1077-H1-1408 **John K McSweeney***, john.mcsweeney80@gmail.com. *Quantitative Analysis of Crossword Puzzle Difficulty.*

What distinguishes a crossword puzzle from a simple list of trivia questions is the interlocking nature of the answers in the grid – one solution can promote further ones in a cascading fashion. To model this mathematically, we build a network object from a puzzle: answers in the puzzle are nodes in the network, and nodes are linked via an edge if the corresponding answers cross. Each node also has a state, "solved" or "unsolved", and a node x becomes solved if the proportion of its neighbors that are solved exceeds some given threshold φ_x; we take the φ_x to be independent and identically distributed random variables. Motivated by analogous issues which arise in epidemiological analyses of structured populations, we consider the following general questions: what features of the distribution of the difficulties φ_x of the clues, and of the topology of the crossword network, determine whether a puzzle can be fully (or nearly fully) solved? Are impediments to full solution typically due to puzzle structure or clue difficulty? We will present rigorous results for certain puzzles with a high degree of symmetry, as well as simulation-based analyses of "real-world" puzzles from the Sunday New York Times. (Received September 19, 2011)