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RESEARCH STATEMENT

Time cues are ubiquitous at both sentence and discourse levels. The ability to quickly integrate time cues is a crucial and fascinating aspect of discourse comprehension. My major research interest is in how temporal processing cues are integrated with both linguistic and world knowledge to facilitate language comprehension.

The formation and updating of mental event representations are guided by both generalized event knowledge and temporal processing cues. Verb aspect provides one type of time cue that modulates the implicit mental activation of event knowledge. Although much is known about differences in mental representations that map onto ongoing versus completed events, no work has yet examined how representations unfold within events that are in progress. My research examines these in progress or ongoing events signaled via verb aspect and hypothesizes that ongoing events engender a fine-grained incremental updating process. Results of this program will have implications for the theoretical contrast between constraint-based and spreading activation models of semantic priming. This line of research should eventually have clinical implications as well, for populations with acquired brain injury who have discourse comprehension deficits. More generally, the results will provide a novel contribution toward conceptualizing how time cues shape event processing.

As lab manager and then director of the Tompkins Adult Neurogenic Language Lab, I engaged in all aspects of the research process for two large-scale investigations funded by the National Institutes of Health (NIH). Both research projects investigated language comprehension deficits following right hemisphere brain damage (RHD). For the first investigation, I mentored multiple graduate and undergraduate students during stimulus development, participant recruitment, E-prime programming, and data collection and analyses. My contributions yielded co-authorship of three refereed publications (Tompkins, Fassbinder, Scharp, & Meigh, 2008; Tompkins, Scharp, Fassbinder, Meigh, & Armstrong, 2008; Tompkins, Scharp, Meigh, & Fassbinder, 2008) and a fellowship to present at the Clinical Aphasiology Conference (CAC), a highly competitive platform for disseminating cutting edge research and the premier conference for aphasia researchers world-wide.

In addition to managing the lab activities and mentoring students, I gained considerable experience in grant writing. Specifically, I assisted in the conceptual development and writing of the second grant which was an early phase clinical trial implementing a contextual bias treatment targeting basic psycholinguistic mechanisms (suppression and coarse coding) in individuals with RHD. My efforts for this project produced two co-authored publications (Blake, Tompkins, Scharp, Meigh, & Wambaugh, 2014; Tompkins, Scharp, Meigh, Blake, & Wambaugh, 2012) with a third underway, and I expect to continue to collaborate on publication of results from this line of work. I directed students and staff members throughout the second investigation and gained valuable skills and insight for developing and executing a line of research from start to finish. Complementing these efforts with the RHD population, my lab contributions have also culminated in multiple peer-reviewed publications in the aphasia literature (Scharp, Tompkins, & Iverson, 2007; Tompkins, Fassbinder, & Scharp, 2004; Tompkins, Scharp, & Marshall, 2006).

My independent line of research in temporal processing was sparked by weaving together my lab experiences with a long standing interest in narrative comprehension. Comprehension relies on a multitude of linguistic and non-linguistic cues that are essential for locating and
sequencing events on a narrative timeline. Shifts forward on the narrative timeline (e.g., an hour later) often prompt a decrease in mental activation for concepts that are read or heard before the time shift. My initial investigation examined how adults with and without RHD process shifts in the narrative timeline. Narrative comprehension deficits are frequently associated with RHD and narrative comprehension is predicted by effective suppression function, a general comprehension mechanism that reduces the mental activation of contextually irrelevant or incompatible information. As applied to shifts in the narrative timeline, suppression would function to decrease activation of concepts that were highlighted before the time shift. The novel prediction from this investigation was that a suppression deficit would generalize to processing time shifts. Results indicated that a subset of adults with RHD demonstrated a suppression deficit that extends to processing time shift cues. These findings have been published in the *American Journal of Speech-Language Pathology* (Scharp & Tompkins, 2013).

While interpreting my time shift data in the landscape of the larger literature on temporal processing, event completion status emerged as a prominent factor. Event completion status refers to whether an activity is perceived as in progress or completed. Distinctly different mental event representations are formed based on completion status and examining those differences became the springboard for my dissertation proposal.

The theoretical rationale for my dissertation stems from two prominent event representation perspectives: simulation and semantic association. Simulation theories propose that primary sensory and motor neural networks are activated during semantic processing in a pattern similar to actually experiencing what is read or heard. The semantic association perspective suggests that specific features and attributes become linked to a given event through knowledge and associations acquired during real-world experiences. In their current forms, these perspectives are not mutually exclusive, but instead offer critical insights that shape this line of research. The temporal processing literature currently conceptualizes events as either in progress or completed, thus framing event continuity as an all or nothing phenomenon. However, it is highly likely there is a dynamic nature to event model updating, specifically that events that are in progress engender an incremental updating process. This novel prediction is derived from unexpected and contradictory empirical findings, contributions from event representation theories, and an integration of threads from research in both the temporal and spatial processing domains.

My dissertation study is innovative because it is the first to focus specifically on mental event representations that are in progress and predicts that there is an incremental updating process at work. I have completed a large pilot study to identify experimental targets, in which 40 participants generated features or attributes that are strongly associated with either an early or a late event phase. Event phases close to the two extremes of the timeline for a single ongoing event were chosen to elicit a strong contrast: either just beginning or being almost finished with an event (e.g., playing a board game, watching a movie). The experimental stimuli are sentences that signal an early or late event phase paired with lexical targets derived from the pilot data that are strongly associated with each event phase. The experimental task includes word-by-word sentence processing followed by a letter string that prompts a lexical decision. A congruity effect is predicted based on the hypothesized difference between the implicit mental activation of event features that are linked to each event phase. Therefore, the primary predicted outcome is faster lexical decision response times (RTs) to time congruent event phase features and longer RTs for incongruent pairings. Data analysis is being conducted using multilevel modeling, a novel
approach in this body of literature. This study is an initial step toward examining whether comprehenders engage an incremental updating process for events that are cued as in progress.

The ability to quickly integrate time cues is a critical piece of the discourse comprehension puzzle. The results of my dissertation will generate multiple directions for future research in the temporal processing domain. For example, a follow-up study could use eye tracking in a visual world paradigm to examine online gaze patterns to pictures highlighting event features that are strongly associated with different event phases. Future work will continue to be theoretically motivated by contrasting the influences of time cues using different facets of mental event representation formation and updating.

This research program stretches beyond the standard semantic and syntactic manipulations in the temporal processing literature and provides a natural application to understanding the nature of strengths and weaknesses in clinical populations with discourse comprehension deficits. Tapping into the internal structure of mental event representations will also offer insight related to constraint-based models of semantic priming versus simple spreading activation accounts. In addition, I was recently honored to receive a 2016 CAPCSD Ph.D. Scholarship and my dissertation is on track to be completed by early summer 2016.

This novel line of research also offers possible collaborations with scholars from fields such as cognitive psychology, psycholinguistics, and neuroscience. The priorities for the first year of my tenure track position are to forge relationships with potential collaborators, establish my research lab, submit at least one article for publication based on my dissertation results, and apply for training via ASHA’s Research Mentoring (ARM) Network: Pathways Program to support ongoing preparation toward crafting competitive applications for extramural funding. In years two and three, my goals will include tapping funding sources within the university community and applying for ARM: Lessons for Success, a program that provides tailored mentoring for both grantwriting and executing successful programs of research. Actively seeking mentoring and training is mandatory to hone my skills and to supplement grantwriting coursework and experiences I engaged in during my Ph.D. program. My scholarly work will build toward submitting grant proposals to the National Institutes of Health and the American-Speech-Language-Hearing Foundation. In addition to pursuing multiple funding sources and maintaining a productive publication record, my work will be submitted annually to the Clinical Aphasiology Conference and ASHA convention, or other relevant meetings.

My research program in temporal processing provides a multitude of access points for student involvement at all developmental levels. Stimulating critical thinking via research-driven experiences provides an indispensable opportunity for students to apply their budding analytical and clinical skills in a complementary setting. I will recruit and foster student participation early and often in my research lab.

In conclusion, I am excited to expand this original and innovative line of research that targets a crucial aspect of discourse comprehension, offers a fresh perspective on conceptualizing mental event representation formation and updating, and has potential implications for theoretical views of semantic priming. I’m also quite eager to develop new collaborations and skills and to support student development in the process.
References


