Chambers (2009: 44-45) and Tagliamonte both quote David Sankoff to the effect that "ongoing work in sociolinguistics found that relatively small samples--samples too small to be technically representative--were sufficient to account for language variation in large cities" (Tagliamonte 2006: 23). Milroy and Gordon, too, quote Sankoff, noting that "samples for linguistic studies tend to be much smaller than those found in other types of surveys" (2003: 28-30). Tagliamonte recommends "reaching the right people" (2006: 28) for sociolinguistic purposes, and that "it is better to design your sample to be smaller … the size of the sample must necessarily be balanced with the available time and resources for data handling" (2006: 33). These central sources describe the basic practice in the field. In this paper, I will show from an analysis of large-scale survey data that small samples preserve a disproportionate amount of the feature variants from the overall speech community. The experiment used data from the Linguistic Atlas Web site (www.lap.uga.edu). Twelve vowels from the American English phonological system were each represented by one word: i (three), I (six), e (eight), E (ten), A (half), ai (five), a (watch), O (fog), o (sofa), uh (one), U (good), and u (two). For six vowels, the data was also processed using the "simplified phonetics" option on the site. The number of types of realization for each vowel was tallied overall, and then tallied separately for eleven subsamples at different sizes, in four domains: sex (women/men), education/ social adjustment (Type I/II/III), occupation Farmers/KeepingHouse/Managers/Professionals, and urban centers (New York City/Philadelphia). When the percentage of types found in any subsample is compared to the sample overall, we find that the ratio of types to speakers consistently increases for each smaller subsample. The effect is moderate in the larger subsamples, but at lower levels of subsampling we observe a dramatic change in the type/speaker ratio: up to 14 times more types than expected are retained in the small samples. For example, out of 44 realization types for 1162 speakers overall for the simplified phonetics of /u/ in two, the 5% sample for Professionals still has 14 types instead of the expected 2, and the 2% sample for New York City still has 5 types instead of the expected 1. We can explain this effect as a basic principle in linguistics that arises from the inherent multidimensionality of the complex system of speech (Kretzschmar 2009): since there are many spatial and social groups in a large sample, each of which may have different preferred variants for any feature, and most of the same multiple dimensions are still in play within a small sample, then proportionately more variation than expected will be present there owing to the dimensionality of speech. Sociolinguists thus cannot rely on small samples accurately to represent the larger community, and should anticipate that small samples will contain influences from multiple dimensions of speech.