Neural correlates of prosody and plausibility in garden-path processing
Dirk B. den Ouden1, Kiel Christianson2, Catherine Anderson3 & Michael Walsh Dickey4
1. Department of Communication Sciences and Disorders, University of South Carolina
2. University of Illinois at Urbana-Champaign; 3. McMaster’s University; 4. University of Pittsburgh
denouden@sc.edu

Introduction
• Prosodic and semantic sources of information interact with syntactic information during sentence processing.
• Studies into the neural correlates of (complex) syntactic processing suggest a left-hemisphere network of cortical and subcortical areas in which activation is modulated as a function of syntactic complexity (e.g. Den Ouden et al., 2012):

Methods (II)
1) While the man hunted the deer ran into the woods (plausible GP)
2) While the man hunted the pheasant the deer ran into the woods (globally implausible)
3) While the man hunted the pheasant flew over the woods (locally implausible - impossible)
4) While the man hunted the pheasant the deer ran into the woods (non-GP control)

Results
Main Effects:
Figure 2: A: Main FX of sentence type and prosody (F-tests, p<.001 (uncorr.); k>3)

• Prosodic versus neutral intonation: superior temporal and auditory cortex, bilaterally, with more extensive activation in left temporo-occipital cortex.
• Sentence types with less plausible GP interpretations associated with higher processing cost, as reflected in neural activation patterns.

Syntactic localization (OC>SC):
• LH lateralized activation pattern, replicating previous studies.
• Overlap with sentence-structure and prosodic main FX in LH superior temporal cortex.

Conclusions
In processing temporarily ambiguous sentences, the syntactic network in particular left posterior MTG/STS shows increased activation with greater reliance on use of extrasyntactic information, i.e. plausibility and prosody. This suggests highly interactive system, rather than autonomous syntactic processor.

References

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

Figure 11

Figure 12

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