and can predict the perception of age. As with the previous studies, 260 participants will be run for this experiment in Edmonton so that comparisons can be made to Experiments 1 and 2.

Website: An integral part of this proposal is the dissemination of the data. As each experiment is completed, the data will be posted to a website dedicated to this project. The actual data will be archived locally in the University of Alberta Library electronic archive (ERA: https://era.library.ualberta.ca/) which will create permanent URLs for the data. The resultant database will have an ongoing update, such that the data will be released as soon as there are enough participants for analysis. Then as more datasets are available, they will also be published to the same website, creating more recent versions of the datasets so that users can access the different dataset versions.

A timeline of the proposed project is provided below. Abbreviations for the table are: Undergraduate (UG), Graduate (G), PostDoc (PD), Website Creation (Web). The numbers provided in the timeline indicate when various parts each of the five experiments are planned.

Proposed timeline:

	Year 1		Year 2		Year 3		Year 4		Year 5	
Semester	**Fall**	**Wint.**	**Fall**	**Wint.**	**Fall**	**Wint.**	**Fall**	**Wint.**	**Fall**	**Wint.**
Personnel	UG		UG, G, PD		UG, G, PD		UG, G		UG, G	
Experiment Preparation	2	2		5	5	5				
Experiment	1	1	1,2	2, 4	2, 4	3 (AZ, NS), 4	3 (NZ), 4	4, 5	4, 5	
Experiment Analysis			1	1	1, 2	2	2	3	3	3, 4, 5
Dissemination			Web	1	1	1, 2	2	2, 3	3	3, 4, 5

Existing infrastructure
The Department of Linguistics at the University of Alberta has excellent facilities for the research envisioned in this proposal. The Alberta Phonetics Laboratory has facilities for recording and running participants in the experiments locally, though some computers are in need of updating. The necessary infrastructure is also available in the other locations where participants' data is to be recorded. Necessary infrastructure is already in place at the University of Alberta for the creation of a website dedicated to this project and to be used for the dissemination of the resultant datasets.

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Knowledge Mobilization Plan

One of the main goals of the proposed research is to make the results of the proposed megastudies publicly available, "The Spoken English Lexicon Project", which can be used by other researchers to explore aspects of spoken word recognition making, knowledge mobilization a key component of this project. One of the main methods through which the knowledge and resources gained from this project will be disseminated is through the project website made available specifically to researchers but more generally to all interested individuals, following open access principles. The site will provide basic information, metadata, describing the database and how it was created, in addition to commonly accessible formats of the final data (e.g. Text, Excel, and R data frame). The final data will be hosted and stored for long term preservation purposes on the University of Alberta's institutional repository, Education & Research Archive (ERA). ERA will provide a permanent URL for the resultant data files and ERA will take on responsibility for preservation of the data as technology changes. ERA and the website also track usage statistics, providing usage information on the resultant datasets.
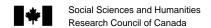
The results of this research will be presented at international and national conferences such as the Acoustical Society of America, Psychonomic Society, Laboratory Phonology, the Linguistic Society of America, American Speech and Hearing Sciences, International Congress on Phonetic Sciences, InterSPEECH, Alberta Conference on Language, Mental Lexicon (international but held in Canada), Canadian Acoustic Association, and the Canadian Linguistic Association. Whenever possible, students participating in this project will participate in these meetings. These conferences focus not only on Linguistic audiences but also Psychology, Speech Pathology, and Speech Technology, who will also have an interest in the results of this research. Publications will be submitted to journals such as *Behavioral Research Methods, Ear and Hearing, the Journal of the Acoustical Society of America*, the *Journal of Memory and Language*, the *Journal of Phonetics*, *Language and Cognitive Processes*, *Language and Speech*, *Brain and Language*. Publications and presentations resulting from this project will be archived on ERA and linked on the project webpage. Following, the notions of reproducible research (AAAS 2011, http://www.stanford.edu/~vcs/AAAS2011/), "paper packages" containing the information (datasets, scripts, statistical analysis scripts, etc…) necessary for recreating the work will also be archived and made available. Links to the project webpage will also be distributed as part of presentations and announcements will be made on appropriate lists (such as LinguistList).

It is expected that students in introductory graduate phonetics, psycholinguistics, and statistics courses will use this resource to run virtual experiments for term papers and other projects. It is hoped that by allowing students to have a more hands on experience with full datasets and doing analyses will allow them to better understanding the material and lead to possible publications.

Knowledge Mobilization Schedule

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6 (PG)
Data Release		1	2	3	4	5
Presentations		1	1, 2	1, 2, 3	2, 3, 4	2, 3, 4, 5
Publications		Website, 1	2	3	4, 5	5

Numbers in the schedule indicate individual experiments in the detailed description. Data release indicates that data will be posted to ERA and with links on the project website. Further announcements will be sent out to the appropriate audience upon data release.

Family name, Given name
Tucker, Benjamin

Expected Outcomes
Elaborate on the potential benefits and/or outcomes of your proposed research and/or related activities.

Scholarly Benefits
Indicate and rank up to 3 scholarly benefits relevant to your proposal.

Rank	Benefit	If "Other", specify
1	Knowledge creation/intellectual outcomes	
2	Enhanced research methods	
3	Enhanced theory	

Social Benefits
Indicate and rank up to 3 social benefits relevant to your proposal.

Rank	Benefit	If "Other", specify
1	Technological outcomes	
2	New or enhanced partnerships	
3		

Audiences
Indicate and rank up to 5 potential target audiences relevant to your proposal.

Rank	Audience	If "Other", specify
1	Professional and/or scholarly associations	
2	Students	
3	General public	
4		
5		

Personal information will be stored in the Personal Information Bank for the appropriate program.

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Canada

Social Sciences and Humanities
Research Council of Canada

Conseil de recherches en
sciences humaines du Canada

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Expected Outcomes Summary

Describe the potential benefits/outcomes (e.g., evolution, effects, potential learning, implications) that could emerge from the proposed research and/or other partnership activities.

It is expected that we will gain knowledge with regard to how dialects of English that are particularly difficult to understand and ways in which that difficulty can be overcome. It is also expected that the results will provide insight into the effects of the aging voice and mind on spoken word recognition. It is important to understand how changes related to aging affect the voice but also how those changes affect comprehension. It is possible that it is easier for young listeners to recognize words from an older voice. Perhaps, there are benefits for certain types of words while others are more difficult to recognize. The results will also be used in the creation and testing of models of spoken word recognition. It is important to understand what aspects of speech that humans use to recognize the incoming speech stream.

An expected outcome of the proposed project are datasets from the proposed megastudies containing word recognition response latencies and response accuracy, "the Spoken English Lexicon". This database will be made available online to all potential researchers who would like to use it. Multiple aspects of this project not only address the need for an auditory word recognition megastudy but it also expands the megastudy across ages, various speakers and dialect recognition. The proposed database also has the potential to be useful in research by speech pathologists, psychologists and language technology. For example, speech pathology researchers might use the results of the present research to create control trials to compare spoken word recognition of disordered populations to non-disordered populations. For example, the effects of stroke on listeners can be compared to age matched listeners in this study, allowing these researchers to focus their work on the disordered population.

Understanding how listeners recognize speech has the potential to influence the domain of computer speech recognition. In this domain, designers of automatic speech recognition systems can be designed to take advantage of the same cues that listeners use to recognize speech. Further, designers of speech synthesis systems can use the recognition results in the proposed database to create "smart" synthesis that maximizes the acoustic signal such that it is easier to recognize for listeners.

One of the expected outcomes is the training of young researchers. This is an important part of the proposed project. It is expected that one postdoctoral researcher, two graduate students, and between 6-10 undergraduate students will receive training directly from this research project. The skills learned by these individuals will largely be specific to research, however they will also learn important analytically and research related skills that will benefit them in whatever career path they choose to follow. It is also expected that this project will influence a large number of young researchers and students indirectly (as mentioned in the Knowledge Mobilization Plan). When the database is used as a teaching tool in classes and as young researchers use the database it will allow them to "get their feet wet" as they analyze data for the first time and perform their own virtual experiments with the data.

Personal information will be stored in the Personal Information Bank for the appropriate program.

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Research Team, proposed student training and previous output

A. Description of the research team
A team approach is essential to this project. The acquisition of data from various dialects and thus locations requires a collaborative approach so that data can be acquired more efficiently. Just as importantly, a collaborative approach allows us as a research team to bring together our combined experience and knowledge as we consider the questions posed in this research project and other question that can be investigated with the data collected.

Benjamin V. Tucker, Applicant. Dr. Tucker is an expert in phonetics and psycholinguistics. His research focuses on the phonetic aspects of spoken word recognition and the production and recognition of spontaneous speech. The applicant will be responsible for the management and direction of the research project, development of experiments, daily supervision of the postdoctoral researcher and students, statistical analyses, and dissemination of results. Of the time available to the applicant for research, 50% will be allotted to this project.

R. Harald Baayen, Collaborator. Dr. Baayen contributed to the initial development of the experimental design and the creation of the items and will continue to provide feedback on the experiment and its design. He is an expert in quantitative analysis of linguistic data with areas of emphasis being psycholinguistics and morphology. His primary contribution will be in the analysis of the data and in the creation and testing of models of spoken word-recognition. Of the time available to the Dr. Baayen for research, 5% will be allocated to this research project.

Kara Hawthorne, Collaborator. Dr. Hawthorne is currently a Postdoctoral researcher in the Department of Linguistics at the University of Alberta and has participated in the development of the first experiment described in the Detailed Description. It is expected that she will continue her collaboration in terms of helping create and develop the proposed experiments. Of the time available to the Dr. Hawthorne for research, 5% will be allocated to this research project.

Jennifer Hay, Collaborator. Dr. Hay is an expert in sociophonetics and has investigated the influence of dialect and age on speech perception. Her main role in this project, in addition to providing expert feedback on the analysis of age and dialect, will be to host a graduate student for three months while data is gathered in Christchurch, NZ. Of the time available to the Dr. Hay for research, 5% will be allocated to this research project.

Michael Kiefte, Collaborator. Dr. Kiefte is an expert in speech perception and has recently collected a large corpus of spontaneous speech in Nova Scotia documenting the dialects of the region. He has implemented and used a forced alignment method to segment the phones in his data. His knowledge of Nova Scotian dialects will be essential as he hosts a graduate student for three months during which data will be collected from speakers on the South Shore. Of the time available to the Dr. Kiefte for research, 5% will be allocated to this research project.

Terrance Nearey, Collaborator. Dr. Nearey and the applicant have previously collaborated on SSHRC funded research. Dr. Nearey is an expert in the area of speech perception and the creation of statistical models of speech production. Of the time available to the Dr. Nearey for research, 5% will be allocated to this research project.

Natasha Warner, Collaborator. Dr. Warner and the applicant have a long history of collaboration. Her main role in this project will be to host a graduate student for three months while that student runs participants in Arizona. She is an expert phonetician investigating spoken word recognition and has valuable experience managing large projects designed to gather large amounts of data.

She will also provide feedback and insight on the development and analysis of the data. Of the time available to the Dr. Warner for research, 5% will be allocated to this research project.

The research team will also include two graduate students and a postdoctoral fellow. These individuals will be essential in accomplishing the goals of this proposal. There will also be two undergraduate research assistants who will have the opportunity to participate and contribute to the proposed research.

B. Description of previous and ongoing research results
The applicant in collaboration with Dr. Baayen received a Killam Cornerstone grant from the University of Alberta which provided initial funds to allow for the creation of what has been labeled Experiment 1 in the Detailed Description. While, the funding for this project ended in 2012 (it was intended to help initiate this project), this has been an ongoing project, and the first group of participants is currently being run in the applicant's lab.

The applicant has recently completed a SSHRC funded 1 year Standard Research Grant entitled: "Fine acoustic detail of stem vowels in English regular and irregular verbs". This project identified many aspects of the fine acoustic detail that are relevant in the production of English verbs. The results of this project are currently being prepared as journal submissions (*Journal of Phonetics* and the *Journal of the Acoustical Society of America*) and one report has been published in the conference proceedings of the Canadian Acoustical Association in their journal *Canadian Acoustics*. The results have been disseminated at international conferences (Canadian Acoustical Association, Mental Lexicon Conference, and the International Cognitive Linguistics Conference) and invited talks given by the applicant (Arizona and Germany). Further, parts of this project have been expanded and have become part of a dissertation, under the supervision of the applicant, focussing on this topic.

The applicant is also in the final year of a SSHRC Individual Insight Development Grant entitled: "The role of phonetic reduction on spoken word recognition". This grant builds from the applicant's previous work (Tucker, 2011; Warner & Tucker, 2011; Warner, Fountain, & Tucker, 2009) and investigates aspects of the processing of word-medial stops. The experiments in this project have been completed and data analysis is in progress. Preliminary results of this work have been presented at the International Congress on Acoustics and a proceedings paper published. Further data analysis is underway and manuscripts for submission will be prepared in this final year. Additionally an Undergraduate Honors Thesis has been supported and produced a part of this project (Podlubny, 2013).

The applicant is also the co-principal investigator in two other grants. The first, in collaboration with Dr. Karen Pollack, is designed to create online teaching materials for an introductory phonetics class. The second grant with Dr. Juhani Järvikivi, is an 18 month collaborative grant with seven collaborators from the University of Alberta. The grant is designed to create a multi-modal corpus of spontaneous speech, investigating aspects of the speech, gesture and the way in which information is communicated and processed. Both of these projects were awarded funding in the spring of 2013 and are just getting underway.

The applicant is a collaborator on a grant held by the collaborator, Dr. Warner. This is a 4 year grant (ending in 2014), funded by the National Science Foundation investigating the recognition of reduction in multiple dialects and by second language speakers. Preliminary findings from this work have been and will be presented at Acoustical Society of America meetings and portions of this project are currently being prepared for submission. This project, as with the proposed

project, involved several offsite experimental locations in which students travelled to various locations to gather data.

The applicant and collaborator, Dr. Hawthorne, along with Dr. Juhani Järvikivi are currently pursuing work which investigates the processing of prosodically accented speech across ages as part of Dr. Hawthorne's postdoctoral fellowship.

International collaborator, Dr. Baayen, has worked and published extensively on both visual and auditory comprehension. He is the recent recipient of a prestigious Alexander von Humboldt award and is pursuing work on modeling of language from a discriminative learning perspective. He is also an expert on the statistical analysis of experimental and naturalistic data. The collaborator and the applicant have several ongoing projects. Most relevant to this application is work with a Dr. Denis Arnold (Postdoctoral researcher supervised by Dr. Baayen) on creating a model of spoken word recognition using notions of information theory and learning, following successful work in modeling reading by the collaborator (Baayen et al., 2011).

C. Description of proposed student training strategies
Postdoctoral, Graduate student and undergraduate student involvement and training are an integral part of this project and a central goal of the applicant's lab. We expect to have two graduate research assistants, whose dissertations would be supervised by the applicant, working closely with the applicant and other members of the research team throughout this project. Graduate students will be involved in all aspects of the project and as part of their training they will be given responsibility for many aspects of the project under the supervision of the applicant and the postdoctoral researcher.

The postdoctoral researcher will be employed to assist the PI in years 2 and 3 of the project with the analysis of the first experiment, the development of the website, the development and creation of the experiments, recording of Experiment 5, training and working with the graduate students. The postdoctoral researcher will also work on analysis of the first and second experiments (additional description is provided in the description of the training strategies).

This grant, in many ways, is designed around training graduate students. For example the budget: since the SSHRC notification of award often occurs after incoming graduate students have been accepted to the program, the first year of this proposal includes funding for undergraduate students. This will provide the applicant a full year to recruit specific graduate students to be members of this research team, who will then work as members of this project for the four years of their degree. It is expected that these Graduate student will make use of aspects of the proposed project to feed into their dissertations.

An important aspect of this proposal with regard to training is the research visits to the University of Arizona, University of Canterbury, and Dalhousie University. While the main purpose of the research visits is to gather data, these visits will also provide the graduate students with an invaluable opportunity to meet new researchers and to see how other universities and research laboratories function. They will have the opportunity to talk about and potentially present their research during these visits, which will help them develop their ideas and abilities to discuss their work. This will also provide students an opportunity to create relationships with internationally renowned scholars working in the related areas and create the opportunity for collaboration not only within the scope of this project but outside it as well.
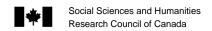
Each graduate student will be assigned to specific parts of the project (e.g., one for Experiment 3 and 5 [will travel to New Zealand and Halifax] and one for Experiments 4 and 5 [will also travel

to Tucson]). It is expected that over the course of the project graduate students will acquire the following important research skills, classified into five groups: scripting, acoustic analysis, experimental design, data analysis, and research dissemination. Students will learn basic skills in working with speech corpora such as extracting data from a corpus using Python, R and Praat scripts. Many of our students come equipped with basic knowledge of how to extract data from custom built corpus interfaces. However, for many research questions such interfaces are inadequate. The students and postdoc on this project will receive extensive training and hands on experience with scripting. With respect to acoustic analysis, students will acquire expertise in: manual speech segmentation, use of a forced alignment system for automatic segmentation, acoustic data extraction from the speech signal. Students will learn to use E-prime and other relevant software packages for experimental design, running the tasks, stimulus design and preparation. As part of the analysis portion of this project students will learn to use state of the art advanced statistical data analysis methods such as: Linear mixed-effects regression, General Additive Modeling, and Random Forrest Analysis.

In order for this project to be implemented efficiently students will meet with the applicant at weekly research project meetings in addition to regular individual meetings. They will work together in developing and creating each portion of the research. As the students work through their responsibilities at various stages of this project, they will have the opportunity to apply the skills they are learning and work through any possible challenges. They will also have regular opportunities to report back to the applicant regarding their responsibilities and work on questions they may have. Graduate students will be involved in all aspects of the dissemination of the results: this will range from presentations at conferences, manuscript preparation, and the review process. It is expected that the students will also be lead author on many of the resultant publications. It is expected that the graduate students' own lines of research, carried out as part of their PhD track, will develop in synergy with the project. As the graduate students work with the undergraduate students they will also receive training in supervision, mentorship and leadership.

Undergraduate student involvement is also an essential part of the project, which is an ongoing commitment in the applicant's laboratory, where there are normally 4-6 undergraduate students participating in research. Undergraduates will largely be responsible for processing the stimuli as they are prepared and for running participants. They will also have the opportunity to be involved in the analysis of the resultant data. Undergraduate students will be recruited regularly over the full period of the project. These undergraduate students will also receive training, and will work in close collaboration with the graduate students and the applicant. This interactive learning environment will help prepare the students for future work in an academic or other analytical career. Undergraduate students will also be encouraged to explore related areas of research for honors theses and other research projects.

The postdoctoral researcher, graduate students and undergraduate students in the project will also be involved in weekly lab meetings where research presentations will occur. A video conference system is also available which will be used to allow members of the research team to meet and work on collaborations. In addition to presentations in a lab meeting setting, students will also be given the opportunity to present aspects of their research at conferences. For the undergraduate students, the Alberta Conference on Language, a provincial conference with students and faculty from the University of Alberta, University of Calgary and University of Lethbridge, is an excellent venue. Graduate students will also participate in at least one national and one international conference.

Family name, Given name
Tucker, Benjamin

Funds Requested from SSHRC

For each budget year, estimate as accurately as possible the research costs that you are asking SSHRC to fund through a grant. For each Personnel costs category, enter the number of individuals to be hired and specify the total amount required. For each of the other categories, enter the total amount required.

Personnel costs	Year 1 No.	Year 1 Amount	Year 2 No.	Year 2 Amount	Year 3 No.	Year 3 Amount	Year 4 No.	Year 4 Amount	Year 5 No.	Year 5 Amount
Student salaries and benefits/Stipends										
Undergraduate	2	16,500	2	16,830	2	17,166	2	17,510	2	17,860
Masters										
Doctorate	0	0	2	32,240	2	32,885	2	33,543	2	34,213
Non-student salaries and benefits/Stipends										
Postdoctoral	0	0	1	41,391	1	41,391	0	0	0	0
Other	0	0	1	1,782	0	0	0	0	0	0

Travel and subsistence costs	Year 1	Year 2	Year 3	Year 4	Year 5
Applicant/Team member(s)					
Canadian travel	0	0	2,020	1,930	2,020
Foreign travel	0	0	4,290	5,040	4,990
Students					
Canadian travel	0	0	8,470	2,130	2,220
Foreign travel	0	0	10,040	11,790	4,290

Other expenses

	Year 1	Year 2	Year 3	Year 4	Year 5
Professional/Technical services					
Supplies	500	500	500	500	500
Non-disposable equipment					
Computer hardware	4,800	4,800	0	0	0
Other					
Other expenses (specify)					
Software	300	300	300	300	300
Participant Fees	15,600	10,400	5,200	2,600	0
Dissemination Costs	0	0	600	600	600
Total	37,700	108,243	122,862	75,943	66,993

Application WEB

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Budget Justification

Personnel Costs
Undergraduate Researchers: Two undergraduate students (quoted at the department standard $15 per hour for a total of 500 hours per year) over the course of the full five years of the grant. A 10% non-discretionary benefits charge has been added. An inflation adjustment of 2% per year has been added for subsequent years. *Y1*: $16,500, *Y2*: $16,830, *Y3*: $17,166, *Y4*: $17,510, *Y5*: $17,860

Doctoral Researchers: We expect to employ two graduate students for the last four years of this project (12 hours per week, for two semesters a year) providing the applicant a full year to recruit appropriate Graduate students to join the research team. The students will work as members of the project for the four years of their degree program. An inflation adjustment of 2% per year has been added for subsequent years. *Y1*: 0, *Y2*: $32,240, *Y3*: $32,885, *Y4*: $33,543, *Y5*: $34,213

Postdoctoral Researcher: In years 2 and 3 money has been budgeted for a postdoctoral researcher. This person will assist the PI in the beginning of the project as it is often the busiest, in addition to the size of the proposed project and the large number of participants. The Postdoctoral researcher will work on analysis of the first and second experiments (see also Training strategies). A salary of $40,000 is budgeted for each year with $1,391 for benefits. *Y2*: $41,391, *Y3*: $41,391

Speaker fees: One speaker (age 50-70, Exp. 5) will be hired to produce the 26,000 words and 9,600 pseudo-words in a high quality recording booth. The speaker will be recorded daily in two to three hour blocks. The speaker should be able to comfortably produce approximately 700 words or 300 non-words in an hour. It is estimated that the speaker will be recorded for 90hrs over a 9 week period (70hrs original recordings plus 20hrs rerecording mispronounced items). The speaker will be paid $18 per hour plus 10% for benefits, totalling: **$1,782**.

Travel and subsistence costs [including fieldwork]
Applicant
Dissemination: The travel section of the budget is based on estimated costs for the following conferences: Acoustical Society of America (ASA), Psychonomic Society, Canadian Acoustical Association (CAA), Laboratory Phonology (LabPhon), and INTERSPEECH. It is expected that results from Experiment 1 will be ready for presentation in Year 3. Each trip assumes a 5-night stay at $130 per night and a 6 day per diem allowance at $45, as per University of Alberta requirements. The average duration of these conferences is 4-5 days. All flights are estimates based on location, where available.

Year 3 **ACOL** (Canada): Oct. 2016 TBD, Alberta; Travel $50; Room $50 (times 3 students)
Mental Lexicon Conference (Canada): Oct. 2016 Air $750; Ground $100; Per Diem $270; Room $650; Registration $250 for PI, $150 for student
Psychonomics (foreign): Nov. 2016, Boston, MA; Air $900; Ground $100; Per Diem $270; Room $650; Free for society members
ASA (foreign): May 2017 TBD; Air $1000; Ground $100; Per Diem $270; Room $650; Registration $350 for PI, free for student
Year 4 **CLA** (Canada): June 2017 TBD; Air $750; Ground $100; Per Diem $270; Room $650; Registration $160 for PI, $60 for student
ACOL (Canada): Oct. 2017 TBD, Alberta; Travel $50; Room $50 (times 3 students)
INTERSPEECH (foreign): Nov. 2017, TBD, Air $1000; Ground $100; Per Diem $270; Room $650; Registration $650 for PI, $350 for student
ASA (foreign): May 2018 TBD; Air $1000; Ground $100; Per Diem $270; Room $650; Registration $350 for PI, free for student

Year 5 **LabPhon** (foreign): Summer 2018 TBD; Air $1000; Ground $100; Per Diem $270; Room
$650; Registration $600 for PI, $250 for student
ACOL (Canada): Oct. 2018 TBD, Alberta; Travel $50; Room $50 (times 3 students)
Mental Lexicon Conference (Canada): Oct. 2018 Air $750; Ground $100; Per Diem $270;
Room $650; Registration $250 for PI, $150 for student
ASA (foreign): May 2019 TBD; Air $1000; Ground $100; Per Diem $270; Room $650;
Registration $350 for PI, free for student

Student
Dissemination: Student travel is an essential part of research dissemination. One student will
accompany the PI on each trip listed for the applicant above, which is a crucial component of graduate-student training. Costs will be identical to above, ACOL only requested for students.

Field work: Three fieldwork trips are planned to Christchurch, New Zealand (Y4); Tucson, AZ, USA
(Y3), and Halifax, Nova Scotia (Y3). Each trip will be for three months (9 months total), total cost is
estimated based on airfare and a living stipend ($1,800 per month).
Airfare: Tucson, $700; Halifax, $850; Christchurch, $2000   **Total: $19,750**

Other expenses
Supplies
The following supplies are for experiment and research related expenses, such as: media for recording
of data during the production experiments and printing of research articles. Estimated at $500 per year,
equipment sanitizer, cables, compact flash media.   **Total: $2,500**

Non-disposable equipment
Computer Hardware: Three computer work stations (CPU and monitor) in year one and three in year
two. The first three are to replace existing experimental machines which were purchased in 2008 and
will need to be replaced. The second set of three are for workstations for data cleaning, structuring,
analysis, and website creation/maintenance to be used by the postdoctoral and doctoral researchers.
Price is based on a quote from a local distributor ($1,600 per workstation). **Total: $9,600**

Other Expenses (specify)
Computer Software
MATLAB   4 Network License $75: (times 5 years): $300

Other Communication
Manuscript and poster preparation costs: $600 for the last three years.   **Total: $1,800**

Experiment participant fees
Estimated at $10/hour, for a total of 3,404 estimated participant hours. For the participants in
Experiment 1 there is a $60 finishing bonus to encourage the participants to continue to the end of the
experiment ($60 * 40 = $2,400). No participant fees are requested for participants that can be recruited
from the University of Alberta participant pool.
Y1: $15,600;   Y2: $10,400;   Y3: $5,200;   Y4: $2,600;   Y5: $0

Research Tools = **$72,349**

Undergraduate Researcher	20% of total time: data cleaning and structuring	$17,173
Graduate Researcher	20% of total time: data cleaning and structuring	$26,576
Postdoctoral Researcher	30% of total time: website, data cleaning	$24,000
3 Computers	Data cleaning and structuring, website	$4,600

The contribution of the budget to the creation of a research tool has been calculated for cleaning and
structuring resultant datasets and website creation for dissemination. Listed expenses are included in
appropriate categories above and the portion contributing to the research tool is indicated here.

Funds from Other Sources

You must include all other sources of funding for the proposed research. Indicate whether these funds have been confirmed or not. Where applicable, include (a) the partners' material contributions (e.g. cash and in-kind), and (b) funds you have requested from other sources for proposed research related to this application.

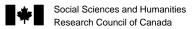| Full organization name Contribution type	Confirmed	Year 1 Year 5	Year 2	Year 3	Year 4
	☐				
	☐				
	☐				
	☐				
	☐				
	☐				
	☐				
	☐				
	☐				
Total funds from other sources		0	0	0	0
		0			

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Application WEB

Canada

Suggested Assessors

List Canadian or foreign specialists whom SSHRC may ask to assess your proposal.

List keywords that best describe the assessor's areas of research expertise. Please refer to the Suggested Assessors section of the detailed instructions for more information on conflicts of interest.

Family name	Given name	Initials	Title
Russell	Kevin		Professor

Org. code	Full organization name	Keywords
	University of Manitoba	spoken word recognition, phonetics, phonology

Department/Division name	Address
Department of Linguistics	Linguistics Department University of Manitoba

	Country code	Area code	Number	Extension	City/Municipality	Prov./State	Postal/Zip code
					Winnipeg	MB	R3T2N2
Telephone number	1	204	4749620		Country CANADA		
Fax number	1	204	4747671				

E-mail Kevin_Russell@umanitoba.ca

Family name	Given name	Initials	Title
Johnson	Kieth		Professor

Org. code	Full organization name	Keywords
	University of California, Berkeley	phonetics, speech perception, dialect

Department/Division name	Address
Department of Linguistics	Department of Linguistics University of California, Berkeley

	Country code	Area code	Number	Extension	City/Municipality	Prov./State	Postal/Zip code
					Berkeley	CA	94720
Telephone number	1	510	6437617		Country UNITED STATES		
Fax number							

E-mail keithjohnson@berkeley.edu

Family name	Given name	Initials	Title

Org. code	Full organization name	Keywords

Department/Division name	Address

	Country code	Area code	Number	Extension	City/Municipality	Prov./State	Postal/Zip code
Telephone number					Country		
Fax number							

E-mail

Application WEB

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	Social Sciences and Humanities Research Council of Canada	Conseil de recherches en sciences humaines du Canada

Internal use	CID (if known)
■	■

Identification

Only the information in the Name section will be made available to selection committee members and external assessors. Citizenship and Statistical and Administrative Information will be used by SSHRC for administrative and statistical purposes only. Filling out the statistical and Administrative Information section is optional.

Name

Family name	Given name	Initials	Title
Tucker	Benjamin	V.	Dr.

Citizenship - Applicants and co-applicants must indicate their citizenship status by checking and answering the applicable questions.

Citizenship status	◯ Canadian	⦿ Permanent resident since (yyyy/mm/dd) 2009/08/17	◯ Other (country) _____	Have you applied for permanent residency? ◯ Yes ◯ No

Statistical and Administrative Information

Birth year	Gender	Permanent postal code in Canada (i.e. K2P1G4)	Correspondence language	Previous contact with SSHRC? (i.e. applicant, assessor, etc.)
1977	◯ F ⦿ M	T6E2M1	⦿ English ◯ French	⦿ Yes ◯ No

Full name used during previous contact, if different from above

Contact Information

The following information will help us to contact you more rapidly. Secondary information will not be released by SSHRC without your express consent.

Primary telephone number				Secondary telephone number			
Country code	Area code	Number	Extension	Country code	Area code	Number	Extension
	780	492-5952					

Primary fax number				Secondary fax number			
Country code	Area code	Number	Extension	Country code	Area code	Number	Extension
	780	492-0806					

Primary E-mail	bvtucker@ualberta.ca
Secondary E-mail	

Personal information will be stored in the Personal Information Bank for the appropriate program.

Do not photocopy this page.

Family name, Given name

Tucker, Benjamin

Current Address

Use only if you are not affiliated with a department at a Canadian university. (If you are affiliated with a department at a Canadian university, the department's mailing address will be used.) If you wish to use another address, specify it under the Correspondence Address.

Correspondence Address

Complete this section if you wish your correspondence to be sent to an address other than your current address.

Address

Address

City/Municipality	Prov. / State	Postal/Zip code

Country   CANADA

City/Municipality	Prov. / State	Postal/Zip code

Country

Temporary Address

If providing a temporary address, phone number and/or E-mail, ensure that you enter the effective dates.

Permanent Address in CANADA

Address

Address

City/Municipality	Prov./ State	

City/Municipality	Prov./ State	Postal/Zip code

Country

Country

Start date (yyyy/mm/dd)	End date (yyyy/mm/dd)	Temporary telephone/fax number
		Country code Area code Number Extension

Temporary E-mail

Web CV

Social Sciences and Humanities
Research Council of Canada

Conseil de recherches en
sciences humaines du Canada

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Family name, Given name

Tucker, Benjamin

Research Expertise (optional)

The information provided in this section refers to your own research expertise, not to a research proposal. Filling out the following 4 sections is optional. This page will not be seen by selection committee members and external assessors. This section will be used for planning and evaluating programs, producing statistics, and selecting external assessors and committee members.

Areas of Research

Indicate and rank up to 3 areas of research that best correspond to your research interests as well as areas where your research interests would apply. Duplicate entries are not permitted.

Rank	Code	Area
1	120	Communication
2	360	Science and technology
3		

Temporal Periods

If applicable, indicate up to 2 historical periods covered by your research interests.

From				To			
Year	BC	AD		**Year**	BC	AD	
————	○	○		————	○	○	
————	○	○		————	○	○	

Geographical Regions

If applicable, indicate and rank up to 3 geographical regions covered by your research interests. Duplicate entries are not permitted.

Rank	Code	Region
1	1000	North America
2		
3		

Countries

If applicable, indicate and rank up to 5 countries covered by your research interests. Duplicate entries are not permitted.

Rank	Code	Countries	Prov./State
1	1100	CANADA	
2	1200	UNITED STATES	
3	3313	ROMANIA	
4	3206	GERMANY	
5			

Web CV

Curriculum Vitae

Family name, Given name

Tucker, Benjamin

Language Proficiency

	Read	Write	Speak	Comprehend aurally	Other languages
English	**X**	**X**	**X**	**X**	Romanian: read, write, speak, comprehend aurally
French	**X**	☐	☐	**X**	

Work Experience

List the positions, academic and non-academic, you have held beginning with the current position and all previous positions in reverse chronological order, based on the start year.

Current position	Start date (yyyy/mm)
Associate Professor	2013/7

Org. code	Full organization name
1480111	University of Alberta

Department/Division name

Linguistics

Position type	● Tenured ○ Non-tenure	Employment status	● Full-time ○ Part-time
	○ Tenure-track ○ Non-academic		○ Non-salaried ○ Leave of absence

Position	Start date (yyyy/mm)	End date (yyyy/mm)
Adjunct professor	2013/1	

Org. code	Full organization name
1480111	University of Alberta

Department/Division name

Speech Pathology and Audiology

Position	Start date (yyyy/mm)	End date (yyyy/mm)
External Collaborator	2011/9	

Org. code	Full organization name
9147111	Eberhard Karls Universität Tübingen

Department/division name

Quantitative Linguistics

Position	Start date (yyyy/mm)	End date (yyyy/mm)
Interim Director	2010/8	2011/8

Org. code	Full organization name
1480111	University of Alberta

Department/Division name

Canadian Indigenous Languages and Literacy Development Institute

Web CV

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Family name, Given name

Tucker, Benjamin

Work Experience (cont'd)

Position	Start date (yyyy/mm)	End date (yyyy/mm)
Editor	2007/10	

Org. code	Full organization name
1	Linguistics Abstracts

Department/Division name
NA

Position	Start date (yyyy/mm)	End date (yyyy/mm)
Assistant Professor	2007/7	2013/7

Org. code	Full organization name
1480111	University of Alberta

Department/Division name
Linguistics

Position	Start date (yyyy/mm)	End date (yyyy/mm)
Consultant	2007/10	2007/10

Org. code	Full organization name
1	The Coushatta Tribe of Louisiana

Department/Division name
Coushatta Language Program

Position	Start date (yyyy/mm)	End date (yyyy/mm)
Research Assistant	2005/10	2007/10

Org. code	Full organization name
9976101	University of Arizona

Department/Division name
English

Position	Start date (yyyy/mm)	End date (yyyy/mm)
Research Assistant	2001/10	2007/10

Org. code	Full organization name
9976101	University of Arizona

Department/Division name
Linguistics

Web CV

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Academic Background

List up to 5 degrees, beginning with the highest degree first and all others in reverse chronological order, based on the start date.

Degree type	Degree name	Start date (yyyy/mm)	Expected date (yyyy/mm)	Awarded date (yyyy/mm)
Doctorate		2003/08		2007/06

Disc. code	Discipline	Did SSHRC support enable you to get this degree?
62400	Linguistics	◯ Yes ⦿ No

Org. code	Organization
9976101	University of Arizona

Country	UNITED STATES

Degree type	Degree name	Start date (yyyy/mm)	Expected date (yyyy/mm)	Awarded date (yyyy/mm)
Master's		2003/08		2005/07

Disc. code	Discipline	Did SSHRC support enable you to get this degree?
62400	Linguistics	◯ Yes ⦿ No

Org. code	Organization
9976101	University of Arizona

Country	UNITED STATES

Degree type	Degree name	Start date (yyyy/mm)	Expected date (yyyy/mm)	Awarded date (yyyy/mm)
BA Gen.		1999/01		2002/12

Disc. code	Discipline	Did SSHRC support enable you to get this degree?
62400	Linguistics	◯ Yes ⦿ No

Org. code	Organization
9976101	University of Arizona

Country	UNITED STATES

Degree type	Degree name	Start date (yyyy/mm)	Expected date (yyyy/mm)	Awarded date (yyyy/mm)

Disc. code	Discipline	Did SSHRC support enable you to get this degree?
		◯ Yes ◯ No

Org. code	Organization

Country	

Degree type	Degree name	Start date (yyyy/mm)	Expected date (yyyy/mm)	Awarded date (yyyy/mm)

Disc. code	Discipline	Did SSHRC support enable you to get this degree?
		◯ Yes ◯ No

Org. code	Organization

Country	

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Web CV

Family name, Given name
Tucker, Benjamin

Credentials

List up to 6 licences, professional designations, awards and distinctions you have received and feel would be the most pertinent to the adjudication of your application. List them in reverse chronological order, based on the year awarded.

Category	Name	Source or Country	Duration (Months)	Value / Year awarded
Professional Designation	Editor: Linguistics Abstracts		24	$0
Professional Designation	Co-Editor, Linguistics Abstracts		36	2009
Professional Designation	Associate Editor, Linguistics Abstracts		30	$0 2007

Research Expertise

The information provided in this section refers to your own research expertise, not to a research proposal.
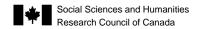
Keywords

List keywords that best describe your areas of research expertise. Separate keywords with a semicolon.

Phonetics; spoken word recognition; acoustic reduction; speech; experimental phonology; language documentation and revitalization

Disciplines

Indicate and rank up to 5 disciplines that best correspond to your research interests. Duplicate entries are not permitted.

Rank	Code	Discipline	If Other, specify
1	62424	Phonetics	
2	62428	Psycholinguistics	
3	62406	Computers and Language	
4	62426	Phonology	
5	62499	Other Linguistics	Language Documentation & Revitalization

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Web CV

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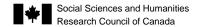
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Canada

Family name, Given name
Tucker, Benjamin

Funded Research

List up to 8 grants or contracts you have received from SSHRC or other sources. List them in reverse chronological order, based on the year awarded. If you are not the applicant (principal investigator), specify that persons' name.

Org. code	Full name of funding organization	Year awarded (yyyy)	Total amount (CAN$)
1	Kule Institute for Advanced Studies	2013	$19,815

Role		Completion status ☐ Complete
Co-applicant		

Project title	Corpus of Spontaneous Multimodal-Interactive Language

Applicant's family name	Applicant's given name	Initials
Juhani	Järvikivi	

Org. code	Full name of funding organization	Year awarded (yyyy)	Total amount (CAN$)
1	Teaching Learning Enhancement Fund: University of Alberta	2013	$52,981

Role		Completion status ☐ Complete
Applicant		

Project title	Developing Interactive Online Lab Activities and an Online Course for Phonetics (LING 205)

Applicant's family name	Applicant's given name	Initials

Org. code	Full name of funding organization	Year awarded (yyyy)	Total amount (CAN$)
3010325	Social Sciences and Humanities Research Council of Canada	2011	$34,206

Role		Completion status ☒ Complete
Applicant		

Project title	Fine acoustic detail of stem vowels in English regular and irregular verbs

Applicant's family name	Applicant's given name	Initials

Org. code	Full name of funding organization	Year awarded (yyyy)	Total amount (CAN$)
3010325	Social Sciences and Humanities Research Council of Canada	2011	$62,924

Role		Completion status ☐ Complete
Applicant		

Project title	The role of phonetic reduction in spoken word recognition

Applicant's family name	Applicant's given name	Initials

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Tucker, Benjamin

Funded Research (cont'd)

Org. code	Full name of funding organization	Year awarded (yyyy)	Total amount (CAN$)
1	Killam Research Fund: University of Alberta	2011	$17,592

Role		Completion status
Applicant		[X] Complete

Project title The Spoken English Lexicon

Applicant's family name	Applicant's given name	Initials

Org. code	Full name of funding organization	Year awarded (yyyy)	Total amount (CAN$)
1	University of Alberta, Faculty of Arts, Small Grant	2010	$2,500

Role		Completion status
Applicant		[X] Complete

Project title Acoustic detail of vowels in English irregular verbs

Applicant's family name	Applicant's given name	Initials

Org. code	Full name of funding organization	Year awarded (yyyy)	Total amount (CAN$)
1	National Science Foundation (USA)	2010	$227,001

Role		Completion status
Collaborator		[ ] Complete

Project title Speech production across languages and dialects

Applicant's family name	Applicant's given name	Initials
Warner	Natasha	

Org. code	Full name of funding organization	Year awarded (yyyy)	Total amount (CAN$)
1	Tsuut'ina Gunaha Language Program	2009	$10,500

Role		Completion status
Applicant		[X] Complete

Project title Digitization of archival Tsuut'ina Language

Applicant's family name	Applicant's given name	Initials

Web CV

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Canada

1. Research Contributions Over the Last Six Years (2008–2013)
[In multi-authored contributions, Benjamin V. Tucker contribution estimated as percentage]

Refereed contributions (excluding most significant contributions below)
R Cox, C., Drieger, J.M., & Tucker, B.V. (2013). Illustrations of the IPA: Mennonite Plautdietsch (Canadian Old Colony). *Journal of the International Phonetic Association*. 43(2), 221-229 [30%]

R Kryuchkova, T., Tucker, B.V., Wurm, L., & Baayen, R.H. (2012) Danger and usefulness in auditory lexical processing: evidence from electroencephalography. *Brain & Language.* 122(2): 81-91. [30%]

R Penfield, S. D., & Tucker, B. V. (2012). From documenting to revitalizing an endangered language: Where do applied linguists fit? In L. Cope (Ed.), *Applied Linguistics Needed: Cross-disciplinary Networking in Endangered Language Contexts*. Routledge. (reprint)[50%]

R Tremblay, A. & Tucker, B.V. (2011). The effects of N-gram probabilistic measures on the recognition and production of four-word sequences. *The Mental Lexicon*. 6(2): 302-324. [50%]

R Warner, N & Tucker, B.V. (2011). Phonetic variability of stops and flaps in spontaneous and careful speech. *Journal of the Acoustical Society of America*, 130(3): 1606-1617. [40%]

R Van de Ven, M., Tucker, B.V., & Ernestus, M. (2011). Semantic context effects in the comprehension of reduced pronunciation variants. *Memory and Cognition*. 39(7): 1301-1316. [20%]

R Kanu, S., Tucker, B.V. (2010). Illustrations of the IPA: Temne. *Journal of the International Phonetic Association*. 40(2): 247-253. [50%]

R Warner, N., Fountain, A., Tucker, B.V. (2009). Cues to perception of reduced flaps. *Journal of the Acoustical Society of America*. 125, 3317-3327. [25%]

R Penfield, S.D., Serratos, A., Tucker, B.V., Flores, A., Harper, G., Hill Jr., J., Vasquez, N. (2008). Community Collaborations: Best practices for North American Indigenous language documentation. *International Journal for the Sociology of Language*. 191. 187–202. [30%]

Other refereed contributions (selection)
Chen, T-Y., & Tucker, B. V. (2013*). F0 transition as a perceptual cue of lexical tones in Mandarin*. Presented at the 12th International Cognitive Linguistics Conference (Edmonton, AB). [25%]

*Sims, M., & Tucker, B. V. (2013). *Linguistic Influences on Fine Phonetic Detail*. Presented at the 12th International Cognitive Linguistics Conference (Edmonton, AB). [40%]

Tucker, B.V. & Kuperman, V. (2012). *Orthographic influences on the speech production of compounds*. Presented at The Mental Lexicon Conference (Montreal, QB). [50%]

*Sims, M., Bolger, P., & Tucker, B. V. (2012). *Processing of Reduction in Spontaneous Speech: An Event Related Potential Study*. Presented at The Mental Lexicon Conference (Montreal, QB).[20%]

Kryuchkova, T. & Tucker, B.V. (2012). Emotion co-exists with lexical effects: A case-study. *Canadian Acoustics*. 40(3), 32-33. [35%]

Porretta, V. & Tucker, B.V. (2012). Predicting accentedness: Acoustic measurements of Chinese-accented English. *Canadian Acoustics*. 40(3), 34-35. [35%]

*Sims, M., Tucker, B.V., Nearey, T.M. (2012). Modelling Vowel Inherent Spectral Change in Spontaneous Speech. *Canadian Acoustics*. 40(3), 36-37. [35%]

Poretta, V. & Tucker, B.V. (2012). *Perception of non-native contrast: Consonant length and L1 English listeners*. Presented at the Second Language Acquisition of Phonology 2012. (University of York, UK). [40%]

Arppe, A. & Tucker, B.V. (2012). *You should model what you observe - The case of the allophonic realizations of the English /t/ in a spontaneous speech corpus*. Presented at the Linguistic Evidence Conference (Tuebingen, Germany). [50%]

Tucker, B.V. & Baayen, R.H. (2011). *Acoustic duration is predicted by syntactic prototypicality*. Presented at the Nijmegen Spontaneous Speech Workshop (Nijmegen, NL). [50%]

Dilts, P., Tucker, B.V., & Baayen, R.H. (2011). *Describing and predicting phonetic reduction in a corpus of spontaneous speech*. Presented at the Nijmegen Spontaneous Speech Workshop (Nijmegen, NL). [30%]

Tucker, B.V. & Arppe, A. (2011). *Allophonic realizations of the phoneme /t/ in an English spontaneous speech corpus*. Presented at the Nijmegen Spontaneous Speech Workshop (Nijmegen, NL). [50%]

Van de Ven, M., Tucker, B.V. & Ernestus, M. (2011). *Semantic context effects in the processing of unreduced and reduced sentences*. Presented at the Nijmegen Spontaneous Speech Workshop (Nijmegen, NL). [20%]

Tremblay, A., Baayen, R. H., Derwing, B., Libben, G., Tucker, B. V., & Westbury, C. (2011). *Empirical evidence for an inflationist lexicon*. Presented at the annual meeting of the Linguistic Society of America (Pittsburgh, PA). [20%]

Van de Ven, M., Tucker, B.V., Ernestus, M. (2010). The influence of acoustic reduction on the informativeness of semantic contextual information. Poster presented at the 12th Conference on Laboratory Phonology (LabPhon 2010, Albuquerque, NM). [20%]

Sims, M., Tucker, B. V., Baayen, R. H. (2010). Morphological Information and Fine Phonetic Detail in English Irregular Verbs. Talk presented at the 7th International Conference on the Mental Lexicon (Windsor, Canada). [40%]

Kryuchkova, T., Tucker, B. V., Wurm, L., Baayen, R. H. (2010). Pitch Information Provides Privileged Lexical Access for Emotion Words: Evidence from Electroencephalography. Talk presented at the 7th International Conference on the Mental Lexicon (Windsor, Canada). [20%]

Van de Ven, M., Tucker, B. V., Ernestus, M. (2010). Semantic Priming in Processing Unreduced and Reduced Speech. Talk presented at the 7th International Conference on the Mental Lexicon (Windsor, Canada). [20%]

Tucker, B. V., McDonough, J. (2010). Investigation of the sounds of Dene Sųłiné: A replication of Goddard's 1905 kymographic study . Presented at Conference on Endangered Languages and Cultures of Native America (University of Utah, Salt Lake City, UT). [60%]

Cox, C., Tucker, B. V. (2010). Collaborative digitization of historical language materials . Presented at Conference on Endangered Languages and Cultures of Native America (University of Utah, Salt Lake City, UT). [50%]

R Van de Ven, M., Tucker, B.V., Ernestus, M. (2009). Semantic context effects in the recognition of acoustically unreduced and reduced words. In *Proc. of the 10th Annual Conf. of the International Speech Communication Association* (pp. 1867-1870). Causal Productions Pty Ltd. [20%]

Van de Ven, M., Tucker, B. V., Ernestus, M. (2009). Semantic context effects in the recognition of acoustically unreduced and reduced words. Oral presentation at Interspeech 2009 (Brighton, United Kingdom). [20%]

Rice, S., Tucker, B. V., Cox, C., Starlight, B., Donovan, G. (2009). Linguistic Training in an Endangered Language Community. Presented at Conference on Endangered Languages and Cultures of Native America at University of Utah, Salt Lake City, UT. [20%]

Warner, N., Tucker, B.V. (2008). *Fourth formant drop as a correlate of American English Flaps*. Presented at the annual meeting of the Linguistic Society of America (Chicago, IL). [50%]

Tucker, B. V., Warner, N. (2008). *An unusual result of prosodic domain boundary effects: Romanian devoiced nasals*. Presented at the meeting of the Linguistic Society of America (Chicago, IL). [75%]

Non-refereed contributions (selection 2011-2013)

Tucker, B.V. & Kuperman, V. *The interaction of orthography, phonetics and morphology.* Invited workshop at the University of Düsseldorf, Düsseldorf, Germany. August 21, 2013.

*Tucker, B.V. *Exploring variability in speech production and morphological interactions.* Invited colloquium at the University of Arizona, Tucson, Arizona, USA. January 25, 2013.

Tucker, B.V. *Digitizing language: The value of digital records of language material in language study and preservation.* Invited workshop Presented at Digitization Day at the University of Alberta, Edmonton, AB, Canada. April 16, 2012.

*Tucker, B.V. *Why is the signal smooth?* Invited colloquium at the University of Siegen, Germany. November 30, 2011.

Tucker, B.V. *Investigations into spontaneous speech.* Invited talk at Eberhard Karls Universität Tübingen, Germany. September 29, 2011.

Tucker, B.V. *Digitizing indigenous language material.* Invited workshop Presented at Digitization Day at the University of Alberta, Edmonton, AB, Canada. December 16, 2010.

Warner, N. & Tucker, B.V. *Production (or non-production) of American English intervocalic stops.* Invited workshop Presented at the First Nijmegen Speech Reduction Workshop. Nijmegen, the Netherlands. June 16, 2008. [35%]

Tucker, B.V. *The influence of speech style as context on the processing of reduced North American English flaps.* Invited workshop Presented at the First Nijmegen Speech Reduction Workshop. Nijmegen, the Netherlands. June 16, 2008.

Tucker, B.V. *Phonetic variability due to reduction in speech production and processing: The American English Flap.* Invited talk at the University of Calgary, Calgary, AB, Canada. March 7, 2008.

*Tucker, B.V., Kryuchkova, T., Mackie, K. (2013). Effects of variation on processing of word-medial consonants. *Proceedings of Meetings on Acoustics*, 19(1), 060256.

Porretta, V. & Tucker, B.V. (2013). Perception of non-native consonant length in naïve English listeners. *Proceedings of Meetings on Acoustics*, 19(1), 060274.

Chung, H., Nearey, T.M., Hodge, M., Pollock, K. & Tucker, B.V. (2012). Preliminary statistical pattern recognition methods in the study of vowels produced by children with and without speech sound disorders. *Canadian Acoustics*. 40(3), 18-19

Kryuchkova, T. & Tucker, B.V. (2012). Emotion co-exists with lexical effects: A case-study. *Canadian Acoustics*. 40(3), 32-33.

Porretta, V. & Tucker, B.V. (2012). Predicting accentedness: Acoustic measurements of Chinese-accented English. *Canadian Acoustics*. 40(3), 34-35.

*Sims, M., Tucker, B. V., Nearey, T. M. (2012). Modelling Vowel Inherent Spectral Change in Spontaneous Speech. *Canadian Acoustics*. 40(3), 36-37.

*Tucker, B.V. & Mendenhall, D., (2012). *Identifying reduced speech in prepositional phrases.* Presented at the Annual Conference of the Canadian Acoustical Association (Banff, AB). [65%]

Dilts, P., Tucker, B.V., & Baayen, R.H. (2011). *Random forest modelling of phonetic reduction in spontaneous speech.* Presented at the Alberta Conference on Linguistics (Edmonton, AB). [25%]

Kryuchkova, T. & Tucker, B.V. (2011). *Lexical influences on emotional speech.* Presented at the Alberta Conference on Linguistics (Edmonton, AB). [35%]

Puderbaugh, R. & Tucker, B.V. (2011). *An acoustic description of the phoneme inventory of Maku.* Presented at Conference on Endangered Languages and Cultures of Native America at University of Utah (Salt Lake City, UT). [35%]

Forthcoming contributions

R Chen, T.-Y. & Tucker, B.V. (accepted). F0 transitions as a perceptual cue of lexical tones in Mandarin. *Phonetica.*

R Porretta, V. & Tucker, B. V. (submitted). Perception of non-native consonant length contrast: The role of attention in phonetic processing. *Second Language Research*

R Sims, M., Bolger, P., Tucker, B.V. (submitted). Processing Difficulty and Word Recognition in Spontaneous Speech: An Event-Related Potential Study.
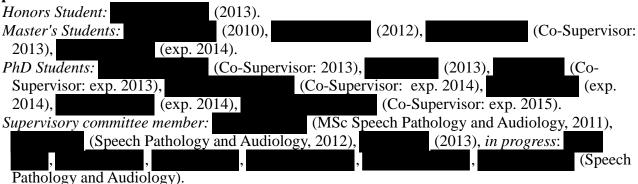
2. Other Research Contributions

I have created two language databases for the highly endangered languages Chemehuevi and Mohave. Additional material is currently being added to both of these databases. They are also being developed for delivery on the internet and as a CD to be distributed to the communities where these languages are spoken. Resources such as dictionaries, phrase books and picture dictionaries are being developed for these languages as well.

3. Most Significant Career Research Contributions

R Tucker, B.V., Warner, N. (2010). Separating Effects of Prosodic Domain Boundaries, Syllable Structure, and Assimilation: The Case of Romanian Devoiced Nasals. *Phonology.* 27(2): 289-324. [65%] – This work triangulates a question using multiple methods and provides a potential explanation as to how the phonetics-phonology interface might function.

R Penfield, S. D. & Tucker, B.V. (2011). From documenting to revitalizing an endangered language: where do applied linguists fit? *Language and Education*, 25, 291-305. [50%] Argues for the increasing need of creative applied linguists in language documentation and revitalization.

R Tucker, B.V. (2007). *Spoken word recognition of the reduced American English flap*. Tucson, AZ. Ph.D. dissertation, University of Arizona. This work investigates the effects of segmental reduction on word recognition, showing that reduction inhibits recognition with and without context.

R Tucker, Benjamin V., Warner, Natasha. 2007. Inhibition of processing due to reduction of the American English flap. *Proceedings of the 16th International Congress of Phonetic Sciences, Saarbrücken, August 2007.* [85%] – This work finds effects of reductions at the segmental level influence lexical access.

R Tucker, B. V. (2011). The effect of reduction on the processing of flaps and /g/ in isolated words. *Journal of Phonetics*, 39(3), 312-318. – Expand the previous findings by using a more sophisticated statistical analysis and indicates that there may be a non-linear relationship between reduction and recognition of words.

5. Contribution to Training
Supervision:
   Honors Student: ▮▮▮▮▮▮▮▮▮▮ (2013).
   Master's Students: ▮▮▮▮▮▮▮▮▮▮ (2010), ▮▮▮▮▮▮▮▮▮ (2012), ▮▮▮▮▮▮▮▮▮ (Co-Supervisor: 2013), ▮▮▮▮▮▮▮▮▮▮▮▮ (exp. 2014).
   PhD Students: ▮▮▮▮▮▮▮▮▮▮ (Co-Supervisor: 2013), ▮▮▮▮▮▮▮ (2013), ▮▮▮▮▮▮ (Co-Supervisor: exp. 2013), ▮▮▮▮▮▮▮▮▮▮▮ (Co-Supervisor: exp. 2014), ▮▮▮▮▮▮▮▮ (exp. 2014), ▮▮▮▮▮▮▮ (exp. 2014), ▮▮▮▮▮▮▮▮▮ (Co-Supervisor: exp. 2015).
   Supervisory committee member: ▮▮▮▮▮▮▮▮ (MSc Speech Pathology and Audiology, 2011), ▮▮▮▮▮▮▮▮ (Speech Pathology and Audiology, 2012), ▮▮▮▮▮▮ (2013), *in progress*: ▮▮▮ ▮▮▮▮, ▮▮▮▮▮▮, ▮▮▮▮▮▮, ▮▮▮▮▮▮, ▮▮▮▮▮▮ (Speech Pathology and Audiology).
   I regularly have 2-4 undergraduate students (per semester) working in my laboratory under my supervision. Several of these students have informally pursued research projects which have resulted in local and international conference presentations, one was published as a conference proceedings.
   As the Editor of *Linguistics Abstracts*, I regularly supervise the work of 4-6 students (undergraduate and graduate) working on various parts of the *Linguistics Abstracts* database and the preparation of a quarterly publication.