In this joint paper with Camilo Thorne, we investigate whether semantic complexity influences the distribution of generalized quantifiers in a large English corpus derived from Wikipedia. As a measure of semantic complexity of a quantifier we take the minimal computational device recognizing it. We consider quantifiers that belong to three increasingly more complex classes: Aristotelian (recognizable by 2-state acyclic finite automata), counting ($k+2$-state finite automata), and proportional quantifiers (pushdown automata). Using regression analysis we show that semantic complexity is a statistically significant factor explaining 27.29\% of frequency variation. We compare that with the influence of other factors (e.g., quantifier monotonicity or quantifier length).