

My goal is to become a first-rate scientist and leader in the study of language and mind. This goal began to take shape during my freshman year at Vassar College when I discovered Cognitive Science. I not only learned about the physiology of the brain, but also about theories of knowledge representation and anthropological methods for studying human cognition. Thanks in part to this broad exposure, I realized that collaboration among many fields can inform our understanding of human cognition and behavior better than any one alone. Outside my Cognitive Science courses, I also became a fluent French speaker, a harpist, and a proficient programmer, all of which helped me think about the mind in novel contexts.

To supplement my liberal arts education, I sought out laboratory experience. During three summers, I worked in MIT's Computer Science and Artificial Intelligence Lab. One project I worked on was to improve a syntactic simplification program that was ineffective on sentences with the structure "Noun phrase-preposition-noun phrase-relative clause" (i.e., "the leader of the group which..."). My role was to investigate ways that a human might solve this parsing problem. I found that the specific preposition and type of source both predicted the intended meaning of the phrase, which improved the original program. It can now be used to simplify medical journal articles, increasing patients' ability to understand and comply with medical advice. I presented this work at the 2010 E-Learn Conference, where I discovered how stimulating it is to be surrounded by researchers sharing their work. As I boarded the plane back to New York, I vowed to build a life of research and intellectual exchange.

During my junior year, I met a high school student with Verbal-Auditory Agnosia (VAA). I was curious about the extent to which cognition can exist in a seemingly nonlinguistic person, so I spent winter break shadowing him. He performed procedural tasks like setting a table with relative ease and could match pictures to written words, but he showed no signs of understanding language. I presented this work at the 2012 Mid-Hudson Psychology Research Conference. The paper addressed the relationship between language and the mind and also suggested opportunities for improving education for students with VAA.

The following summer, I volunteered in Daniel Casasanto's lab at the New School for Social Research. I learned how to use transcranial direct current stimulation (tDCS), and I eventually ran participants independently. We wanted to know whether electrical stimulation over a brain area that supports working memory could improve people's ability to understand syntactically complex sentences. We administered a small electrical current between participants' prefrontal cortex and temporal lobe before they read sentences. Our first pass did not reveal an effect of tDCS on people's syntactic abilities. This negative result led us to revisit the literature, our predictions, and methods to make sense of our findings. It presented a valuable lesson on the reality of life as a researcher and taught me how to use unexpected results as constructive lessons – a skill that will be handy throughout my academic career.

While working in Dr. Casasanto's lab, I also helped replicate a prior study on space-time metaphors. The original study found that the spatial metaphors people use to talk about time in their native language influence their estimates of duration (Casasanto & Boroditsky, 2008). Some languages (like English and Indonesian) talk about duration using distance terms (a *long* meeting). Other languages (e.g., Greek) use more volumetric spatial terms to describe duration (a meeting that lasts *much*). Participants were asked only to estimate the duration of an event. English speakers were more distracted by irrelevant spatial information that had a strong distance component (a line growing) than a volumetric component (a container filling). The reverse was true for Greek speakers, a pattern consistent with the dominant temporal metaphors in each language. These findings suggest that the linguistic metaphor for an abstract concept can be

internalized and can manifest itself in a non-linguistic perceptuomotor task. My experience in Dr. Casasanto's lab was immersive and exciting, and therefore contributed a significant piece to the puzzle of my ultimate goal.

During my final year at Vassar, I completed an independent senior thesis on the relationship between grammatical gender and speakers' object conceptualizations. I created a computer program to introduce participants to a gendered lexicon that I developed. Then, participants rated the how likely each object was to possess stereotypically gendered traits. The data I collected in fact revealed no effects of the new lexicon. In revisiting the design, I discovered features that were probably not ideal - hindsight is 20-20. The experience of conceptualizing, designing, programming, running, analyzing, and writing about this study independently gave me a new understanding of empirical research. In part because of this thesis work, I graduated with departmental and Phi Beta Kappa honors.

As an undergraduate, I also sought out opportunities for teaching and mentoring. I volunteered at an elementary after-school program in an underprivileged community, where I led activities like vegetable-identifying contests, lessons on how weather systems work, and spent time knitting with the students. I also taught weekly French lessons to kindergarteners in New York, and during a semester in Paris, I taught English to French-speaking fifth graders. These experiences have helped me gain confidence and a passion for mentoring and teaching.

During my final year at Vassar, I was selected to be the Cognitive Science Intern for all introductory classes. In addition to grading assignments, I held weekly office hours and evening workshops when difficult projects were assigned. When students started coming to chat about "cog sci" even when there was no assignment, I knew I had begun to make the impact I hope to continue making in the future: building enthusiasm for and participation in Cognitive Science.

I have started my path toward a Ph.D. in Cognitive Science at UCSD and am thrilled to be a part of an interdisciplinary program with widespread interest in embodiment and language. Because involvement in the department is important to me, I am one of two graduate representatives. We act as liaisons between the graduate students and faculty and coordinate meetings among the students to discuss current issues and promote department cohesion.

The courses I have taken at UCSD have contributed both breadth and depth to my background. I have benefitted from courses not only in Cognitive Science, but also in Linguistics and Psychology. I am also an active participant in the Center for Research on Language (CRL), which brings together researchers from Linguistics, Psychology, Communication, and Cognitive Science. In addition, the hands-on research experience that I have acquired in my first year has been formative. I participated in three different lab rotations, each exposing me to new ideas and techniques, such as investigating language processing using eye-tracking and electroencephalography (EEG).

I have also been working on projects that aim to better understand how metaphor shapes the way we conceptualize the world. One project looks at how we talk about economic inequality. There are metaphors like *the gap between the rich and everyone else* or *the poor getting left behind in the economic race*. We want to know whether these metaphors invite systems of inferences about causes, solutions, and other features of the problem. For instance, does framing the problem as a gap encourage people to emphasize the distance between the two sides and think of it as an all-or-none split that is difficult to cross?

We have also been working on understanding how linguistic metaphors shape our representations of time (for more detail, see Research Proposal). To see whether learning a new way of talking about time can change the way people conceptualize it, we first trained English

speakers to use vertical metaphors for time. Participants learned a relation such as *lunch is higher than dinner*. Next, they completed an implicit space-time association task. We found that people were significantly faster to make sequential decisions when the response key they pressed was congruent with the metaphor they learned (i.e., they learned that early events happen above later ones, and the “earlier” key was above the “later” one). This suggests that learning a new metaphor can create new spatial representations for time. Our follow-up experiments investigate the nature of this representation (linguistic or non) and whether a more natural context will have the same effect. This project provided me with the opportunity to learn to program an experiment in Matlab and analyze results with R.

I have also had opportunities to teach at UCSD. I worked as a Teaching Assistant for the Cognitive Science courses *Drugs: Brain, Mind, and Culture* and *Learning, Memory, and Attention*. For both, I held weekly discussion sections, and I created and graded assessments. Through these experiences, I have become better at communicating difficult concepts, and I received the department’s Superior Teaching award during my first quarter as a TA.

I have also honed my teaching skills through UCSD’s Academic Connections, a pre-college program geared especially toward underprivileged students. Through this program, I teach SAT prep at a local high school and also taught a 3-week *Intro to Cognitive Science* course over the summer. Designing the curriculum for this course was a major and satisfying undertaking. In addition to teaching through traditional lectures, discussions, and readings, we explored anthropology at the Museum of Man, learned about robotics through hands-on programming, and conducted our own behavioral experiments.

In order to share Cognitive Science with a wider audience I keep a blog called *What’s in a brain?* I am also part of a blog called *NeuWrite San Diego*, which is written by neuroscience and Cognitive Science grad students. The weekly meetings in which we critique our posts are valuable opportunities to enhance my science communication skills while collaborating with others. Thanks in part to my blogging background, I was recently commissioned to write an article for Virgin Unite on metaphors in business.

My research and teaching experiences at UCSD will continue to lay a solid foundation for my career, setting me on a trajectory to become a leader in the study of language and mind. Ultimately, my goal is to have a career in science, to continue to push the frontiers of our understanding of language and mind, and to share what I learn through writing and teaching. I am prepared, driven, and passionate about this journey.

Publication & Presentation:

Approaches to simplifying sentences containing relative clauses. (2010) Hendricks, R., Curtis, D. & Zeng-Treitler, Q. In J. Sanchez & K. Zhang (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2010* (pp. 118-126). Chesapeake, VA: AACE. Retrieved from <http://www.editlib.org/p/35519>

Rose Hendricks, *Cognition Without Language*, Mid-Hudson Psychology Research Conference, April 2012.

References:

Casasanto, D. & Boroditsky, L. (2008). Time in the mind: Using space to think about time. *Cognition*, 106, 579-593.