APPENDIX B

Four alternatives to Equation (1) were examined. Rather than reporting correlations between the models and every measure, we focus on the dimension of primary interest, mutability, and will use a single measure as our proxy for mutability. The factor analysis reported in Table 4 illustrates that only one measure seems to be a "pure" measure of mutability in the sense that it loads highly on Factor 1, the mutability factor, but has near-0 loadings on the other factors, namely ease-of-imagining. Therefore, tests below report correlations for ease-of-imagining only.

The first alternative model represents a feature's immutability as the simple sum of other features' dependencies on it:

$$c_i = \Sigma_j d_{ij}.$$

Correlations between this model and ease-of-imagining judgments were −.86, −.43, −.28, and −.75, for the categories *chair, guitar, apple* , and *robin,* respectively. Three of these correlations are lower than the corresponding correlations for Equation (1), −0.92, −0.62, −0.60, and −0.59, although the differences are not statistically significant. The relative superiority of Equation (1) over the sum of dependencies model confirms the need for the iterative aspect of Equation (1).

To construct the second alternative model, we added a nonlinearity to Equation (1) to optimize the fit to mutability judgments. In this model, the result of each iteration was normalized using a linear transformation which placed the lowest centrality value at 0 and the highest at 1, then raised each value to a power in the range 0 to 1, a power chosen to maximize the resulting correlation. This model gave only slightly better predictions of immutability than Equation (1), −.92, −.72, −.60, and −.74 for the four categories, respectively, despite its greater complexity and its free parameter.

We also tried a model which considered not only the extent to which other immutable features depended on the focal feature, but also the extent to which the focal feature depended on other mutable features, by adding a new term $\Sigma_k d_{ki} (1 - c_{k,t})$. Logically, a feature's dependence on other mutable features should increase its mutability, so this term should be subtracted to predict immutability:

$$c_{i,t+1} = \alpha \Sigma_j d_{ij} c_{j,t} - (1 - \alpha) \Sigma_k d_{ki} (1 - c_{k,t})$$

where α is a number between 0 and 1. If α is close to 0, then the centrality of feature i is proportional to what feature i depends on; if α is close to 1, then the model approaches Equation (1), feature *i*'s centrality is proportional to what depends on it. We varied α from 0 to 1 in increments of .01. The correlations with ease-of-imagining were highest for all categories when α was close to 1 (in all cases, greater than 0.8), suggesting that the second term adds little of psychological relevance to the model.

We also evaluated a model which considered the total connectivity of each feature; one that sums over the two directions of dependency:

$$c_{i,t+1} = \Sigma_j d_{ij} c_{j,t} + \Sigma_k d_{ki} c_{k,t}$$