My research involves applied, clinical investigations that typically include intervention studies using single-subject designs in order to carefully examine individual client's response to treatment in a detailed manner. These lines of inquiry form the majority of my research with my development of the multiple oppositions approach (Williams, 2000a; 2000b; 2003a; 2003c; 2004; 2005a; 2005c; 2006). I have conducted funded studies through the National Institute of Deafness and Other Communication Disorders (NIDCD) to experimentally examine the effectiveness of this approach. Recently, I have extended this line of investigation in a series of comparative studies to examine the learnability hypothesis with regard to the role of larger, integrated treatment input (multiple oppositions) versus smaller, distributed treatment input (minimal pairs). Also, I've examined intervention contexts that compare treatment outcomes using computer-based intervention versus traditional tabletop intervention through collaboration with John Bernthal at the University of Nebraska and Megan Overby, currently at the College of St. Rose. I incorporate graduate students in all aspects of my research, either as a research assistant or as a research clinician in the Phonological Intervention Program.

Parallel to my research in intervention is the development of a model of assessment of speech disorders in children called *Systemic Analysis of Child Speech* (*SPACS*; Williams, 2001; 2002a; 2002b; 2003c; 2005a; 2006). As we get better methods for describing disordered sound systems, we have the capability of designing more effective treatment plans for each child. Using linguistic methodology, *SPACS* provides an in-depth description of a child's sound system as a unique, independent, and self-contained language. Once the child's system is described as a unique and separate language, it is then mapped onto the adult sound system via phoneme collapses. These phoneme collapses represent how the two systems align since the ultimate goal is for the child to be intelligible in the ambient language.

A logical extension of this line of clinical investigation is examination of an approach that I have developed for selecting treatment targets from the phoneme collapses called the *distance metric* (Williams, 2003b; 2003c; 2005a; 2005b; 2006). Analogous to a puzzle, the distance metric is based on two parameters for selecting target sounds for treatment which will result in targets that are maximally distinct from each other and from the child's error substitute. Therefore, the treatment targets are more salient and considered to be more learnable, similar to the corner puzzle pieces, as the child works to restructure his/her sound system to be more like the adult sound system and hence increase his/her speech intelligibility.

The integration of a systemic perspective to intervention, assessment, and target selection provides a unified approach to the clinical management of speech disorders in children. From a systemic view, the **multiple oppositions approach**, *SPACS,* and the **distance metric** have the potential to result in the greatest amount of change in the least amount of time with the least amount of effort.

Since 2003, my work has involved **translational research** in making the newer models of phonological intervention, including multiple oppositions, accessible to practicing clinicians. This translational research was funded by Small Business Innovative Research (SBIR) Phase I and Phase II grants by the NIDCD and the National Institute of Child Health and Human Development (NICHD). In collaboration with Thinking Publications, now Super Duper Publications, I developed an intervention software program called *Sound Contrasts in Phonology (SCIP)* that translates the research from the newer, evidence-based models of speech
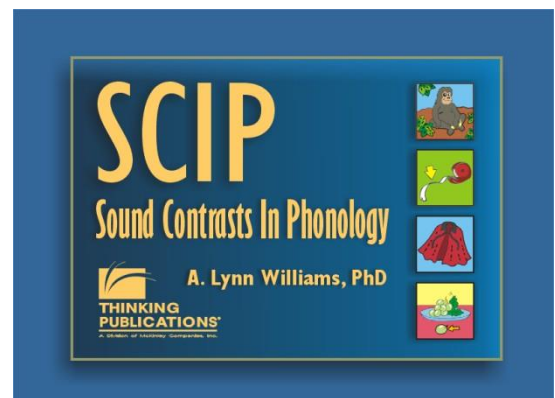
intervention (including multiple oppositions) into a tool that provides a time-saving resource for speech-language pathologists to use in designing individualized treatment materials for the children in their clinical practice. My latest endeavor is a partnership with Plural Publishing in which we submitted an SBIR grant to NIDCD to develop a software program for analysis and clinical management of speech sound disorders in children. The program is called ***Comprehensive Analysis and Target Selection in Speech (CATSS).***

Finally, a recent corollary of my research has been in the area of emergent literacy, particularly with at-risk children who live in poverty. This area of inquiry complements the research I've done with children who have speech sound disorders because these children are at greater risk for later reading difficulties. This research also provided an opportunity to conduct cross-disciplinary studies with faculty in early childhood special education. Of particular interest in this line of inquiry is developing parent training programs to teach parents how to actively engage their young children in shared book reading activities (Williams, 2006; Williams & Coutinho, 2008).