**NON-INTERVENTIONAL/METHODOLOGICAL**

**RESEARCH PROTOCOL TEMPLATE**

(HRP-503b)

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| **STUDY INFORMATION**   * **Title of Project:**   Production, perception, and processing of prosody in second language acquisition   * **Principal Investigator Name**   Joseph V. Casillas, PhD   * **Principal Investigator Div. & Dept.**   School of Arts and Sciences, Spanish and Portuguese   * **Principal Investigator Contact Info:**   joseph.casillas@rutgers.edu  Rutgers University – Academic Building, Room 5174  15 Seminary Place, New Brunswick, NJ 08901  848 932-6930   * **Protocol Version and Date:**   HRP-503b 10.01.2019 |

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**1.0 Research Design**

**1.1** **Purpose/Specific Aims**

The purpose of this project is to study the production, perception, and processing of prosody in second language acquisition. This research looks at the role of individual pragmatic skills in the process of learning a new language. Specifically, we look at the role of empathy in the development of L2 prosody by analyzing the perception of intonation in questions and statements in L2 Spanish.

**A. Objectives**

The objectives of this research are twofold. First, the project intends contribute to cumulative science by replicating the Brandl et al. (2020) finding demonstrating that perception and processing of L2 intonation improves in conjunction with L2 proficiency and as a function of intonation type. Second, this research will extend the current findings on perceptual development to include pragmatic skills, specifically empathy.

**B. Hypotheses / Research Question(s)**

Research question 1: Is perceptional development in L2 Spanish modulated by proficiency and intonation type (i.e., Brandl et al., 2020).

Hypothesis: Accuracy will increase and processing time will decrease as a function of proficiency and intonation type. Yes-no questions will present the most difficulty for L2 learners of Spanish.

Research question 2: Do pragmatic skills modulate rate of development in L2 prosody?

Hypothesis: Based on the findings of Esteve-Gilbert et al. (2020), we posit that prosodic development will occur sooner and at a faster rate in higher empathy individuals.

**1.2** **Research Significance** **(Briefly describe the following in 500 words or less)**

The purpose of this project is to study the production, perception, and processing of prosody in second language acquisition. This research looks at the role of individual pragmatic skills in the process of learning a new language. Specifically, we look at the role of empathy in the development of L2 prosody by analyzing the perception of intonation in questions and statements in L2 Spanish.

L2 learners gradually acquire Spanish prosody as they gain proficiency in the language. The extant literature shows that 'yes/no'-type questions harder to process and acquire, when compared with simple statements (Brandl et al., 2020). Recent research has also shown that empathy influences language processing in how listeners interpret intonation and meaning when words are ambiguous (Esteve-Gilbert et al., 2020). Specifically, higher empathy individuals, in comparison with lower empathy individuals, appear to be more sensitive to intonation cues in the process of forming sound-meaning associations. In short, individuals with more pragmatic skill (higher empathy) are able to use intonation to resolve temporary lexical ambiguity that can lead to confirmatory vs. contrasting interpretations. This research underscores the importance of considering individual pragmatic differences when examining intonational meaning processing and sentence comprehension. Thus, we extend this research to second language acquisition in order to determine if individual differences in pragmatic skill affect the development of intonation in L2 processing and sentence comprehension.

References

Brandl, A., González, C., & Bustin, A. (2020). The development of intonation in l2 spanish: A perceptual study. In A. Morales-Front, M. J. Ferreira, R. P. Leow, & C. Sanz (Eds.), Hispanic linguistics: Current issues and new directions (pp. 12–31). John Benjamins Publishing Company.

Baron-Cohen, S., & Wheelwright, S. (2004). The empathy quotient: An investigation of adults with asperger syndrome or high functioning autism, and normal sex differences. Journal of Autism and Developmental Disorders, 34(2), 163–175.

**1.3** **Research Design and Methods**

In other to address our research questions and accomplish the goals of this research we will conduct an online perception experiment. We will recruit participants online via the Prolific.ac recruiting platform. This platform allows us to select a subset of the participant pool. We will recruit individuals who are native speakers of American English that have begun the process of learning Spanish as a second language as adults (after the age of 17). The prolific.ac platform allows us to filter the participant pool for individuals with the aforementioned characteristics. Individual information is completely anonymous. The prolific.ac platform provides each individual with an alphanumeric ID of 20 characters and this ID is used in their results files.

Next, individuals that are interested in participating will complete 3 tasks. First, we will administer an the LexTALE vocabulary test () to assess their proficiency in Spanish. This task presents real and fake words in Spanish (or that are Spanish-like) and asks participants to determine if they are indeed real words in Spanish. This assessment of vocabulary has been shown to correlate with proficiency. Afterwards, participants will complete the Empathy Quotient questionnaire (). This questionnaire includes 60 items that require Lykert-type responses ranging from ‘strongly disagree’ to ‘strongly agree’ and has been used to measure the construct empathy in numerous studies. Finally, participants will complete the forced-choice task used in Brandl et al. (2020) in which they both hear via headphones and see on a computer screen Spanish sentences with varying intonation contours. The participants’ task is to determine if the aural and visual stimuli match. In all the three tasks will take approximately 20 minutes.

The results are automatically saved in an online repository that is encrypted and password protected. Only the PI has access to these files, which, again are completely anonymous. The data will be analyzed using Bayesian multi-level regression models that will explore accuracy and reaction time as a function proficiency (LexTALE) and empathy (Empathy Quotient).

**A. Research Procedures**

All tasks are performed online. The participants will complete the LexTALE proficiency task first, followed by the Empathy Quotient, and then the experimental matching task. All experiments are presented using the open source software PsychoPy. Individual results are stored in an online repository that is only accessible to the PI. The data are encrypted and password protected. Once data collection is finished, the data will be downloaded from the private repository and subsequently deleted. The only copy of the data will exist on the private work computer of the PI.

**B**. **Duration for Study and Each Subject**

Piloting of the experimental tasks by the PI suggests that participants should finish in approximately 20-25 minutes.

**1.4** **Preliminary Data**

NA

**1.5** **Sample Size Justification**

Power analyses suggest we can replicate the Brandl et al. (2020) effect with 80% power and a false positive rate (alpha) of 5% with 200 participants. Thus, we will recruit 200 participants.

**1.6** **Study Variables**

The study includes 2 dependent, outcome variables: response accuracy and response times.

**A. Independent Variables, Interventions, or Predictor Variables**

The study includes 3 predictor variables: proficiency (derived from the LexTALE score), empathy score (derived from the Empathy Quotient) and intonation type (i.e., statement, yes-no question, etc.).

**1.7** **Specimen Collection**

NA

1. **Primary Specimen Collection**

NA

* **Types of Specimens**: NA
* **Annotation**: NA
* **Transport**: NA
* **Processing**: NA
* **Storage**: NA
* **Disposition**: NA

1. **Secondary Specimen Collection**

*NA*

* **Types of Specimens**: *NA*
* **Annotation**: *NA*
* **Transport**: *NA*
* **Storage**: NA
* **Disposition**: NA

**1.8** **Data Collection**

1. **Primary Data Collection**

* **Location**: All data collection will take place online.
* **Process of Data Collection**: Data collection will take place online. Processing is automated via the online platform. Posterior analyses of the data will be conducted by the PI.
* **Timing and Frequency**: Upon receiving IRB approval the study will be published on the prolific.ac online platform and data collection will be open until reaching 200 participants. Based on previous experience, we estimate this will take approximately 2 days.
* **Procedures for Audio/Visual Recording**: Will not conduct any audio/visual recording.
* **Study Instruments**: The lexTALE task (Lemhöfer & Broersma, 2012; Izura et al., 2014) and the Empathy Quotient (Baron-Cohen & Wheelwright, 2004) are both well-known, standardized instruments. The matching task was used in Brandl et al. (2020). The relevant files have been uploaded in Section 7.

Izura, C., Cuetos, F., & Brysbaert, M. (2014). Lextale-esp: A test to rapidly and efficiently assess the spanish vocabulary size. Psicológica, 35(1), 49–66.

Lemhöfer, K., & Broersma, M. (2012). Introducing lextale: A quick and valid lexical test for advanced learners of english. Behavior Research Methods, 44(2), 325–343.

Brandl, A., González, C., & Bustin, A. (2020). The development of intonation in l2 spanish: A perceptual study. In A. Morales-Front, M. J. Ferreira, R. P. Leow, & C. Sanz (Eds.), Hispanic linguistics: Current issues and new directions (pp. 12–31). John Benjamins Publishing Company.

Baron-Cohen, S., & Wheelwright, S. (2004). The empathy quotient: An investigation of adults with asperger syndrome or high functioning autism, and normal sex differences. Journal of Autism and Developmental Disorders

* **Ethnographic Studies, Interviews, Or Observation**: We, the investigators, will not directly interact with the participants.
* **Subject Identifiers**: The prolific.ac platform will automatically generate a unique subject identifier for each participant. The identifier is a 20 character alphanumeric with no personally identifying information.

1. **Secondary Data Collection**

NA

**Type of Records**: NA

**Location**: NA

**Inclusion/Exclusion**: NA

**Data Abstraction Form(s):** NA

**1.9** **Interviews, Focus Groups, Surveys, and/or Observations**

NA

**2.0** **Project Management**

**2.1** **Research Staff and Qualifications**

The other researchers participating in this project are students, graduate and undergraduate, studying linguistics. The undergraduate students are participating in the Aresty research program for the 20/21 academic school year. The graduate students are part of the Bilingualism and Second Language Acquisition PhD program. All researchers have completed the CITI training and their certifications are included here.

* 1. **Research Staff Training**

My research team meets weekly to design and discuss experimental research. We have discussed and decided upon the research protocol for this project together.

2.3 Resources Available

As this study is conducted online, we do not have any resources associated with physical space. We do not foresee any possibilities for physical harm related to this research.

**2.4** **Research Sites**

NA

**3.0** **Multi Center Research**

NA

**4.0** **Research Data Source/s**

**4.1** **Subject Selection and Enrollment Considerations**

1. **Method to Identify Potential Subjects**

We will use the prolific.ac platform to identify participants. This platform includes a large subject pool of individuals interested in participating in scholarly research. Participants are compensated for their time. We will using the filtering options available on the platform to limit our subject pool to Adult native speakers of American English that are learning Spanish as a second language.

1. **Recruitment Details**

Upon determining the selection criteria in prolific.ac, prospective participants are automatically notified via email of a study that fits their characteristics. At this point, participants are free to decide if there are interested in participating. In the case that they want to participate, prolific.ac provides them with a link that takes them to the online study.

1. **Subject Screening**

The filtering function of prolific.ac will allow us, the researchers, the set the criteria used to determine if possible participants will be made aware of our study.

* **Inclusion Criteria**

The target population includes adult native speakers of American English that are learning Spanish as a second language. Participation is open to adults that meet this criteria of all proficiency levels.

* **Exclusion Criteria**

We will filter out possible candidates that already know a language other than English and Spanish, as well as those that began learning Spanish before the age of 18.

**4.2** **Secondary Subjects**

NA

4.3 Number of Subjects

**A. Total Number of Subjects**

200

**B. Total Number of Subjects If Multicenter Study**

NA

**4.4** **Consent Procedures**

**A. Consent Process**

* **Location of Consent Process**

Consent occurs online.

* **Ongoing Consent**

The duration of participation is not lengthy.

* **Individual Roles for Researchers Involved in Consent**

Individual members of the research team will not be involved in the consent process.

* **Consent Discussion Duration**

Consent occurs online thus it will not be discussed directly with the researchers.

* **Coercion or Undue Influence**

Participants will willingly accept to participate in this research without contact with the researchers.

* **Subject Understanding**

Participants will be presented with instructions explaining each task before beginning.

1. **Waiver or Alteration of Consent Process** 
   * **Waiver or Alteration Details**

We are indeed interested in waiving consent or streamlining the process so as to avoid collecting possibly identifying information (such as signatures). Ideally, the participants will give their consent to participate by clicking the link provided by prolific.ac to complete the experiment.

* + **Destruction of Identifiers**

We will not collect any identifying information.

* + **Use of Deception/Concealment**

This research does not include deception or concealment.

1. **Minimal Risk Justification**

NA

1. **Alternatives**

NA

1. **Subject Debriefing**

NA

1. **Documentation of Consent**

* **Documenting Consent**

Our experiment will explain that by continuing, i.e., clicking a button, they are consenting to participate. We have included rCR Anonymous Data Collection Consent Form as an example of what we could say at the beginning of the experiment.

* **Waiver of Documentation of Consent (i.e., will not obtain subject’s signature)**

We will not obtain participant signatures. Please see document rCR Anonymous Data Collection Consent Form.

**4.5** **Special Consent/Populations**

1. **Minors-Subjects Who Are Not Yet Adults**

* **Parental Permission**

NA

* **Non-Parental Permission**

NA

* **Assent Process**

NA

* **Documentation of Assent**

NA

* **Reaching Age of Majority During Study**

NA

1. **Wards of the State**

NA

* **Research Outside of NJ Involving Minors**

NA

1. **Non-English-Speaking Subjects**

All participants will be native English speakers.

* **Process for Non-English-Speaking Subjects**

NA

* **Short Form Consent for Non-English Speakers**

NA

1. **Adults Unable to Consent / Decisionally Impaired Adults**

NA

* **NJ Law-Assessment of Regaining the Capacity to Consent**

NA

* **Capacity to Consent**

NA

* 1. **NJ Law-Selecting A Witness**

NA

* 1. **Removing a Subject**

If a participant wishes to stop participating they can stop the experiment at any time by closing their web browser. Partial data will not be saved. If a participant decides they do not want us to use their data after they have completed the experimental tasks they can contact us via email and we will delete their data.

**4.6** **Economic Burden and/or Compensation for Subjects**

**A. Expenses**

The only expenses involved with this research are those related to time (approx.. 25 minutes).

1. **Compensation/Incentives**

Upon completing the experiment participants will be credited with $3.96 to their prolific.ac accounts (approx.. $9.50 hourly).

**C. Compensation Documentation**

Prolific.ac provides complete documentation regarding participant compensation. Upon completing the experiment, the PI will review to assure all three tasks have been completed and will then release compensation to the participant.

**4.7** **Risks and Benefits to Subjects**

NA

1. **Description of Subject Risk And Benefits**

NA

* **Existing Condition/Disorder**

NA

* **Additional Considerations**

NA

* + - **Minimizing Risks**

NA

* + - **Certificate of Confidentiality (CoC)**

NA

* + - **Risks to Non-Subjects**

NA

* + - **Potential Benefits**

There are no potential benefits to participating in this research above and beyond the personal gratification of contributing to the scientific process.

**5.0** **Special Considerations**

**5.1** **Health Insurance Portability and Accountability Act (HIPAA)**

We will not be obtaining, creating, and using, and/or disclosing individually identifiable health information associated with a HIPAA-covered component or entity in the research.

**5.2** **Family Educational Rights and Privacy Act (FERPA)**

No student records will be accessed for the research.

**5.3** **Code of Federal Regulations Title 45 Part 46 (Vulnerable Populations)**

This research does not involve individuals who are vulnerable or susceptible to coercion or undue influence.

1. **Special Populations**
   * + - NA

**5.4** **General Data Protection Regulation (GDPR)**

Data will only be collected from individual in the U.S.

**5.5****NJ Access to Medical Research Act (Surrogate Consent)**

NA

**6.0** **Data Management Plan**

**6.1** **Data Analysis**

The data will be analyzed using Bayesian multi-level regression models.

**6.2** **Data Security**

Upon completing the experiments, participant data will be stored in a private, online repository that is password protected and automatically encrypts the data. Our data will not contain any identifying information. Once data collection is completed, the data will be downloaded from the repository and subsequently deleted. It will then only be stored on the work computer of the PI, which is also password protected.

**6.3** **Reporting Results**

1. **Subject Results Reporting**

We have no plans for sharing data with subjects aside from standard scientific dissemination of research via scholarly articles.

1. **Professional Reporting**

The data will be analyzed and submitted to journals in linguistics and second language acquisition for publication.

**6.4** **Secondary Use of the Data**

We have no plans to share the data with other individuals.

**7.0** **Research Repositories – Specimens and/or Data**

NA

**8.0** **Approvals/Authorizations**

NA

**9.0** **Bibliography**

Izura, C., Cuetos, F., & Brysbaert, M. (2014). Lextale-esp: A test to rapidly and efficiently assess the spanish vocabulary size. Psicológica, 35(1), 49–66.

Lemhöfer, K., & Broersma, M. (2012). Introducing lextale: A quick and valid lexical test for advanced learners of english. Behavior Research Methods, 44(2), 325–343.

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