

Part I

Project Title: Spelling as a window of phonological development in typically developing children, bilingual children and children with hearing loss

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Part II: *Impact on Applicant's Personal Research and Development.*

This work will build upon my previous research and act as a bridge to my future work serving as preliminary data to use to develop an NIH RO1 research proposal. I aim to continue to investigate the different routes children use to develop their awareness of individual sounds in their environment and how this awareness impacts their spelling and reading. Phonologic representations are intrinsic to reading, writing and spelling in children and this proposed project will elucidate on the spelling skills of three groups of fourth graders who are 1) typically developing English speakers, 2) English Language Learners (ELLs) 3) students with hearing loss.

Impact on the Field. Phonological knowledge has been defined as an important skill for learning to read, write and spell in hearing children, thus information about how children develop phonological representations is intrinsic to advancing the three fields. Infants who have hearing are sensitive to more sound contrasts than are adults, but if certain sounds are not used within their ambient language, they lose the ability to make those sound distinctions (Best, 1994). Understanding how these sound representations develop in ELLs and those with hearing loss is important, because they will not have had consistent exposure to English within their ambient language in the early years of their lives. Information learned in this study will help us to

ascertain strengths, and weaknesses within the learning strategies of these groups for the development of interventions that exploit strong areas, and build upon weak areas.

Brief Review of Relevant Literature.

Currently there is no consensus of what constitutes as a *contributor* to the development of phonology when analyzing how children learn to use the sounds of our language as they learn to read, write and spell. A central point of discrepancy in the literature includes how to define the *input* for phonology or phonological development. Exclusive views regarding the input for phonology limit it to acoustic input e.g. (Iverson and Kuhl 2000, Kuhl, Williams, Lacerda, Stevens, & Lindblom 1992, Flege 1991) while views tend to incorporate phonological input as coming from both visual and auditory modalities and is enhanced when we attempt to reproduce what we hear e.g. (Leybaert & Charlier 1996, Stevens 2002). Using the broadest definition possible, one way to describe phonology could be that it is the process of deriving a representation of speech sounds. This process includes decomposing speech sounds from visual and auditory input into a systematic representation of units that correspond to sound units. One can have a phonology related to speech sound production and a phonology related to perception.

Part III: Research Plan

Setting/Facilities.

The majority of data from hearing and ELL children will be collected in public elementary schools in Las Cruces, New Mexico. In order to achieve the required number participants (30) from 4th grade children with hearing loss, I will need to collect data from children within the region. Data analysis will be accomplished in my Phonology, Hearing Articulation, Language, Literacy (PHALL) Lab located in the Speech Building here on the NMSU Campus.

Procedures (data collection, data analysis). Participants will include 30 children from the following demographic groups: typically developing 4th graders within the Las Cruces Public Schools, typically developing 3rd graders in the ELL program in the Las Cruces Public Schools, and 3rd grade children with hearing loss from within schools within the region. Consent for participation will be obtained by sending home a consent form approximately 2 weeks before parent-teacher conferences that outlines the two activities the child will be asked to participate in. Parents will be asked to sign then send the consent form to the school with their child, or to bring the form with them to parent-teacher conferences.

Data collection will include three measures. First a writing sample that will be elicited using a procedure developed by Fey and Catts (2000). No time limit will be given for the task, however in a previous study, I found that most children were finished writing within 15 to 20 minutes (Spencer, Barker and Tomblin 2003). The narratives will then be analyzed and correct word ratio and error word ratio will be derived. The children will also be asked to label 40 photos depicting stimuli from the Fry High Frequency Word list with 20 regularly spelled words (e.g. bed), and 20 irregularly spelled words (e.g. bed). Error categories include: *phonological substitution* (letters written are a legal sound pattern for the word e.g. garaj for garage); *non-phonological substitution* (misspellings have a different pronunciation than the target word e.g. fent for fence); *transposition* (target letters are used, but are out of order e.g. toranado for tornado); Other (misspellings do not fall into above three categories, e.g. omission or insertion of letters).

Secondly, the Test of Silent Word Reading Fluency (TSWRF) (Mather, Hammil, Allen & Roberts, 2004) will be administered in order to gain a measure of the student's fluent reading skills. This test can be administered to a group of participants in less than 10 minutes total. The

children are all given a sheet that is composed of rows of words, ordered by reading difficulty; no spaces appear between the words (e.g., *dimhowfigblue*). Students are given 3 minutes to draw a line between the boundaries of as many words as possible (e.g., *dim/how/fig/blue*). The test yields a raw score, a standard score, a percentile score, plus age and grade equivalencies.

Data analysis will include both descriptive and inferential statistics and be completed by computing spelling ratios, and scoring of all the TSWFR tests. Group-wise comparisons in the form of ANOVA will be completed and regression analysis will be completed between spelling and reading standard scores.

Study Timeline. In the summer of 2012 the IRB material will be submitted, and the bulk of the data collection will be completed in the fall of 2012. It is anticipated that data collection and analysis will be completed for the hearing and bilingual groups and approximately 5 to 8 of the children with hearing loss in the Las Cruces Schools. The remaining data collection for the 25 or 28 children will continue throughout the spring and fall 2013 semester.

Use of findings/dissemination of results. Results of this study will be disseminated locally back to the participating school districts in the form of in-services, regionally, at the state convention and nationally at the ASHA convention and in an ASHA publication. It will also be used as preliminary data for an NIH grant.

Part IV: Budget and Budget Justification

Specific detailed listing

Purchase of the Test of Silent Word Reading Test \$170 (shipping included). Payment of participants (90) and teachers (10) via Target gift card at \$5.00 each for total of \$500.00. Travel to Santa Fe and Albuquerque to collect data (gas \$550.00 and lodging \$150.00), for \$800.00,

total travel. Payment of one undergraduate student to score tests 40 hours at \$9.00 hour \$360.00.

Total funding requested \$1830.00.

Part V: References

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