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Exploring animacy as a mnemonic dimension

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ABSTRACT

VanArsdall, Joshua Edward. Ph.D., Purdue University, August 2016. Exploring Animacy as a Mnemonic Dimension. Major Professor: James S. Nairne.

There is a great deal of evidence across cognitive science that animacy, or more generally, the features that make up what it means to be a living thing, is a foundational dimension of human cognition. In perception, animates both capture attention (Pratt, Radulescu, Guo, & Abrams, 2010) and are relatively immune to change blindness (New, Cosmides, & Tooby, 2007). Developmental work places the animate-inanimate distinction as one of the first categories children learn (Opfer & Gelman, 2011). Work in neuroscience points toward a fundamental role for animacy in semantic memory (Caramazza & Mahon, 2003), and linguists have identified animacy as a "linguistic universal" (Comrie, 1989). Despite seemingly overwhelming evidence for the fundamental role animacy plays in human cognition, little effort has been made to understand the role of animacy in episodic memory.

In three studies, the role of animacy as a dimension of word meaning was investigated. The collection of normative data for 1200 words on six scales believed to relate to the animacy construct in Study 1 set the stage for Studies 2 and 3, which explored the makeup of the animacy dimension and how it relates to other word dimensions (Study 2), and then how both animacy and other word dimensions predict

free recall (Study 3). Results from Study 2 indicated that animacy is relatively independent of other word dimensions, and made up of two primary components, a mental component and a physical component. Study 3 collected recall norms from 800 participants, and regression and relative-weight analyses indicated that word animacy was consistently one of the primary predictors of free recall, with the physical component of animacy a larger predictor than the mental component. In addition to these primary results, the animacy advantage in free recall was independent of list composition (casting doubt on a distinctiveness explanation for the effect), age, and two potentially-relevant personality measures, Person and Thing Orientation (Graziano, Habashi, & Woodcock, 2011).

INTRODUCTION

Across cognitive science, the concept of animacy is quite widespread—many researchers in linguistics, perception, semantic memory, and human development are particularly fascinated by the topic. Further, the importance of animacy isn't hard to miss once one starts looking. Animate things (or to somewhat simplify, "living things") are everywhere in our day-to-day lives, and include our friends, family, and pets as well as our competitors, potential food, and (at least for our ancestors) predators. In fact, a basic understanding of living things and their intentions is often understood to be the root of social cognition: To study how people think about social situations, first we must consider how people think about *people.* This concept was first investigated by Heider & Simmel (1944) using now-iconic films that depict shapes chasing one another; an attribution of animacy to the shapes is almost completely irresistible (see Figure 1 for a still from one such film). After all, detecting and understanding that something is alive is an important precursor to later steps, such as inferring another's mental states and predicting another's behavior. These are processes that we engage in every day, moment-to-moment when we interact with other people (and animals, and sometimes even stranger cases as well).

A second example of the "everydayness" of animacy's importance is in the understanding of speech and language. Living things are very often the subjects of

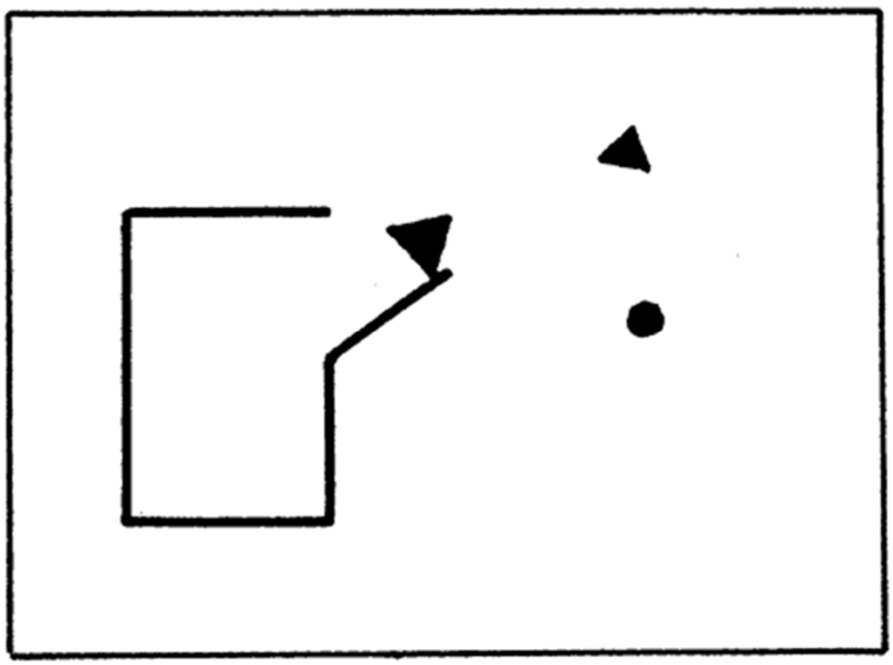

Figure 1. Still from Heider and Simmel's (1944) film, in which geometric shapes interact in an “animate” fashion. In almost all responses, participants readily inferred mental states and attributed animate motion to the shapes.

sentences: They are typically the actors in our conception of how the world works, and this fact is reflected in speech. Because animate words tend to be subjects, they tend to occur earlier in the sentences of many languages (or at least those with subject-verb-object and subject-object-verb structure), including English (Tomlin, 1986). Naturally, identifying and understanding the relationship between a sentence's subject and its object is critical to the proper understanding of language. It seems reasonable then that many linguists talk about the cross-language relative importance of animates over inanimates in the context of an "Animacy Hierarchy", which places humans at the top and inanimate objects at the bottom (Silverstein, 1976; Yamamoto, 1999a).

These concepts are reflected in natural philosophy as well. Greek philosophers including Plato and Aristotle posited ideas that were later refined by theologians like St. Thomas Aquinas into the *scala naturae*, or literally translated, a "stairway of nature" (Lovejoy, 1976). Today this concept is generally referred to as the "great chain of being", with base minerals at the bottom, working up through plants, to animals, to humanity, to divine beings such as angels and demons, and finally to God himself. Notably, the rankings on this scale were thought to relate to the amount of 'spirit' contained within its members (and interestingly, 'animus' is the Latin word for this concept). 'Spirit' related to each member's degree of personal agency, with inanimate objects lacking in spirit and God as omniscient and omnipotent.

While these examples are certainly interesting and illustrative, they do not get at why animacy may be important for human cognition and human memory in particular. Underlying these everyday examples is a functional-evolutionary interpretation of its importance. Both social cognition and speech perception are of course highly social phenomena, and social selection pressures are thought to be some of the most, if not the most important selection pressures in our recent evolutionary history.

In fact, the idea that much of humanity's present-day form is due to social pressures is a theory all its own, known as the Social Brain Hypothesis (Dunbar, 1998). It puts forth that as our pre-human ancestors' group sizes increased in response to pressures selecting for increased group size, so too did the processing power of their neocortices to keep up with the added amount of social information that needed to be processed. An understanding of animacy is surprisingly critical to this theory, as the simple detection and recognition of living things is an obvious prerequisite for any kind of later social processing, including the communication provided by language. These varying forms of evidence all point toward a large role of the concept of animacy in many types of cognitive science, particularly those fields interested in how the brain detects, understands, and retains information about other people and animals.

Our lab and others have recently explored the mnemonic importance of animacy, very broadly described as the difference between living and nonliving things. The initial impetus to explore animacy and its effects on memory came from the *a priori* observation that living things in the environment are among the most dynamic forces present, and represent everything from social partners and potential mates to predators and prey (Barrett, 2005). Evolutionarily, it would make sense to notice and remember these dynamic parts of the environment.

A reading of other literatures in cognitive science confirms the importance of animacy in domains apart from episodic memory, with work done in neuroscience, developmental psychology, and perception highlighting its importance in particular. The distinction between animates and inanimates has long been noted in the neuroscience of *semantic* memory, as some patients are known to lose the ability to name living things, such as animals, but not nonliving things (Caramazza & Shelton, 1998). Further, there is evidence that distinct neural systems exist for the detection of agents in the environment (Gobbini et al., 2011), and that an animacy continuum exists in the ventral vision pathway (Sha et al., 2015). Additionally, young children learn to distinguish between living and nonliving things in the environment very quickly (see Opfer & Gelman, 2011, for a review of the development of the animate-inanimate distinction in children), and considerable recent research in perception indicates that animates receive prioritized attentional and perceptual processing (see New et al., 2007; Scholl & Gao, 2013; Yorzinski, Penkunas, Platt, & Coss, 2014; among others). Yet with all of this work done in other fields, very little is known about how precisely animacy affects memory; this is especially striking considering the attention that word dimensions such as frequency, concreteness, and imageability are given in the field. The goal of this project is to shed light on an otherwise mysterious mnemonic dimension.

Animacy and Episodic Memory

While the majority of studies that tackle animacy as a contributor to episodic memory performance were not performed until recently, using orienting tasks involving living/nonliving decisions and using living things as stimuli have been common practices in much of mainstream memory research. As such, animacy tasks have something of a misleadingly-long history in cognitive psychology. In the levels of processing experiments, for example, participants perform "shallow" (surface feature-level) processing or "deep" (semantic-level) processing on to-be-remembered words as the orienting task for an incidental memory experiment (Craik & Lockhart, 1972). A very common "deep" task is to ask participants whether or not presented stimuli are animate or not, often phrased as, "Is the word an animal name?" or "Is the word a living thing?" (Craik & Tulving, 1975; Fliessbach, Buerger, Trautner, Elger, & Weber, 2010; Shulman, 1971, among hundreds of others). Curiously, it seems as though no one ever thought to look to see if there was a difference in recallability for words classified as animate compared to those classified as inanimate. While such a comparison would of course be flawed due to item-selection issues (animate and inanimate words used in the experiments likely differed on other dimensions that were not animacy), thinking about memory from a functional standpoint may have led to the question being asked.

Initial Empirical Evidence of the Animacy Effect

The bulk of research on the effect of animacy on episodic memory has been done in the past few years, with two primary types of studies: The effects of animate *processing* on remembering, and the effects of animate *concepts* on remembering. Studying the effects of animate concepts is intuitive. Are concepts classified in our semantic memory as animate more likely to be recalled in an episodic memory task? Yet studying recall of different types of items can be problematic, as any two given lists of animate and inanimate words might differ on any number of other dimensions unrelated to animacy. Studying animate processing is therefore interesting, because it can attempt to divorce a conceptual representation of animacy (that is, a representation tied to a particular word and its meaning) from a purer processing account. In doing so, animate processing can avoid previously-mentioned problems with item selection, particularly if nonwords are employed. As nonwords have no prior meaning, they are not laden with any prior assumption of animacy or inanimacy.

The first (and only published) study to investigate the effects of animate processing on remembering (and really the first study to investigate the effects of animacy on episodic memory in general) did just this, looking at the animate processing of nonwords (VanArsdall, Nairne, Pandeirada, & Blunt, 2013). In VanArsdall and colleagues' study, participants processed nonwords (such as "FRAV" or "JOTE") for animacy in an incidental learning task. By presenting these nonwords with short phrases such as "loves to travel" or "filled with wires", the authors implied a state of animacy for some nonwords and not others. Participants' orienting task was to read the nonword-phrase pair, and rate it based on its similarity to a living thing on a scale from one (1) to six (6), with a rating of one (1) corresponding to "very likely to be an object" and a rating of six (6) corresponding to "very likely to be a living thing".

Following this initial processing task, participants performed a short (2 min) distractor task and then completed a recognition task for the nonwords, in which half of the presented words were new. The authors found a significant advantage for nonwords processed with animate properties compared to nonwords presented with inanimate properties in this recognition memory task, $t(37) = 1.96$, $p = .029$ (one-tailed), $d = .32$. In a second experiment, VanArsdall et al. replicated these findings in free recall with a shorter list of nonwords, $t(31) = 3.05$, $p = .005$, $d = .61$.

While these findings on animate processing are important, investigating the effects of animate *concepts* on episodic memory is the more obvious and perhaps more practical approach to understanding the effects of animacy on remembering. In their 2013 article, Nairne, VanArsdall, Pandeirada, Cogdill, & LeBreton investigated animacy as a dimension relevant to memory using both regression analyses and a controlled experiment to demonstrate its importance. In their initial study, Nairne and colleagues reanalyzed a set of recallability norms produced by Rubin and Friendly (1986) for 925 nouns. They roughly coded the words used in the original Rubin and Friendly analysis for animacy using a five-point scale in which one (1) indicated a word clearly representing a nonliving thing and five (5) indicated a word clearly representing a living thing. By coding the words, the authors could re-analyze Rubin and Friendly's existing data, adding animacy as a variable. As the analysis looked at such a large set of words, item-selection concerns are minimized.

In the regression analyses performed on these newly-coded data, it was found that animacy was one of the highest contributors to explaining overall variance in recall ($\Delta R^2 = 0.043$, nearly twice that of its next-highest competitor, imagery). In a further analysis designed to determine the unique variance animacy contributed to recall (a "relative-weight" analysis, see LeBreton, Hargis, Griepentrog, Oswald, & Ployhart, 2007), it was seen that animacy also *uniquely* accounted for the plurality of the variance in recall (21.6%), with imagery once again a close second (20.8%).

Although these data certainly indicate that animacy is an important determinant of recallability, they are post-hoc. To test the effects of animate concepts on episodic memory empirically, Nairne and colleagues developed two lists of words that were matched on ten different dimensions including age of acquisition, category size, category typicality, concreteness, familiarity, imagery, frequency, meaningfulness, word length, and semantic relatedness. One of these lists consisted purely of animate words, while the other consisted of purely inanimate words.

In a direct test of the effects of animate concepts on memory, the authors simply had participants intentionally learn the two lists of words (mixed together) in a repeated study-test design. Participants read the words one at a time on a computer monitor, and then recalled them after a short distractor period a total of three times; animate words were recalled better than inanimate words, $F(1, 53) = 44.9$, $MSE = 0.023$, $\eta_p^2 = .459$, and the size of this effect did not decrease from trial to trial, $F(2, 106) < 1$.

This "animacy effect" on free recall has been replicated by Bonin, Gelin, & Bugaiska, (2013), both directly with a new set of French words and using line drawings of animate and inanimate concepts; these data extended the effect into pictures of animates. Further, Bonin and colleagues found the animacy effect in recognition memory as well, with participants recognizing animate words significantly better than inanimate words, $t(32) = 2.54$, $p = .016$. Further, there was no effect of animacy on false alarm rate, indicating that the animacy effect in recognition is due to better memory and not simply a difference in error rate $t(32) = 0.06$.

The animacy effect has also been investigated using cued recall tasks (VanArsdall, Nairne, Pandeirada, & Cogdill, 2015). In VanArsdall and colleagues' experiments, they paired animate and inanimate words with Swahili words in a kind of mock foreign-language vocabulary learning design. At encoding, participants saw pairs of Swahili and English words (such as "*malkia*-duck"), and were asked to remember these pairs for a later test. Swahili-English words were randomly paired together to avoid any kind of item-selection effects; actual definitions were not used. After a short distractor period, participants were given the Swahili words back one at a time in a random order, and asked to produce the English word that was seen paired with it earlier. This study-distractor-recall design was performed a total of three times, with Swahili-English word pairs kept constant across trials, much like in an actual foreign-language learning task.

Much like in free recall, an effect of animacy was observed across all three study-test trials, $F(1, 45) = 18.82$, $MSE = 0.018$, $\eta_p^2 = .295$, and the advantage did not diminish from trial to trial $F(2, 90) < 1$. Further, the authors replicated their finding using highly-categorized lists of animate and inanimate objects ("four-footed animals" and "articles of furniture"). These data provide the first evidence for an advantage of animate concepts in cued recall, at least for cases in which one of the words is an "effective" nonword; participants had no prior expectations of animacy for the Swahili words.

Data from Popp & Serra (2015) confirm these findings, but also restrict them somewhat: Across several experiments, they demonstrated that while an advantage existed for acquiring English "definitions" for Swahili words, it did not for English-Swahili pairs, or other types of cued recall in English-English word pairs. Popp and Serra have commented that this lack of an effect under certain conditions may be due to an attentional bias for animate concepts, or potentially the influence of mental arousal. In an fMRI study by Xiao, Chen, and Xue (2016), however, it was found that although animate words were processed faster and elicited a stronger pattern of activity in the dorsal attention network, these differences did not mediate the animacy effect in memory. According to their data, the advantage in recall was better explained by a greater neural global pattern similarity in the posterior portion of the left parahippocampus for animate words, as well as more overall activity in the left hippocampus for animate words. These data point toward the influence of semantic organization and semantic context as an explanation of the animacy effect in recall. In other words, it was not attentional processes that explained the effect, but semantic attributes of the words themselves that appeared to explain the animacy advantage in recall.

Unlikely Explanations of the Animacy Effect

While there is interesting evidence that animacy does have significant effects on episodic memory, it is not currently clear what exactly *about* animate concepts causes them to be memorable. In the studies described above, several hypotheses are investigated and rejected. Nairne et al., (2013) investigated the possibility that participants may have been using a categorical search strategy of their memory, for example outputting animate and inanimate items in clusters. This explanation does not seem to pan out, as adjusted-ratio-of-clustering (ARC) scores (Roenker, Thompson, & Brown, 1971), a measure of tendency to recall by category, did not indicate that any kind of recall-by-category strategy was occurring. VanArsdall and colleagues' (2014) findings echo this, as a categorical search of memory would not be particularly useful for a cued recall task.

Gelin, Bugaiska, Méot, and Bonin (2015) also investigated the categorical explanation of the animacy effect, presenting participants with a list containing eight categories of items (four animate and four inanimate categories of four members each).

Even though multiple unique categories were used across the animate-inanimate dimension in an effort to control for the usefulness of any given category as a recall cue, an animacy effect still emerged, $t(26) = 3.68$, $p = 0.001$. A final nail in the coffin for the categorical hypothesis was driven in by VanArsdall, Nairne, Pandeirada, and Cogdill, (2016), when they directly manipulated category salience either masking or making obvious the presence of categories in lists of animate and inanimate words. They did this by embedding target words within a larger set of words to mask any categorical structure of targets, or by using highly salient categories for the entire list to highlight categorical structure. It was found that when category structure was made obvious, participants used the category structure to aid in recall (as evidenced by significantly positive ARC scores) and an animacy effect did not emerge. Yet when the categorical structure of the same list of words was masked by embedding the words in a larger list, participants no longer used a categorical recall strategy and a strong effect of animacy re-emerged for the target animate and inanimate words, $F(1, 49) = 49.85$, $MSE = 0.064$, $\eta^2_p = 0.504$, $p < 0.001$. If anything, using a categorical retrieval strategy reduces the animacy effect.

VanArsdall et al. (2014) also investigated the possibility that animate concepts are simply more “available” in memory. While their data seemed to indicate increased availability for animate concepts in Experiment 1 (incorrect responses were much more likely to be animate than inanimate, pointing to the possibility that participants were simply “dumping out” animate words during cued recall), their second experiment using highly-categorized lists managed to reverse the problem without eliminating the animacy effect in cued recall. That is, with highly-categorized lists, inanimate items were provided more often as incorrect answers to a cue (indicating the higher availability of inanimate items) without affecting the advantage that animate words enjoyed in cued recall.

A third possible explanation of the animacy effect in episodic memory is that animate concepts may be more sensorially detailed; in fact, animate concepts typically have more features that relate to how they look and act compared to inanimate concepts (Hoffman & Lambon Ralph, 2013; McRae, Cree, Seidenberg, & McNorgan, 2005). Many researchers might even go so far to say that differences in the number of sensory properties present for a word is actually one of the *defining features* of the animate/inanimate distinction in semantic memory. These researchers' data show primary dissociations between animates and inanimates appear to come primarily from *visual-motion* and *functional* cues: Animals on average have a much larger number of *visual-motion* cues (as might be expected), and much fewer *functional* cues compared to inanimate objects; Animals are generally not "for" something (except perhaps meat), and on the whole are "for" something much less often than most objects, which are generally designed by humans for a purpose (Cree & McRae, 2003; McRae et al., 2005; Vinson & Vigliocco, 2008).

Additionally, animates (as represented by various "creature" categories such as "reptile", "insect", or "herbivore") are more visually complex (based on the number of external parts and features) and are also more visually similar to one another (based on the four most similar concepts within a category) when compared to inanimates, and are also less distinct from one another than inanimates, presumably partially due to the larger number of features animates share (Cree & McRae, 2003). If anything however, a reduction in distinctiveness should impair memory.

While animate concepts may be more sensorially-detailed, and sensorially-detailed concepts may even be more memorable (Hargreaves, Pexman, Johnson, & Zdrazilova, 2012), these two observations are not necessarily causally linked. In Bonin et al.'s (2013) study, the authors looked at richness of sensory experience as a potential explanatory factor for the advantage that animate words show in various episodic memory paradigms, with particular attention to their own results, which replicated Nairne et al. (2013). For both their own list of French words and the original list used by Nairne et al., no differences were found between animate and inanimate words for their measure of richness of sensory experience. These data indicate that differences in sensorial detail do not wholly explain animacy's effect on episodic memory; indeed, in both Bonin et al. (2013) and Nairne et al. (2013), the animate and inanimate word lists were pre-equated for imagery (a shorthand for sensorial richness).

A related argument to sensorial richness is that animate items engender *interactive* imagery processes. That is, animate words encourage the person processing to imagine themselves interacting with the item. Bonin, Gelin, Laroche, Méot, and Bugaiska, (2015) report a study in which interactive imagery was manipulated: Participants either imagined themselves interacting with presented words, or completed an animacy-rating condition previously used by Bonin et al., (2013). While an animacy effect was found overall, the size of the effect was reliably reduced in the interactive imagery condition, $F(1, 54) = 7.13$, $\eta^2_p = 0.11$, $p < 0.01$. While these results are interesting, they miss a key point—participants themselves are animate. It is completely possible that imagining yourself interacting with an object increases recall precisely because it adds an animate concept—*yourself*—to the scene. Data from Cogdill (2015) reinforce this idea. In three experiments, she demonstrated that imagining animates interacting with objects was more beneficial for later recall of the object than imagining two objects interacting. Therefore, it seems more likely that the results found by Bonin et al. (2015) are a result of *adding animacy* (yourself) to an otherwise inanimate context, than interactive imagery itself.

The effects of encoding instructions on the animacy effect have also been investigated as a potential explanation for the effect, but to no avail (Gelin et al., 2015). Gelin and colleagues showed that animacy effects persist in episodic memory across a variety of encoding instructions, including instructions for survival processing, a moving scenario, pleasantness rating (e.g., Nairne, Pandeirada, & Thompson, 2008), a "tour guide" scenario in which participants rated words for their usefulness in planning a tour presentation, and finally, explicit learning. Across all encoding tasks, a robust animacy effect was found.

Finally, Bonin et al. (2015) have also investigated the role of elaboration as a potential explanation of the animacy advantage. Because elaboration—that is, adding information or features to to-be-learned information (Craik & Tulving, 1975)—is thought to be a resource-demanding process, Bonin et al. presented animate and inanimate items to participants in a memory task under different amounts of cognitive load across several experiments. The hypothesis was that if animacy effects are due to elaborative processing, then they should wane in contexts where less elaboration is possible, like under cognitive load. In all cases, an effect of animacy remained robust.

These data appear to somewhat disconfirm the hypothesis that the animacy effect in free recall is a result of additional elaborative processing for animate items.

Identifying Dimensions of Interest for Explaining the Animacy Effect

A major aim of this project is to begin demystifying what it is about animacy that leads to benefits in episodic memory. There is clearly something “special” about animate concepts that make them more memorable, but at present there is very little empirical evidence as to what that might be. This project aims to determine exactly what that “something special” may be by taking a forward approach. By reviewing the literature related to animacy (and a wide and disparate literature it is), the process of empirically defining and measuring several possible “underlying factors” of the animacy construct that may be driving the observed effects in episodic memory can begin.

Why then, are animate concepts memorable? Based on a reading of the literature describing what animacy *is* (Gray, Gray, & Wegner, 2007; Opfer & Gelman, 2011; Scholl & Gao, 2013; Yamamoto, 1999a, among others), a few potential features come to the fore. Gray et al. discuss “mind perception” (for our purposes, understanding that something is animate) as having not one but two primary axes: The extent to which something can *experience* the world, and the extent to which something can act on the world: Its degree of *agency*. Typically, the experience dimension is assessed via the physical, perceptually available features of a thing. Does it have eyes to see with? Can it feel with its hands? That is, can it *experience* the world with some kind of sensory apparatus? Similarly, physical reactions shown through contingent movement are also typically cues for experience—things that can sense the world should react to it.

Contingent movements can also be an indicator for agency, however. The key difference that Wegner and Gray (2016) put forward between movement as a cue for agency versus as a cue for experience is that agentic movement is active, while experiential movement is reactive. This they say is the difference between active *doers* and reactive *feelers*. Most other indicators for agency are more conceptual and subtle. Can it think? Does it have self-control? Can it recognize emotions in others? The key question here is: Does it have ways to interpret and act on the world around it? A potential problem with this approach however is that it is almost primarily focused on the perceptual and conceptual features that may identify whether or not something has a mind: This approach is primarily rooted in how the mental features of animacy are identified.

Opfer and Gelman (2011) offer a different delineation of cues that make the difference between between the animate and inanimate: *Featural* cues and *dynamic* cues. Featural cues are the physical cues that indicate something is animate—features like whether something has a face, the presence of legs, smooth versus angular contour, or potential textural features like fur and skin. Dynamic cues, meanwhile, are physical cues that help infer something about more abstract mentalistic animate features that include agency, intentionality, or goal-directedness. Typically, dynamic cues are related to movement. In particular, movements that are self-generated and self-sustained are the most indicative of the presence of animacy; objects cannot move on their own. Other dynamic cues include movement that is particularly biological in form

(Johansson, 1973), directed by a goal, or otherwise contingent or time-linked to the actions and behaviors of others.

The most obvious demarcation between types of cues that appears to satisfy both of these ways of carving up animate features is that some cues are physical (rooted in what something *is*, either observable perceptually or known conceptually), while others are mental (rooted in the inferred mental capacities something has, that once again, are either observable perceptually or known conceptually). The second axis along which cues for animacy appear to be divided (as hinted above) is whether they are observed perceptually or known conceptually.

A goal of this project is to attempt to identify a few key markers of both physical and mental cues for animacy that are able to sample widely from the animacy dimension. These markers include features that are readily available via perception, such as the presence of movement (particularly movement that is goal-directed), and other features that while physical, have a more conceptual basis. Movement itself is a very physical cue for animacy, and is inherently perceptual. Yet at the same time (as discussed by both Opfer & Gelman, 2011, and Wegner & Gray, 2016), movement can be indicative of mental states as well, particularly if the movement is goal-directed (agentic) or contingent (experiential). Thus, perceptual information about movement can be informative about both physical cues (the movement itself) and mental cues (the goal or purpose of the movement) for animacy.

To give an example of a more conceptually-driven yet inherently physical cue for animacy, we can consider something like the ability to reproduce. The ability to reproduce is fairly diagnostic about whether or not something is a living thing, and it is a physical feature of a thing, yet the ability to reproduce is also more rooted in a conceptual understanding of what it means to be alive than any particularly observable perceptual information. Similarly, whether or not something has the ability to think is also a conceptually-driven feature of animacy. Whether or not something can think isn't as readily available perceptually as movement or even goal-directed movement, with a possible exception described later. Thus, the ability to think is both a mental cue for animacy and one that is conceptually-driven.

In addition to these physical and mental cues for animacy, two potentially composite metrics for these dimensions are also explored: A simple living-nonliving judgment as a composite measure for physical features of animacy, and a similarity to a person judgment that may reflect both the ability to empathize with a target concept and also act as a gauge of mental capacities in general. Each of these is discussed in turn.

Perceptual features that indicate animacy are likely among the most important, whether they are indicators of physical or mental cues for animacy—our visual systems are thought to be able to quickly assign a label of "animate" to anything that moves of its own accord. Scholl and Gao (2013) make the case for this position, describing the detection of animacy as a perceptual phenomenon rather than a downstream cognitive bias, noting the irresistibility with which we assign the classification of "animate" to even the simplest of stimuli, like the chasing shapes in Heider and Simmel's (1944) classic video. When describing the phenomenology of animacy, Scholl and Gao note that "…observers simply see animacy and intentionality when viewing the displays, effortlessly and automatically, and without any instructions or preparation." (2013; pp.

207). Further, they note that it is extremely difficult to resist interpreting "obviously animate" displays (once again, such as that of Heider & Simmel, 1944) as being animate—objects "chase" each other and "try" to "hide" from one another, and observers under cognitive load have an extremely difficult time not using such mentalistic language to describe the scene.

A rich animacy percept can even be obtained when only very subtle cues are given, such as when "facing" is the only aspect altered between conditions: When chevrons "face" (point) 90 degrees away from a disc that moves about on a screen, their random motion is interpreted as exactly that—no perception of animacy is evident. Yet when watching a display of chevrons whose points are all directed *toward* a disc moving about on a screen however, even though their actual motion path is still random, the cue of "facing" leads to an evocative perception of animacy—all of the chevrons are "staring at" or "chasing" the central disc; this phenomenon is known as "the wolfpack effect" (Gao, McCarthy, & Scholl, 2010).

The wolfpack effect is an example of one low-level perceptual cue for animacy that allows us to infer something about mental states—it illustrates what is called "coordinated orientation". That is, the facing of the chevrons is *contingent* on the central disc—as the target disc moves around, the chevrons contingently reorient to face it. It may be difficult to believe that this kind of coordinated movement is indeed "low-level", but it may make more sense to point to a very similar phenomenon, perceptual synchrony. Although Gao and colleagues do not note a link to perceptual synchrony—an excellent example of which is the Gestalt principle of common fate—it takes a very small leap to go from "moving together" (as is the case in the principle of common fate) to “orienting together”. Contingent behavior like that seen in the wolfpack effect is possibly itself a subclass of the more general *goal-directed behavior*. In the wolfpack effect, the “goal” is as simple as tracking the target disc. Participants in these experiments seem to make the intuitive leap that the distractor chevrons are “looking at” or “chasing” a target despite no global movement cues indicating that is the case; while the chevrons change their facing, their overall direction of movement is random. “Self-propulsion”, for example, is often cited as a basic cue for animacy in the perception literature (Scholl & Tremoulet, 2000); this quite obviously fits in with self-generated motion.

Bassili (1976) provides us with a second example of the effectiveness of contingent behavior as a low-level perceptual cue for animacy, and in fact Bassili actually led the early effort to determine what low-level perceptual cues lead to the perception of animacy and intentionality. He had participants view films in which the movements of two circles were temporally-contingent or not—that is, if one circle changed its movements soon after the other—and found that when their movements were contingent, participants perceived the two circles as interacting with one another. Once again, this is an example of a cue for *contingency,* but also of *goal-directed* movement: One circle’s “actions” are contingent on the other’s, and the same circle has “a goal” of “keeping up” with the other circle.

These data are supported by a more recent article by Takahashi and Watanabe (2015). When a dot moves by itself on a computer screen, it is considered animate and possessing of intentions. Yet when other dots have a synchronous motion path (in the exact same path as the target dot, simply translated to a different position) or semi-synchronous motion path (in the exact same path as the target dot, but translated to a different position on the screen and also rotated), the rated perception of animacy and intentionality of the target dot decrease substantially compared to when the target dot moves alone. It is important to note that while the *motion paths* vary for the non-target dots, all of the dots are perfectly in sync with one another along the time axis, tracing their (semi-)synchronous motion paths at the *exact same time*. *Perfectly* in-time motion allows little room for contingent behavior based on global motion cues alone; contingent behavior likely needs "time to adjust" to accommodate for thought and the updating of goals. Takashi and Watanabe demonstrate the effect that slight asynchronies along the time axis have on animacy in a later experiment in the same article: By adding a delay either before or after the target dot begins to move so that the target dot's movements appear contingent on the other dots' movement (or the other dots' movement appears contingent on the target dot's movement), ratings of perceived animacy and intentionality are almost completely restored.

Sudden changes in speed and/or direction (heading) also seem to be a low-level cue for animacy, as investigated by Tremoulet and Feldman (2000), and later expounded upon by Szego and Rutherford (2007, 2008). In Tremoulet and Feldman's studies, they showed single objects moving on a screen to participants, and had the object spontaneously change in both direction and speed. Additionally, some of the objects were dots, while others were slim rectangles; this allowed them to manipulate "heading". Dots had no particular heading (as they were spherical), while for the slim rectangles, the slim side was interpreted the object's "face". Thus, the slim rectangles could either maintain a previous heading or tilt to match the new direction of motion.

Their research determined that all three of these factors (magnitude of speed change, degree of direction change, and heading match/mismatch) affected participants' rated perceptions of animacy. Notably, all of these cues for animacy are easily subsumed under the heading of *goal-directed behavior;* changes in speed, direction, and heading are all presumably done for a reason, such as to achieve a goal (like avoiding a collision or facing a target).

Later, Szego and Rutherford (2007, 2008) illustrated that speed and animacy perception are dissociable; perceptual illusions leading to a sense of greater speed as well as the influence of perceived gravity on speed (objects moving down are perceived as faster) led to no commensurate increase in perceived animacy. Note that for both of these cases, an outside factor other than *the actor itself* is attributed as the cause of the change in speed, such as gravity. Based on Szego and Rutherford's work, it appears that perceptual cues for animacy are only as useful as they are attributable to a sense of self-propulsion and goal-directedness. By attributing a cue to a factor other than the moving object itself (such as gravity), a cue loses its diagnosticity as a cue for animacy.

Another perceptual cue for animacy (and an obvious one, based our criterion of cues that indicated goal-directed behavior) is movement that appears purposeful; that is, movement that appears to have a goal in mind. Dittrich and Leas (1994) investigated the perception of 'approach' patterns of behavior in a target letter among randomly moving letters, made to look like 'stalking' movement (a negative type of movement) or 'following' movement (a neutral-to-positive type of movement). Participants were better at detecting the target object (the 'stalker' or 'follower') when it moved in a more direct fashion toward its goal-letter, and when it moved faster than distractors. Additionally, reported perceptions of intention and animacy were greater in these instances as well.

A sort of spiritual successor to these studies, Gao, Newman, and Scholl (2009) studied chasing (similar to 'stalking'), noting two cues for it: *chasing subtlety* (to what degree the 'wolf' deviates from 'heat-seeking' directly toward its target, the 'sheep'), and *directionality* (a measure of the relationship of how the 'wolf' and distractor shapes faced the target shape). The authors also added in an additional measure, a '*Don't-Get-Caught*' task in which participants controlled the target of the 'wolf's' chasing. In these trials, a more indirect measure of animacy perception was available: A participant's ability to avoid the 'wolf' should be mostly dependent upon his or her detection of it—if the 'wolf' was not noticed, then its arrangement of attributes (its chasing subtlety and directionality) did not lead to a perception of animacy, and it was less likely to be actively avoided by the participant.

Gao et al. found that both chasing subtlety and directionality were highly related to participants' ability to perform the task, as well as their verbal reports of perceived animacy: As chasing subtlety increased (degree of heat-seeking decreased), participants were less likely to verbally report perceiving the 'wolf'. Further, a U-shaped relationship was found between chasing subtlety and the '*Don't-Get-Caught*' task. These data indicated that when chasing was obvious (perfectly heat-seeking), participants easily avoided the 'wolf', and when chasing was 'incompetent' (the 'wolf' chased its target within a 180° window), participants avoided the wolf not through detection of it, but rather because it wasn't really chasing them very well to begin with.

In the middle of the U-shaped distribution, participants were unable to perceive the ‘wolf’, yet it was not wholly incompetent—and were therefore caught by it more often. Chasing subtlety is clearly related to goal-directedness, and may in fact be a direct measure of the idea. On the ‘incompetent’ side of the “U”, the goal of the wolf is not obvious, but the wolf is also incompetent. On the right side of the “U”, the goal of the wolf is to track the target, and it is very obvious. In the middle of this U-shaped relationship between chasing subtlety and performance on the ‘*Don’t-Get-Caught*’ task, the wolf has no clear goal *advertised* perceptually, but yet it is still competent enough to catch the target.

Directionality was also related to the perception of animacy in these experiments, similar to Tremoulet and Feldman's (2000) conception of ‘heading’. Unlike heading however, directionality was related to a goal rather than a direction of motion. As the ‘wolf’ and distractor shapes (chevrons) became increasingly misaligned with their target (the point of the chevrons tilted increasingly away), perception of animacy and proportion of ‘successful escapes’ from the ‘wolf’ decreased.

The studies by Dittrich and Leas (1994) and Gao et al. (2009) illustrate the important role of goal-directed behavior in the perception of animacy, with Gao et al.’s work offering important performance data to supplement verbal reports of perceived animacy. Overall, it would appear that from a perceptual perspective, there is one particularly important cue for the perception of animacy: *Goal-directed* behavior must be indicated, either featurally (chevron orientation in Gao et al., 2010, 2009; heading in Tremoulet & Feldman, 2000) or by an object’s global movement (approach styles in Dittrich & Leas, 1994; Gao et al., 2009). It is important to note that while goal-directedness is a perceptually-available cue, it is also primarily concerned with the *mental* features of animate beings.

A final important—but not necessarily diagnostic—perceptual cue for animacy is the simple *likelihood of movement*: All goal-directed movements are movements, but not all movements are goal-directed. In contrast to goal-directedness, movement is primarily a physical feature of animacy, and a precursor itself to any inference of goal-directedness. The question here is simply, “Is it moving?”. Investigating the simple presence of movement as generally as possible is important because it allows for the dissociation between movement itself and movement that is goal-directed, as described above. It further allows us to ask questions about things such as vehicles or weather phenomena: Are they treated like animates simply because they move? Or is movement alone insufficient to specify that something is animate—is an inference about mental states necessary?

Moving on to potentially diagnostic *conceptual* features of animacy, the ability to think is likely relevant because it is a conceptual “version” of goal-directedness. Thoughts and the ability to think or plan goals are related—but not identical—to goal-directedness. We might say that bacteria are “goal-directed” in that they “desire” to reproduce and persist, but there are no thought processes happening inside the bacteria. Similarly, thoughts do not need to be goal-directed.

Interestingly, the “wolfpack effect” (Gao et al., 2010) combined with data on the role of temporally-contingent motion from Takahashi and Watanabe's (2015) studies is possibly some evidence for the role of ability to think in the conception of animacy. Takahashi and Watanabe illustrate that complete temporal synchrony with something else in a scene greatly reduces the perception of animacy in a target. Yet in the wolfpack effect, complete temporal synchrony occurs between the target's movements and the "wolves'" headings. There is no delay between the change in target direction and change in heading, yet a powerful perception of animacy is created. Further, complete temporal synchrony of the "wolves'" headings and the target's movements produces no perception of animacy when the "wolves'" headings point completely away from the target. This condition is an example of contingent behavior that is not perceived as goal-directed; because of this exception, theory of mind (the ability to put yourself "in someone else's shoes" and predict their mental state, c.f. Leslie, Friedman, & German, 2004) appears to be critical to understanding why the wolfpack effect produces such a strong perception of animacy. We understand that the "wolves" have a goal of tracking their target, only by assuming that something akin to thought is occurring on the part of the "wolves".

A second conceptual dimension that may be useful in determining whether something is animate is whether physical markers for animacy exist. Questions like, "Does it have a face?", "Does it have fur?" or "Does it have legs?" may be indicative of the presence of animacy, but they are rather specific. A more general question that still taps the conceptual nature of animacy would be, "Can it reproduce?". Answering in the affirmative is a fairly diagnostic cue for animacy (or at least that something is alive), and allows for the investigation of potential edge cases at the lower end of the animacy spectrum as well. Plants and bacteria are capable of reproduction and are living things, but are rarely considered animate, *per se*. In fact, some languages (such as Hebrew) do not even natively classify plants as living things (Hatano, 1994;

Kemmerer, 2016). On the opposite end of the spectrum, there are concepts that clearly think, are goal-directed, and/or can move that also are unable to reproduce or perhaps reproduce ambiguously, such as mules, robots, ghosts, and vampires. Largely due to these edge cases, an index of reproduction—possibly as purely a measure of whether a concept is physically biological—may be an interesting and potentially explanatory factor of the animacy effect.

The final two aspects of animacy that may be of interest are more composite, holistic measures than anything else. In the vein of how Nairne et al. (2013) and much of the continuing research on the animacy effect in episodic memory define animacy, one potentially useful way to describe the dimension holistically is to simply ask how similar something is to a living or nonliving thing. This question gets at a lot of the aspects of animacy at once, especially the physical features. In addition, whether something is living or nonliving is more general than a question such as "Does this have a face?"—the animacy effect may not be entirely limited to animals, but could potentially include plants as well.

A general observation about how similar something is to a person could also be useful as an identifier of animacy. Animacy is known to drive the organization of animate concepts in the ventral vision pathway, with people, animals, and objects all organized on the same continuum according to their animacy status (Sha et al., 2015). If animacy is indeed graded, then a concept's similarity to a person may be a useful way to measure it. Further supporting a similarity to a person judgment is that a person's ability to empathize with the target may play a role in animacy perception. The more similar something is to a person (in particular, ourselves), the more likely its mental and emotional states can be simulated. Much of the evidence for the role of empathy in animacy comes from the literature on animacy in linguistics. Silverstein and Comrie established that there is a range of principles that govern linear order of words in a given language, and that one of these principles is animacy (Comrie, 1979, 1989; Silverstein, 1976). That is; animate words tend to be placed near the beginning of sentences.

How is animacy defined in a linguistic context? Typically relative to the speaker, a human. In his book *Animacy and Reference*, (Yamamoto, 1999a) expounds on Comrie's work and discusses how animacy is conceived of in the study of language in great detail. Namely, most language theorists believe that an "Animacy Hierarchy" exists such that humans are at the top (most animate), while inanimate objects are at the bottom (least animate)—and that this dimension affects a number of linguistic aspects, including word order and verb use. For example, in Japanese the verb 'to be' is different for animate and inanimate nouns: '*iru'* is used to reference 'living beings' such as humans and animals, while the verb '*aru'* is used in reference to plants and nonliving things (Inagaki & Hatano, 2002, p.20; as cited in Dellantonio et al., 2012).

A particularly fine-grained view of animacy exists in linguistics, emphasizing even the relationship between the speaker and his or her target as an important distinction. Yamamoto cites Langacker (1991), writing that "the concept of 'empathy' plays a significant role in the perception of animacy, and hence Langacker labels the kind of hierarchy which has been called an 'animacy hierarchy' as an 'empathy hierarchy'" (1999, pp. 25). Further, according to Langacker, this empathy hierarchy reflects the "egocentric assessment of the various sorts of entities that populate the world" (1991, p. 306-7) and sorts them by their ability to engender empathy in the observer. Therefore, factors such as similarity to the observer are very important. From Langacker:

> Now the highest degree of empathy is of course with oneself — one is exactly like oneself, and shares precisely the same concerns. The starting point for the empathy hierarchy is therefore the speaker:
>
> speaker > hearer > human > animal > physical object > abstract entity
>
> Ranked directly after the speaker is the hearer, for their co-participation in the speech event is an immediate common concern that can hardly be ignored. Continuing along this natural path, we next encounter a person other than the speaker and addressee, then an animal other than a human, and so on.
>
> (Langacker, 1991, pp. 307)

Yamamoto takes slight issue with Langacker's statement, as what differentiates the speaker from the hearer is very different from what differentiates the two conversants from the other items on this list. These latter items are relative to one another on a more general level (the "General Animacy Scale", wherein humans > animals > objects) while the first two items must necessarily evoke differences in empathy in the speaker to be ranked.

Interestingly, Yamamoto points to the nature of the first, second, and third person in language as additional evidence that differences in empathy are apparent in a linguistic conception of animacy. For example, compare "I will ride the bike," with

"You will ride the bike," and "She will ride the bike." In both the first- and second-person sentences ("I will…" and "You will…"), the person doing the action must be present to be referred to properly. In the sentence "She will ride the bike," there is no necessity for the physical presence of whoever "she" is for the sentence to make logical sense; the conversants could be talking about a mutual friend for example. Lack of physical presence necessarily reduces the amount of empathy that can be felt.

In addition to the theoretical support for empathy as dimension of animacy provided by the linguistics literature, studies from developmental psychology that take an embodied perspective also seem to make room for a role of empathy in a conception of animacy. In their 2013 chapter regarding online action analysis in infants, Woodward and Cannon discuss this role of action experience in infants' ability to perceive goal-directed actions in detail (Woodward & Cannon, 2013). In particular, they believe that the findings of Brune and Woodward (2007) as well as Woodward and Guajardo (2002) provide some initial correlational evidence that infants' ability to understand an action fully depends upon their ability to make the action themselves.

In Woodward and Guajardo's study, the understanding of pointing as an action that resolves toward an object ('object-directed pointing') appears dependent on an infant's own experience with object-directed pointing. Namely, they demonstrated that infants who made object-directed points during the study (classified as "pointers") were more sensitive to changes in observed pointing, indicating a better understanding of the action when they could perform it themselves. This finding was corroborated in Brune and Woodward (2007), and expanded upon in a more recent study showing that 12-month-old infants who do not have motor experience with "containment" actions (or at least did not spontaneously engage in them in a free-play period prior to the experiment) could not accurately anticipate the path of an experimenter-picked-up ball as it traveled toward a container. Meanwhile, 12-month-old infants who did have motor experience with "containment" actions, did anticipate the path of said ball to the container (Cannon, Woodward, Gredebäck, von Hofsten, & Turek, 2012),

Further, with even brief experience to a particular motor activity, this experiential difference in expectations can be eliminated. In a study on the perception of grasping behavior, once again, action experience facilitated action perception: Three-month-old infants who did not otherwise have experience grasping objects (an ability which arises later in development) were given mittens covered in Velcro; these mittens enabled them to swipe at objects and "grasp" them in an interactive fashion. Infants who were given the opportunity to interact with objects using these gloves showed looking-time differences when experimenters grasped a new goal item after habituation, while infants who were not given the same opportunity did not show looking time differences based on how an experimenter interacted with objects presented to the infants (Sommerville, Woodward, & Needham, 2005). This study provides some quite interesting evidence that the ability to understand certain actions seems dependent on the ability to perform those actions.

What does this mean for a role for empathy in the animacy effect? These studies indicate that an infant's ability to understand certain cues that are diagnostic of animate entities (like goal-directed movement) is at least somewhat dependent on both their own motor experience and ability to model the mental states of others. Asking about similarity to a person also necessarily taps into Gray et al.'s (2007) dimensions of experience and agency. According to their research, humans in general and the self in particular are conceived of as being both highly agentic and also capable of a great deal of experience; this should come as no surprise. For all these reasons, it is completely possible that a gross index of the mental cues involved in animacy may be as simple as asking, “How similar is the target to myself?” or perhaps, ”How easily can I simulate the target’s thoughts and actions?”

Current Studies

The following studies are aimed at both building a conception of the features that go into specifying word animacy, and demystifying what it is about animacy that leads to benefits in episodic memory. There is clearly something “special” about animate concepts that makes them more memorable, but at present there is very little empirical evidence as to what that might be. This project aims to determine exactly what that “something special” may be by empirically defining and measuring several possible “underlying factors” of the animacy construct that may be driving the observed effects in episodic memory. If for example, “likelihood of movement” is the primary factor in determining later episodic memory for a word, then this evidence would lead us to consider certain possible proximate mechanisms for the animacy effect, such as attentional capture: It is reasonable to think that the activation of systems pertaining to visual motion may be related to attention.

First, this project attempts to describe animacy more fully in an effort to discover possible underlying dimensions of the animacy construct. To do this, a database of 1200 animate, inanimate, and ambiguously-animate words was constructed. The database itself was created by following in the footsteps of researchers who have created norming databases in the past, such as Clark and Paivio's (2004) extension of the original Paivio, Yuille, and Madigan (1968) word norms for dimensions including concreteness and imageability. Like these researchers, rating scales were built in an attempt to create normative values along multiple dimensions that are likely to be important in specifying the animacy construct. These rating scales should be familiar, based on the previous discussion of potentially useful ways to construct the animacy dimension. The six scales of interest (each on a seven-point scale) are *goal-directedness* ("1" - "low goal-directedness"; "7" - "high goal-directedness"), *ability to think* ("1" – "low ability to think"; "7" – "high ability to think"), *movement likelihood* ("1" – "low movement likelihood"; "7" – "high movement likelihood"), *ability to reproduce* ("1" – "low ability to reproduce"; "7" – "high ability to reproduce"),a composite measure of mental cues for animacy including empathy titled *similarity to a person* ("1" – "low similarity to a person"; "7" – "high similarity to a person"), and a final gross measure of whether the word is a living thing, which likely captures many of the physical cues involved in animacy perception ("1" – "high non-living"; "7" – "high living"). Because these scale anchors are not very descriptive by themselves, full descriptions of how these dimensions were assessed are available in Appendix A.

These norms are important, as no such "animacy" norms exist in the literature, apart from the broad, intuitive conceptualizations that many researchers use for unrelated tasks, such as categorization exercises. Further, the results of these norms will tell us whether the dimensions discussed in the previous section actually do matter for episodic memory. This norming set is also important because it is the only one to attempt to actively sample from across the animacy dimension—an important consideration for using these norms when selecting words to be used as stimuli in an experiment. Following collection of this new normative data, a factor analysis was conducted to determine whether any of the measured dimensions of animacy appear to map on to each other and/or to more general word dimensions such as imagery or frequency.

Once norm collection was complete, a massive free recall experiment in the vein of Rubin & Friendly's (1986) project was conducted. Analysis of these data gives a “bird’s eye view” of the factors that determine the animacy effect, as it looks at a very large sample of data to determine how these newly-collected norms for animacy (and any possible collapsed factors discovered through factor analysis) influence the recallability of words. The collection of *new* recallability norms is an especially important aspect of this project, as simply norming the existing Rubin & Friendly (1986) data would provide insufficient insight into the animacy dimension: Their data only contain roughly 157 animate words out of 925, a rather poor sampling. Further, their data were obtained from many experiments across several years of work, and are also thirty years old this year. The present data were collected over a much shorter timeframe (on the order of a few months), and all testing procedures were exactly the same from participant to participant. Therefore not only are these recallability norms be useful in determining the locus of the animacy effect in episodic memory, but also contribute a new, more methodologically consistent set of recallability norms in general. As for analysis, both regression analysis and relative-weight analysis

(LeBreton et al., 2007) were used to determine the contribution of the separated aspects of animacy (and any possible factors discovered through factor analysis) on free recall.

Finally, there are several other side benefits to collecting such a massive free recall sample. In addition to testing for the locus the animacy effect, its resistance to both context differences and individual differences will be examined. Specifically, because list composition (that is, the proportion of the list that is animate items) varies from participant to participant in the present recall study, it can be treated as a predictor of the animacy effect as well. List composition can be an interesting dimension to study, as it can be indicative of whether an effect is partially determined by distinctiveness (e.g., McDaniel, DeLosh, & Merritt, 2000). One might expect animate items to only be memorable in the context of inanimate items—after all, in the real world animates are always remembered in the context of the world itself, which consists primarily of inanimate things.

As for individual differences, demographic data on participant age and two potentially-relevant personality dimensions (Person and Thing Orientation, see Graziano et al., 2011) were also collected and used as predictor variables for the size of the animacy effect. Age is useful in simply extending the effect across the lifespan. Person and Thing Orientation, two separate personality dimensions that measure interest in people and things, are also potentially interesting to explore—the extent to which a person is interested in people (animates) and things (inanimates) could have important influences on the animacy effect in free recall. Namely, people high on person orientation may be more likely to remember animates (as they are more interested in them), while people high on thing orientation may be more likely to remember inanimates (for the same reason). Notably, the dimensions are separable, so any given person can be both person- and thing-oriented. Any interactions of the animacy effect with these individual difference measures will be interesting; a lack of interaction with these measures could point toward the centrality of animacy as a mnemonic dimension.

STUDY 1: COLLECTION OF NORMATIVE DATA

Addressing the relative importance of animacy compared to other word factors such as imageability and frequency was the thrust of Nairne et al.'s (2013) first foray into the mnemonic effects of animate words. After recoding the 925 words used in Rubin & Friendly's (1986) study on the determinants of free recall, Nairne and colleagues used regression techniques to reanalyze Rubin & Friendly's recallability data with animacy as an additional predictor of recall. As previously discussed, their findings indicated that not only was animacy an important factor in recall, but was in fact one of the strongest contributors to the explainable variance.

While Nairne and colleagues' reanalysis of the recall data amassed by Rubin & Friendly (1986) demonstrated that a general conception of animacy is a consistent and important predictor of recall, it unfortunately does not acknowledge the complexity of the animacy dimension. Instead, the dimension was streamlined to a simple "1" or "0" value for "living" or "nonliving". It is likely that the cognitive construct of "animacy" is in fact composed of several unique conceptual dimensions, each of which may act as a potential cue for an object to be animate. Unfortunately, no normative data exists in the literature for the animacy of nouns; this first study seeks to solve that problem.

As discussed in the introduction, several variables have been identified as potential "markers" for animacy. These include both physical capabilities such as an object's likelihood of movement and its ability to reproduce, as well less obvious internal factors (mental capabilities) that describe its ability to act as an agent, like its ability to think and the extent to which it is directed by goals. Many concepts vary along these dimensions—e.g., computers and robots are often conceived of as having thoughts and being goal-directed, but are nonliving, whereas many living things (e.g., bacteria) do not have thoughts but are clearly alive and reproduce. Supernatural concepts like "ghost" present further complications. Researchers have tried to disentangle the differences between living and nonliving things largely in terms of the unique properties of particular words or considering the animate/inanimate distinction in a more general sense (e.g., McRae, Cree, Seidenberg, & McNorgan, 2005; Opfer & Gelman, 2011; Scholl & Tremoulet, 2000), but there are, at present, no systematic norms covering the full spectrum of what it means to be animate. Creating this set of norms is the primary goal of Study 1.

General Method

Overall Participants

Data was collected from a total of 1644 participants across all measures of interest; all participants were unique. Of these, the data from 59 participants was not scored because the participant self-reported having a native language other than English, or did not report a native language. A further nine participants asked that their data be deleted (discussed further below). Finally, one participant failed an attention check and his data were also not scored. These numbers are broken down further for each individual scale collected. All participants were recruited via a Human Intelligence Task (HIT) posted on Amazon Mechanical Turk (MTurk). Mechanical

Turk Workers could only accept the HIT if they were located in the United States, had a 95% HIT acceptance rate (or higher), and had completed at least 1000 HITs; these restrictions were to ensure high-quality data. Various sources corroborate that data collected from Amazon MTurk, while sometimes less reliable (Rouse, 2015), are not only comparable to the standard university sample in terms of results, but also more demographically diverse (Buhrmester, Kwang, & Gosling, 2011; Rouse, 2015). Further, measures outlined by Rouse (2015) were taken to ensure higher reliability; they are described in the procedure section below.

Demographic information (age, race, gender, and native language, and education level) was collected, and participants were also asked to report if they paid attention and answered honestly at the end of each study; if not, their data were not scored. These metrics are broken down for each scale below. Participants were paid at a rate of $0.05 per estimated minute of task duration; estimated task durations are listed for each scale below. Because each task was self-paced however, many participants finished below the estimated time.

Overall Materials

1200 relatively concrete nouns were selected from the English Lexicon Project's database (Balota et al., 2007), as this project is the single largest compilation of English words and associated word variables with data for over 40,000 words. Nouns were chosen with preference for whether normative values already existed along several key dimensions, and an effort was made to sample widely across the animacy dimension. What this meant in practice was that an effort was made to gather nouns from a variety of different categories that were clearly animate, inanimate, and ambiguous (e.g., a fair number each of animals, plants, and manmade objects).

Which dimensions were chosen was modeled after Rubin & Friendly (1986), as one ultimate goal of this project was to replicate and extend their recallability norms with animacy metrics as additional variables. The pre-existing dimensions of interest include classic measures such as concreteness and imagery, measures related to word frequency and context like word familiarity, availability, meaningfulness, frequency, and contextual diversity, measures related to emotion including valence, arousal, and dominance, measures related to the orthographic and phonographic features of a word such as orthographic and phonographic neighborhood, the number of syllables, and word length. Finally, a measure of age of acquisition was deemed necessary, as it is known to be multidimensional (Clark & Paivio, 2004).

Additionally, the words themselves were chosen to sample widely across the animacy dimension itself. Roughly 36 percent of the words (430 items) were chosen to be "clearly living" (e.g., *mother*, *soldier*, and *zebra*), an equal number were chosen to be "clearly nonliving" (e.g., *couch*, *temple*, and *zipper*), and the remaining 28 percent (340 items) were chosen to be somewhat ambiguous along the living/nonliving dimension (e.g., *ankle*, *devil*, and *society*). Within each of these subsets, an attempt was made to sample from a wide variety of categories. For example, categories in the "living" subset included words for professions (e.g., *doctor*, *politician*, and *scientist*), words for relatives (e.g., *cousin*, *father*, and *wife*), words for mammals (e.g., *bunny*, *moose*, and *tiger*), and words for insects (e.g., *bee*, *caterpillar*, and *wasp*), among others. These categories will be discussed in further detail later on. Word selection was however somewhat constrained by whether sufficient normative data existed along all variables of interest.

The English Lexicon Project (ELP) contains a number of normative values itself, including measures of word frequency and contextual diversity (sourced from Brysbaert & New, 2009), measures of orthographic and phonographic neighborhood, as well as both the number of syllables and the number of phonemes in a word. Thus, these variables did not restrict word selection. The measure of word frequency used is called $SUBTL_{WF}$, and the measure of contextual diversity is called $SUBTL_{CD}$. Both of these measures were estimated by Brysbaert & New (2009) using a corpus of film subtitles; frequency is the number of occurrences per million words, while contextual diversity is a measure of the number of films in the corpus that contained the word. $SUBTL_{WF}$ has been demonstrated by Brysbaert & New (2009) to be a much better measure of frequency than previous metrics (such as the HAL measure from the ELP or the outdated Kučera and Francis (KF) norms; Kučera & Francis, 1967), and contextual diversity (as measured by $SUBTL_{CD}$) is known to play a significant role in word learning, word naming, and lexical decision times (Adelman, Brown, & Quesada, 2006; Hills, Maouene, Riordan, & Smith, 2010).

Likewise, age of acquisition was also not a restrictive variable. In their 2007 study, Kuperman, Stadthagen-Gonzalez, & Brysbaert (2012) collected age of acquisition ratings on over 30,000 English words. Age of acquisition is known to be important in picture naming and other semantic retrieval tasks, thus may relate somewhat to the animacy recall advantage. Further, age of acquisition is known to tap into and load onto multiple different factors including familiarity, concreteness, and word length (Clark & Paivio, 2004), and may load onto animacy as well: Animate words (like animals) may be learned early in life. Age of acquisition is measured by asking raters to enter the age (in years) when they learned the word.

While smaller in size, the nearly 14,000-word corpus of norms for measures of word valence, arousal, and dominance (Warriner, Kuperman, & Brysbaert, 2013) was similarly not very restrictive in how words for the current study were selected. Valence, arousal, and dominance are all word metric related to the affective meanings of words, which have been shown to affect episodic memory both in free recall (emotionality was a primary predictor of recall for Rubin & Friendly, 1986) and other types of episodic memory tasks, including source memory (Kensinger & Corkin, 2003; Kensinger, 2009). Each measure is rated on a nine-point scale, where 1 is "happy/excited/controlled" and 9 is "unhappy/calm/in control" for valence, arousal, and dominance, respectively.

Word availability and meaningfulness are two metrics related to ways in which words are produced by or expounded on in free-association tasks. Typically, meaningfulness is assessed as the average number of words a participant writes down as free associates in response to a cue word; this is the meaningfulness value (Noble, 1952; Paivio et al., 1968; Toglia & Battig, 1978). Conversely, a word's availability is typically conceived of as how often a given word appears as a free associate in response to another word (Palermo & Jenkins, 1964; Rubin, 1983). Understandably, these metrics are difficult to create normative data for on any large-scale basis, and the major sources for these norms are relatively small. Thus, these metrics are potentially very restrictive for the current study. Fortunately, Nelson, McEvoy, & Schreiber (1998) have completed a very large set of normative data on word association, and provide metrics that should act as ready surrogates for traditional norms of availability and meaningfulness. For availability, Nelson and colleagues provide the number of times each word in their set was produced as a free associate in response to other words; these data are available for just in excess of 10,000 words. As directed by Rubin (1983), a suitable availability metric is computed by taking the $\log_{10}$ of the number of times a words is produced as a response; these values are what were used as a metric of availability in the present study.

As for meaningfulness, the same dataset is useful again. Nelson and colleagues determined what they called “cue set size”, which was the total number of unique responses produced by two or more participants in response to any particular cue word. While not measured in exactly the same way as traditional metrics of meaningfulness, this cue set size measure is very likely tapping into the same general construct. Cue set sizes were available for just over 5,000 words. Thus, while availability and meaningfulness metrics were not as restrictive as they could have been using traditional sets of normative data that contain far fewer observations, they did restrict word selection to a degree (with meaningfulness in particular being somewhat restrictive, as the current word set of 1200 makes up roughly a quarter of observed cases in the Nelson et al. database).

Finally, available normative data for concreteness, imagery, and familiarity were the most restrictive in how words were chosen for the current 1200-word set. The MRC Psycholinguistic Database (Coltheart, 1981) is the most comprehensive database for these measures, drawing from multiple sources that use the same rating task for each metric. For example, concreteness is measured on a seven-point scale with 1 referring to words that are highly abstract and 7 referring to words that are highly concrete. Imagery and familiarity too are on seven-point scales, with 1 referring to words that are "highly unfamiliar"/"low imagery" 7 referring to words that are "highly familiar"/"high imagery".

While data exists for these variables, much of the extant datasets were not usable because of the current study's focus on relatively concrete nouns—most animate words are relatively concrete, and it would be unfair to pit them against inanimate abstract concepts. As such, normative data for these variables was compiled from multiple sources, each of which used the same rating task for each variable (Clark & Paivio, 2004; Coltheart, 1981; Cortese & Fugett, 2004; Friendly, Franklin, Hoffman, & Rubin, 1982; Schock, Cortese, & Khanna, 2012; Stadthagen-Gonzalez & Davis, 2006). Table 1 shows the number of words that were used from each dataset for each of concreteness, familiarity, and imagery. Even combining multiple datasets, ratings did not exist for a sizable number of words that were definitely of interest (e.g., *computer*, *robot*, and a number of plants, animals, vehicles, and words that refer to people).

Because ratings did not exist for a sizable number of these words (between 100-200 per measure, detailed below), this led to Study 1A, which collected normative data on concreteness, imagery, and familiarity.

Table 1

Descriptive Statistics and Reliabilities for CNC, FAM, & IMG

Scale	*N*	Mean	*SD*	Alpha	Acronym
Concreteness (All)	1200	560	68		CNC
Concreteness (MRC)	908	561	66		
Concreteness (Nelson)	162	594	60		
Concreteness (Toronto)	7	579	59		
Concreteness (New)	123	509	60	0.833	
Familiarity (All)	1200	536	71		FAM
Familiarity (MRC)	927	519	59		
Familiarity (Bristol)	69	492	52		
Familiarity (CP)	16	549	87		
Familiarity (New)	188	635	35	0.824	
Imagery (All)	1200	553	82		IMG
Imagery (MRC)	916	563	58		
Imagery (Cortese)	99	607	80		
Imagery (Bristol)	70	518	112		
Imagery (Toronto)	6	573	69		
Imagery (CP)	1	552	0		
Imagery (New)	108	445	126	0.936	

STUDY 1A: COLLECTION OF MISSING NORMATIVE DATA

The purpose of Study 1A was to collect normative data for words in the selected set of 1200 that were missing values for concreteness, familiarity, and/or imagery. In total, 209 of the 1200 selected words were missing at least one of these values. 67 words were missing only one value, 74 words were missing two of these values, and 68 words were missing values for all three of these metrics. Amazon Mechanical Turk (MTurk) was used to collect this missing data, with recruited MTurk Workers completing a series of concreteness ratings, a series of familiarity ratings, or a series of imagery ratings (any given Worker completed only one rating scale). Twenty-five workers were recruited for each scale, as at least 20 ratings per scale per word is typical in word variable research (e.g., Clark & Paivio, 2004, among others). Participants who reported a native language other than English and participants who failed an attention check manipulation were eliminated from consideration. The details for each rating scale are covered in turn.

Method

Participants

Concreteness. Participants were 25 MTurk Workers recruited via the Amazon Mechanical Turk website. Of the 25 participants, all were native speakers of English and 14 identified as male (56%) and 11 identified as female (44%). As for race/ethnicity, 15 identified as Caucasian/White/European American (60%), 4 identified as Asian/Pacific Islander (16%), 3 identified as African American (12%), 1 identified as Hispanic/Latino (4%), and 1 identified as multiracial (4%). Participant age ranged from 24-60 years, with a median age of 39. All Workers were paid $0.60, as the estimated task duration was 12 minutes ($0.05/minute). A total of $18 was spent (including fees to Amazon) to complete data collection.

Familiarity. Participants were 27 MTurk Workers recruited via the Amazon Mechanical Turk website. Of the 27 participants, 2 were eliminated from consideration because they reported a native language other than English or chose not to report a native language. Of the remaining 25, 15 identified as male (60%) and 10 identified as female (40%). As for race/ethnicity, 18 identified as Caucasian/White/European American (72%), 3 identified as African American (12%), 3 identified as Hispanic/Latino (12%), and 1 identified as Asian/Pacific Islander (4%). Participant age ranged from 24-53 years, with a median age of 31.5; one participant chose not to provide an age. All Workers were paid $1.00, as the estimated task duration was 20 minutes ($0.05/minute). A total of $32.40 was spent (including fees to Amazon) to complete data collection.

Imagery. Participants were 25 MTurk Workers recruited via the Amazon Mechanical Turk website. Of the 25 participants, 11 identified as male (44%) and 14 identified as female (56%). As for race/ethnicity, 21 identified as Caucasian/White/European American (84%), 2 identified as Hispanic/Latino (8%), 1 identified as African American (4%), and 1 identified as multiracial (4%). Participant age ranged from 20-72 years, with a median age of 34. All Workers were paid $0.55, as the estimated task duration was 11 minutes ($0.05/minute). A total of $16.50 was spent (including fees to Amazon) to complete data collection.

Education level was not collected for participants completing concreteness, familiarity, and imagery rating tasks.

Materials

Concreteness. Materials consisted of 123 words that were lacking concreteness values in extant databases. These words were randomly divided into four sets of 30 to 31, which were then presented to participants in a randomly selected order.

Familiarity. Materials consisted of 188 words that were lacking familiarity values in extant databases. These words were randomly divided into six sets of 30 to 31, which were then presented to participants in a randomly selected order.

Imagery. Materials consisted of 108 words that were lacking imagery values in extant databases. These words were randomly divided into four sets of 27, which were then presented to participants in a randomly selected order.

Procedure

The procedure for each task was identical, with any exceptions noted. Participants saw a set of instructions that described the rating scale that they were to use in making their judgments (instructions were adapted from Paivio et al., 1968, and are provided for each scale in Appendix A), and then moved on to the first set of ratings. Words were presented in groups of roughly 30, with a reminder of the scale they were to use in making their rating decisions presented at the top of the web page. Participants made ratings on a scale from 1 to 7, with appropriate anchors at either end. Participants were forced to make a rating decision for each word before moving on to the next page. At the halfway point (after two sets of roughly 30 items for concreteness and imagery, or three sets for familiarity), participants were prompted with an "attention check" question: "Have you ever walked on the surface of Mars?". Participants could respond with either "Yes" or "No"; clearly only one answer is correct.

Following the attention check manipulation, participants continued on to the second half of the rating task. When they were finished rating all of the presented words, a second attention check manipulation appeared: "What is the fifth word in this sentence?". The answer to this question is of course, "word" after counting the words; participants chose an answer from among all words in the sentence, presented in a random order. Attention check questions are a suggestion of Rouse (2015) to increase the reliability of data: Participants who failed both attention check questions would be removed from consideration. This did not happen in the current sample, likely because of the stricter barrier to entry compared to Rouse's sample (95% approval rate over at least 1000 HITs for the current sample, versus no restriction in Rouse's sample).

Finally, participants provided demographic information about themselves. Participants were prompted to provide gender identity (male, female, or a third category of their own description), age in years, race/ethnicity (African American, Asian/Pacific Islander, Caucasian/White/European American, Hispanic/Latino, Native American, or a category of their own description), and native language (Chinese, English, French, German, Japanese, Spanish, a language of their own description, or if they were a native bilingual with the languages spoken described). Additionally, participants were prompted with an "honesty" affirmation suggested by Rouse (2015) to improve the reliability of data:

Realistically, I know some MTurk respondents do not pay close attention to the questions they are answering. This affects the quality of my data. Please select one of the following honestly. Your answer is confidential. It will not affect whether or not you receive payment and will not affect any rating given to you for your work. Did you pay attention and answer honestly?

Below this prompt, participants were presented with a forced choice between "Yes, keep my data", and "No, delete my data". Participants who respond "No" would be removed from consideration; this did not happen in the current study. Following this affirmation, participants were provided with an opportunity to give feedback on the study, and were then provided with debriefing information and a code to receive payment for their participation.

Results and Discussion

Table 1 displays the means and standard deviations for each subset of the concreteness, familiarity, and imagery metrics, and observed reliabilities (Cronbach's alpha, a measure of internal consistency) for newly collected data. Means and standard deviations were multiplied by 100 to match the 100-700 scale common for these metrics. As all alpha values are above 0.8 (a common rule-of-thumb for reliability data), the newly collected data are considered to be internally consistent. Because the newly collected data is for words that did not already have concreteness, familiarity, or imagery values, consistency cannot be compared between the current data and previous normative datasets.

With these newly-collected data on concreteness, familiarity, and imagery, the initial dataset of 1200 nouns is now complete. Further, the fact that Cronbach's alphas for each scale were above 0.8 indicates that participants were quite consistent in their ratings for these new data. Table 2 shows descriptive statistics for all measures of interest, with concreteness, familiarity, and imagery values inclusive of the newly-collected normative data. Further, Table 2 depicts descriptive statistics for all measures broken down by initially-assigned word type. The completion of Study 1A makes for a complete normative dataset for all 1200 selected words, and means that the collection of normative data on the six scales that are proposed to tap the animacy construct can now proceed.

Table 2

Descriptive Statistics for Extant Normative Data

Scale	All Words		Animate Words		Ambiguous Words		Inanimate Words		Acronym
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	
Concreteness	560	68	547	71	553	82	579	43	CNC
Familiarity	536	71	551	81	533	66	522	59	FAM
Imagery	553	82	530	106	556	72	575	50	IMG
Availability	0.90	0.49	0.80	0.46	0.92	0.52	0.99	0.47	AVAIL
Meaningfulness	13.8	5.1	14.0	5.6	14.2	5.2	13.4	4.5	MNG
Valence	5.51	1.19	5.40	1.33	5.49	1.20	5.66	1.01	VAL
Arousal	4.05	0.91	4.28	0.89	4.03	0.92	3.82	0.87	ARO
Dominance	5.33	0.85	5.16	0.91	5.30	0.84	5.53	0.73	DOM
Age of acquisition	6.52	2.06	6.94	2.14	6.41	2.15	6.18	1.84	AoA
Length (in letters)	5.82	1.83	6.23	1.93	5.44	1.75	5.70	1.69	LEN
Orthographic neighborhood	4.72	6.16	3.96	6.24	5.54	6.36	4.84	5.85	OrthoN
Phonographic neighborhood	11.2	13.5	8.5	12.0	13.2	14.1	12.2	14.0	PhonoN
Number of syllables	1.79	0.80	1.97	0.81	1.65	0.80	1.70	0.75	Nsyll
SUBTL Frequency	36.4	100.8	40.8	125.0	40.5	112.2	28.8	52.4	$SUBTL_{WF}$
SUBTL Contextual Diversity	8.5	13.1	7.9	13.5	9.5	15.2	8.3	10.6	$SUBTL_{CD}$

STUDY 1B: COLLECTION OF NORMATIVE DATA FOR ANIMACY SCALES

The purpose of Study 1B was to collect normative data for six scales that are thought to tap various aspects of the animacy construct: Two scales related to the physical capabilities of animate things (likelihood of movement and ability to reproduce), two scales related to the mental capabilities of animate things (degree of goal-directedness and ability to think), and two scales that are thought to be "general" markers of whether something is animate or inanimate: A rating about how similar the thing is to a person and a basic living/nonliving rating. Study 1B used the same general format for data collection as Study 1A, with a few important exceptions described in the procedure section below. For all rating scales, participants were paid $0.60, as the estimated task duration was 12 minutes ($0.05/minute), but as the task was self-paced, many participants finished before the 12-minute mark.

Method

Participants

Movement likelihood. Participants were 260 MTurk Workers recruited via the Amazon Mechanical Turk website. Of the 260 participants, eight were non-native speakers of English (or did not specify a native language), and their data were removed from consideration. An additional two participants responded "No, delete my data" when asked if they were paying attention and providing honest answers. Data from these participants was similarly not considered. A total of $187.20 was spent (including fees to Amazon) to complete data collection.

In response to the demographic question regarding gender identity, 136 of the participants responded “female” (54.4%), while 114 responded “male” (45.6%). As for race/ethnicity, 198 (79.2%) of respondents self-identified as Caucasian/White/European American, 20 (8%) as African American, 15 (6%) as Asian/Pacific Islander, 11 (4.4%) as Hispanic/Latino, 2 (0.8%) as Native American, 2 (0.8%) as multiracial, and 2 (0.8%) chose not to provide a race/ethnicity. Participant age ranged from 19-77, with a median participant age of 35. Four participants chose not to provide an age. When asked about level of education, only one participant chose not to answer. For the remaining participants, the modal response was “Bachelor’s degree” as the highest attained level of education, with 89 participants (35.6%) choosing it. See Appendix B for further detail on education level.

Ability to reproduce. Participants were 260 MTurk Workers recruited via the Amazon Mechanical Turk website. Of the 260 participants, nine were non-native speakers of English (or did not specify a native language), and their data were removed from consideration. An additional participant responded “No, delete my data” when asked if they were paying attention and providing honest answers. Data from this participant was similarly not considered. A total of $187.20 was spent (including fees to Amazon) to complete data collection.

In response to the demographic question regarding gender identity, 130 of the participants responded “female” (52%), while 120 responded “male” (48%). As for race/ethnicity, 204 (81.6%) of respondents self-identified as

Caucasian/White/European American, 18 (7.2%) as African American, 13 (5.2%) as Asian/Pacific Islander, 8 (3.2%) as Hispanic/Latino, 3 (1.2%) as Native American, 3 (1.2%) as multiracial, and 1 (0.4%) chose not to provide a race/ethnicity. Participant age ranged from 18-87, with a median participant age of 34. Two participants chose not to provide an age. Due to a survey error, only 99 (39.6%) of participants in the ability to reproduce task were asked about their level of education, but all asked participants chose to answer. The modal response was "Bachelor's degree" as the highest attained level of education, with 38 participants choosing it (40% of participants who saw the question). See Appendix B for further detail on education level.

Goal-directedness. Participants were 257 MTurk Workers recruited via the Amazon Mechanical Turk website. Of the 257 participants, six were non-native speakers of English (or did not specify a native language), and their data were removed from consideration. An additional participant responded "No, delete my data" when asked if they were paying attention and providing honest answers. Data from this participant was similarly not considered. A total of $185.04 was spent (including fees to Amazon) to complete data collection.

In response to the demographic question regarding gender identity, 134 of the participants responded "female" (53.6%), 114 responded "male" (45.6%), one participant responded with "nonbinary" (0.4%) and one participant chose not to provide an answer (0.4%). As for race/ethnicity, 206 (82.4%) of respondents self-identified as Caucasian/White/European American, 20 (8%) as African American, 13 (5.2%) as Hispanic/Latino, 6 (2.4%) as Asian/Pacific Islander, 4 (1.6%) as multiracial, and 1 (0.4%) chose not to provide a race/ethnicity. Participant age ranged from 18-79, with a median participant age of 35. All participants chose to provide an age and level of education. The modal response for education was “Bachelor’s degree” as the highest attained level, with 85 participants (34%) choosing it. See Appendix B for further detail on education level.

Ability to think. Participants were 261 MTurk Workers recruited via the Amazon Mechanical Turk website. Of the 261 participants, ten were non-native speakers of English (or did not specify a native language), and their data were removed from consideration. An additional participant responded “No, delete my data” when asked if they were paying attention and providing honest answers. Data from this participant was similarly not considered. A total of $187.92 was spent (including fees to Amazon) to complete data collection.

In response to the demographic question regarding gender identity, 133 of the participants responded “female” (53.2%), 116 responded “male” (46.4%), and one participant responded with “agender” (0.4%). As for race/ethnicity, 203 (81.2%) of respondents self-identified as Caucasian/White/European American, 16 (6.4%) as Asian/Pacific Islander, 13 (5.2%) as African American, 11 (5.2%) as Hispanic/Latino, 4 (1.6%) as multiracial, 2 (0.8%) as Native American and 1 (0.4%) chose not to provide a race/ethnicity. Participant age ranged from 19-73, with a median participant age of 36. Four participants chose not to provide an age, and all participants provided their level of education. The modal response for education was “Bachelor’s degree” as the highest attained level, with 104 participants (41.8%) choosing it. See Appendix B for further detail on education level.

Similarity to a person. Participants were 264 MTurk Workers recruited via the Amazon Mechanical Turk website. Of the 264 participants, eleven were non-native speakers of English (or did not specify a native language), and their data were removed from consideration. An additional participant responded "No, delete my data" when asked if they were paying attention and providing honest answers. Data from this participant was similarly not considered. A total of $190.08 was spent (including fees to Amazon) to complete data collection.

In response to the demographic question regarding gender identity, 145 of the participants responded "female" (58%), and 105 responded "male" (42%). As for race/ethnicity, 203 (81.2%) of respondents self-identified as Caucasian/White/European American, 20 (8%) as African American, 12 (4.8%) as Asian/Pacific Islander, 11 (5.2%) as Hispanic/Latino, 3 (1.2%) as Native American and 1 (0.4%) chose not to provide a race/ethnicity. Participant age ranged from 18-72, with a median participant age of 35. One participant chose not to provide an age, and all participants provided their level of education. The modal response for education was "Bachelor's degree" as the highest attained level, with 83 participants (33.2%) choosing it. See Appendix B for further detail on education level.

Living-nonliving scale. Participants were 263 MTurk Workers recruited via the Amazon Mechanical Turk website. Of the 263 participants, eleven were non-native speakers of English (or did not specify a native language), and their data were removed from consideration. An additional participant responded "No, delete my data" when asked if they were paying attention and providing honest answers. Data from this participant was similarly not considered. Additionally, one participant failed both attention check questions in the survey, and these data were also not scored. A total of $189.36 was spent (including fees to Amazon) to complete data collection.

In response to the demographic question regarding gender identity, 145 of the participants responded “female” (58%), and 105 responded “male” (42%). As for race/ethnicity, 203 (81.2%) of respondents self-identified as Caucasian/White/European American, 20 (8%) as African American, 12 (4.8%) as Asian/Pacific Islander, 11 (5.2%) as Hispanic/Latino, 3 (1.2%) as Native American and 1 (0.4%) chose not to provide a race/ethnicity. Participant age ranged from 18-72, with a median participant age of 35. One participant chose not to provide an age, and all participants provided their level of education. The modal response for education was “Bachelor’s degree” as the highest attained level, with 83 participants (33.2%) choosing it. See Appendix B for further detail on education level.

Materials

Materials consisted of 1200 relatively concrete nouns with selection processes described in the overall materials section. Regardless of rating scale, each participant received a random assortment of 120 words to rate. These 120 words were further divided into lists of 30 items each; participants rated words one list at a time before moving on. Although word selection for any given participant was random without replacement, the fact that some MTurk Workers started but did not finish the rating task (a common occurrence on Amazon Mechanical Turk; Workers could be stopping the task for any number of potential reasons) made it so that each word was not rated an equal number of times.

Procedure

The procedure for each rating task was identical to that described in Study 1A with the following exceptions: Words were always presented in groups of exactly 30, and attention check questions always came after the second and fourth sets of words (that is, halfway through the task and at the end of the task). Instructions for each individual rating task are presented in Appendix A.

Results and Discussion

Table 3 displays various metrics for each rating scale. For all rating tasks, each word was rated by at least 18 different participants, and words were rated an average of 25 times on each measure. Words were placed into three bins based on their average ratings to give a rough estimate of the number of "inanimate" (ratings ≤ 3), "ambiguous" (ratings between 3 and 5), and "animate" (ratings ≥ 5) items for each scale. As shown, average ratings were fairly well distributed across each scale. A trend exists however for more words to be given lower ratings overall, especially for the "mental capacities" scales (Animacy (Goals), Animacy (Thought), and Animacy (Person)). A notable exception is the Animacy (Move) scale—this is due to otherwise inanimate words like *tornado*, *jet*, and *car* receiving high ratings. Additionally, the primary trend is for initially-assigned ambiguous items to be reclassified as inanimate, and some initially-assigned animate items to be reclassified as ambiguous. This trend is once again primarily in the "mental capacities" scales: Words like *gazelle*, *hare*, and *trout* were given low-to-middling ratings on these scales compared to words that referred to people, for example. The Animacy (Living) scale related most to the initial assignments, at least for animate and inanimate words. Of the initially-assigned

Table 3

Descriptive Statistics and Split-Half Reliabilities for Animacy Properties

	Ratings per Word			Rating Metrics			*N* Words With Rating				
Scale	Mean *N*	Min *N*	Max *N*	Mean Rating	Min Rating	Max Rating	Rating ≤ 3	Rating 3-5	Rating ≥ 5	Reliab	Acronym
Movement Likelihood	25 (1.82)	19	30	407 (173)	100	681	461	228	511	0.97	Move
Ability to Reproduce	25 (1.83)	19	30	346 (202)	100	675	641	145	414	0.97	Repro
Goal-Directedness	25 (1.98)	18	31	315 (152)	113	692	704	273	223	0.96	Goals
Ability to Think	25 (1.82)	19	30	285 (205)	100	696	731	178	291	0.99	Thought
Similarity to a Person	25 (1.69)	19	29	301 (198)	100	696	786	121	293	0.98	Person
Living/Nonliving Scale	25 (1.62)	19	29	383 (2390	100	700	551	163	486	0.97	Living

animate items, only 14 (3.3%) received ratings below 5, and of these, only 2 (0.5%) received ratings below 3 (these words were *relation* and *nag*). Similarly, of initially-assigned inanimate items, only 15 (3.5%) received a rating on the Animacy (Living) scale above 3, and none received ratings above 5.

Because no two participants saw the same exact list, standard measures of interrater reliability (e.g., Cronbach's alpha) could not be calculated. Instead, estimates of reliability were calculated using the split-half method: For each word, ratings were randomly split into two subgroups of equal size (unless the word received an odd number of ratings, in which case one subgroup had an additional member). Means were calculated for each subgroup, and these means were correlated with one another to get an idea of interrater reliability. All correlations were $r > 0.9$, and from these values split-half reliability was calculated using the formula $2*r/(1+r)$. All split-half reliability measures were quite high (above 0.95), and are also presented in Table 3. These data suggest that participants were extremely consistent in their rating of the words along each scale, which implies that participants consensually understood the rating tasks in the same manner, and could applied them to the words consistently. Participant feedback indicated this as well, with two instances reproduced below. While not shown, similar anecdotes exist for the other scales.

From the Animacy (Living) task:

> This task made me stop and say to myself "huh". When I started this task I honestly thought it would be easy but several of the words I had to think about. Dinosaurs were once alive but they are no longer so

technically they are not living things but at one time they were. A few of the vegetable words are alive while they are growing but are no longer when they make it to produce. However, a potato will continue to grow if left to it's own device[sic] and kept in soil. Does that count as being alive? Our hands and body are alive when attached to a live body but when we die everything dies. I wasn't really sure how to answer a few of those. This was a thought provoking study. Thank you for allowing me to participate.

From the Animacy (Goals) task:

This was an interesting study. My answers may have changed slightly as I became more familiar with the task and viewed objects or things that are not alive as low goal-directedness. I did assign higher to goal-directedness to hurricane
as it seems like a living changing entity.

Table 4 illustrates how various categories of words rated on each of the six measures (means for each scale were multiplied by 100 to match the 100-700 range of scales such as imagery and familiarity). Note that while category norms exist (e.g., Van Overschelde, Rawson, & Dunlosky, 2004), they are not particularly useful for this kind of grouping. Each word was individually assigned to one of the listed categories by hand; another rater may make slightly different choices in some cases, but overall the category assignments seem reasonable. Examples of each category are provided in the

Table 4

Mean Ratings on Animacy Scales by Category

	Category	*N*	*Living*	*Repro*	*Move*	*Person*	*Thought*	*Goals*	*Examples*
Humans	All	283	648	578	569	618	596	533	
	Professions	129	660	596	583	633	617	581	doctor, judge, shepherd
	Descriptors	93	633	551	552	598	566	466	child, foe, hero
	Actors	41	637	571	563	602	588	545	donor, murderer, tourist
	Relatives	20	669	596	566	641	620	515	aunt, dad, wife
Animals	All	111	669	605	597	235	382	313	
	Mammals	65	672	603	609	245	403	317	cat, monkey, tiger
	Reptiles	10	648	600	544	222	371	306	cobra, lizard, turtle
	Birds	21	678	618	622	229	371	328	bluejay, dove, chicken
	Fish	5	666	616	612	214	334	291	salmon, shark, tuna
	Other	10	657	597	518	206	306	278	crab, oyster, toad
	Insects	18	663	614	601	201	284	281	bee, spider, worm
	Misc. Living	18	582	528	554	419	422	384	bacteria, creature, male

(*table continues*)

	Category	*N*	*Living*	*Repro*	*Move*	*Person*	*Thought*	*Goals*	*Examples*
Ambiguous	All	340	350	281	380	245	191	262	
	Weather	29	162	192	486	142	134	204	breeze, hurricane, wind
	Body Parts	76	407	190	398	317	152	240	brain, eye, fur
	Vehicles	28	117	149	576	151	123	263	car, plane, yacht
	Supernatural	18	344	255	458	317	309	330	demon, ghost, mermaid
	Collectives	39	473	405	432	409	420	477	choice, hive, society
	Misc	63	306	299	358	258	213	280	model, pitcher, robot
Plants	All	87	418	368	241	150	123	178	
	Inedible Plants	34	429	363	248	151	124	197	cotton, hedge, tree
	Edible Plants	53	410	371	237	150	122	165	almond, fruit, spinach
Objects	All	302	121	155	284	149	118	196	
	Clothing	32	110	145	285	172	116	180	blouse, hat, vest
	Food & Drink	43	143	164	249	149	118	173	bacon, dinner, vodka
	Furniture	16	109	149	207	143	115	194	bed, sofa, throne
	Instruments	12	114	152	312	141	126	223	bell, guitar, violin
	Manmade	97	117	153	279	150	118	204	barrel, ring, toy
	Natural	29	138	174	260	149	117	160	diamond, mud, salt
	Tools	43	113	152	323	140	121	217	brush, ladder, spoon

(*table continues*)

	Category	*N*	*Living*	*Repro*	*Move*	*Person*	*Thought*	*Goals*	*Examples*
	Weapons	16	117	150	388	144	116	234	blade, gun, missile
	Other	14	127	153	298	138	120	188	item, sphere, triangle
Places	All	128	183	173	203	159	139	246	
	Buildings	70	133	153	164	161	138	258	court, railroad, school
	Landscapes	34	234	186	244	145	129	186	crater, ocean, puddle
	Areas	17	209	209	175	172	150	293	city, property, region
	Celestial Bodies	7	375	226	455	182	177	313	galaxy, sun, world

table to aid in understanding. While not empirically verifiable, each of the scales seems to pass the "eye test"—living things like people and animals group appropriately on the Animacy (Living) and Animacy (Repro) scales, and words for people appropriately separate out from other words on the Animacy (Person), Animacy (Thought), and Animacy (Goals) scales. Further, animal words are given appropriate ratings on these mental scales as well: Not as high as people, but higherthan other categories rated relatively highly on the Animacy (Living) scale, like plants. A few interesting cases that show participants' sensitivity to the Animacy (Thought) scale in particular are among birds (*chicken*—300, *dove*—340, *eagle*—419, and *owl*—496; owls may not actually be that much smarter than other birds, but they are apparently perceived to be) and among mammals (*lamb*—316, *pig*—358, *cow*—396, *dog*—441, *cat*—463, *ape*—493, and *dolphin*—519).

A few interesting cases crop up as well. The Animacy (Living) average for reptiles category is brought somewhat down by the inclusion of *dinosaur*—419; participants seemed to be unsure whether to call it a living or nonliving thing (likely due to dinosaurs' status as extinct). "Collective" words score very middling on all of the scales, for example. Participants appear to acknowledge that these kinds of words are made up of groups of people or animals, yet at the same time are a step removed. Even more interesting, these words rate highest on Goals; many of the words that make up the "collectives" category connote groups of people or animals that are together for a purpose (e.g., Goals: *congress*—623, *orchestra*—527, and *team*—596). These data seem to reflect the fact that groups tend to be seen as possessing of agency, but little else (Knobe & Prinz, 2008). Another interesting case is words for celestial bodies, which, while ostensibly inanimate, often are somewhat goal-directed (e.g., Animacy (Goals): *world*—452, *sun*—312), thought of as pseudoliving things (e.g., Animacy (Living): *world*—408, *sun*—344), and definitely move (e.g., Animacy (Move): *world*—432, *sun*—407).

Further, it appears that participants correctly interpreted the Animacy (Move) scale as *likelihood* of movement, and not simply whether the word can move on its own. For example, vehicles score highly on the Animacy (Move) scale (M = 576), as do weather phenomena (M = 492). Buildings and words for areas score appropriately low on the scale, and words for components of landscapes are artificially inflated by moving bodies of water. For example, while *puddle* has an Animacy (Move) score of 146, *lake* and *ocean* have scores of 330 and 543, respectively. Participants were apparently even sensitive to the rate at which water moves through bodies of flowing water. The word *brook* has an Animacy (Move) score of 438, *creek* has a score of 538, *stream* has a score of 608, and *river* has a score of 627. Overall, it seems that the scales are working as intended.

STUDY 2: FACTOR ANALYSIS OF NORMATIVE DATA

With so much normative data now available for all 1200 words, it makes sense to try to condense these data into a smaller number of more manageable factors. Thus, Study 2 seeks to do exactly that—investigate the factor structure of both the six newly-collected animacy measures (done in Study 2A), as well as investigate whether the six animacy measures relate to or are subsumed by existing normative metrics such as imagery or frequency (Study 2B).

In both Study 2A and 2B, factor analysis was used to combine variables into factors. In the case of Study 2A, exploratory factor analysis was employed, as the animacy measures are thought to tap into a common construct or constructs (described in detail below). For Study 2B, principal component analysis was used to combine variables into factors, as the question of interest in this case is not what the underlying constructs are, but whether the animacy measures are redundant with existing normative data. For example, a potential result could be that animacy metrics simply relate highly to word imagery or familiarity rather than tap a unique construct. In general, Studies 2A and 2B hope to help make sense of the normative data in useful ways.

STUDY 2A: FACTOR ANALYSIS OF ANIMACY MEASURES

Given that six different potential measures of animacy were collected, it is useful to know whether any of these scales are the result of the same underlying construct. Using factor analysis, it can be determined whether this is the case. Factor analysis is appropriate (as opposed to principal component analysis), as factor analysis makes the theoretical assumption that variables are the result of some underlying factor or factors. This is likely true—that is, there may be some underlying component such as "mental capacity" or "agency" that predicts variables like Animacy (Goals), Animacy (Thought), and Animacy (Person). Similarly, Animacy (Living) and Animacy (Repro) are likely to be related because they are both judgments based on whether the target is alive or not. Further, factor analysis minimizes the amount of unique and error variance that is analyzed, and only considers the variance that the variables of interest share (Tabachnick & Fidell, 2013).

Analysis of Validity

While the overall factor structure of this set of scales provides information about construct validity for the measures (that is, do they group together), it is generally useful to examine a correlation matrix for the measures. Correlations among the measures allow for an examination of convergent validity—that is, are measures that are expected to be related actually related? The entire correlation matrix is presented in Table 5. While all measures are significantly correlated, a few expected correspondences stand out in particular. Namely, Animacy (Repro) and Animacy (Living) correlate very highly (.93), as do Animacy (Person) and Animacy (Goals) (.877) as well as Animacy (Person) and Animacy (Thought) (.917) and Animacy (Thought) and Animacy (Goals) (.909). Surprisingly, Animacy (Thought) also correlated highly with Animacy (Living) (.829) and Animacy (Repro) (.843). Finally, the Animacy (Move) measure—while still significantly correlated to all metrics—was comparatively much less correlated to the other measures, with all correlations at or below .72. It is therefore likely that simple movement likelihood as measured by this metric is less related to other components of animacy. If Animacy (Move) instead measured *autonomous* movement, it would likely be more related to the other metrics (in particular, to those likely tapping mental capacities, such as Animacy (Goals), Animacy (Thought), and Animacy (Person)). These data are further evidence that participants were using the Animacy (Move) scale as intended.

Factor Structure of Animacy Measures

The six animacy measures were subjected to an exploratory factor analysis using unweighted least squares estimation with varimax rotation, an orthogonal rotation technique that attempts to maximize the spread among factor loadings. Varimax rotation is also the most commonly used rotation technique in the literature (Tabachnick & Fidell, 2013). Only one factor had an eigenvalue greater than 1.00, indicating a primary factor that explains the majority of the shared variance across the six scales (its eigenvalue was 4.87).

Table 5

Correlation Among Six Animacy Measures for 1200 Items

	Living	Move	Repro	Person	Goals
Move	73				
Repro	93	71			
Person	74	63	70		
Goals	70	63	71	88	
Thought	83	72	84	92	91

Note. Decimals omitted from the table.

A one-factor solution was extracted, and its factor loadings appear in Table 6; primary loadings appear in bold. This single factor accounts for over 77% of the variability in the norms. As can be seen in Table 6, all six variables load highly onto this single factor, which could easily be termed a "General Animacy" factor. Note that this is not a rotated solution, as rotation can only be performed when two or more factors exist.

However, these results may be overly simple. Indeed, Wood, Tataryn, & Gorsuch (1996) have argued that after observing extensive simulations of factor analysis, more bias is shown when factors are underextracted compared with overextraction. In particular, overextraction is typically very robust when so-called singleton constructs are involved; that is, a construct for which only one (or perhaps very few) variables are present in the data set. This is certainly likely true with the current data, which has only six variables, two of which are more 'general' (Animacy (Living) and Animacy (Person)).

Table 6

Animacy Factor Analysis Results for 1200 Nouns

	Single-Factor Solution	*Two-Factor Solution (Varimax Rotation)*		*Two-Factor Solution (Promax Rotation)*	
	Animacy 1	$Anim_{Mental}$ 1	$Anim_{Physical}$ 2	$Anim_{Mental}$ 1	$Anim_{Physical}$ 2
Thought	98	**81**	57	**77**	27
Living	89	42	**88**	2	**96**
Repro	89	42	**86**	3	**93**
Person	88	**84**	42	**92**	3
Goals	87	**84**	40	**93**	0
Move	76	45	61	24	**56**
%Var	77.62	43.74	42.33	79.05	7.02
Cum%Var	77.62	43.74	86.07	79.05	86.07

Note. Decimals omitted from main body of table.

For these reasons, 2- and 3-factor solutions with varimax rotation for the animacy scales were extracted. While the 2-factor solution remained robust (factor loadings appear in Table 6), the 3-factor solution broke down and was uninterpretable (data not shown). With this new rotated 2-factor solution, a total of over 86% of the variability in these norms was explained, and both factors have rotation sums of squared loadings (values akin to eigenvalues) above 2.5 (2.63 and 2.54, respectively), well above the traditional 1.0 cutoff. Compared to the previous results, some differentiation can be seen between two groups of the animacy measures: Animacy (Thought), Animacy (Goals), and Animacy (Person) load highly onto Factor 1 (termed the "Mental" factor, or $\text{Animacy}_{\text{Mental}}$), while Animacy (Living) and Animacy (Repro) load highly onto Factor 2 (termed the "Physical" factor, or $\text{Animacy}_{\text{Physical}}$). The Animacy (Move) measure loads relatively highly onto both factors, potentially illustrating how movement can have both an outward physical component and an inward, intentional component (Wegner & Gray, 2016).

Even still, these results have an alarmingly high number of "double loadings". Generally, any loading greater than .30 is considered a significant loading, and all six variables still load onto both factors when all significant loadings are considered. Because of how tightly all six of the variables are correlated, an oblique rotation of the data may be more appropriate than the current orthogonal (varimax) rotation. There are several ways to determine if an oblique rotation is appropriate given the data at hand. First, it can be determined if the data have *simple structure*. If the data do not have simple structure, then the rotation used is likely not adequate. Bryant & Yarnold (1995, p. 132-133) define simple structure in the following way:

> A condition in which variables load at near 1 (in absolute value) or at near 0 on an eigenvector (factor). Variables that load near 1 are clearly important in the interpretation of the factor, and variables that load near 0 are clearly unimportant. Simple structure thus simplifies the task of interpreting factors.

Clearly, the current 2-factor solution using varimax rotation is not described by this definition: For both factors, while several variables approach 1, none approach 0. Thus, it is somewhat difficult to interpret the distinction between the factors.

There are five criteria put forward by Thurstone (1947) that make simple structure even clearer:

> 1. Each variable should produce at least one zero loading on some factor.
> 2. Each factor should have at least as many zero loadings as there are factors.
> 3. Each pair of factors should have variables with significant loadings on one and zero loadings on the other.
> 4. Each pair of factors should have a large proportion of zero loadings on both factors (if there are say four or more factors total).
> 5. Each pair of factors should have only a few complex variables [variables that load onto both factors].

The current data fail all of these items (excepting number 4, which does not apply in the current case). Clearly, the current data are not in simple structure. A final simple and useful way to illustrate whether the current data are in simple structure is to create a factor plot of the variables, as shown in Figure 2. Ideally, variables should lie along one of the axes (that is, load highly on one Factor and not on the other). From Figure 2 it is clear that while the variables certainly cluster (Animacy (Repro) and Animacy (Living), along with Animacy (Goals) and Animacy (Person) in particular), the axes along which they differ are not orthogonal. For all of these reasons, A final factor analysis was performed extracting two factors using an oblique (that is, correlated) method of rotation called promax. Promax rotation has the benefits of driving small-to-moderate loadings toward zero while only slightly reducing larger loadings. In this way, simple structure is maximized (Tabachnick & Fidell, 2013).

The results of this analysis are presented in Table 6 (results presented are the pattern matrix). With this new oblique rotation, it can immediately be seen that the two factors have separated out much more usefully. The total explained variability is still just over 86%, and both factors now have much larger rotation sums of squared loadings (4.28 and 4.21 for Factors 1 and 2, respectively). Further, this oblique rotation of the data now meets most of the main criteria to have simple structure: Each variable has as many zero loadings as there are factors, each pair of factors has variables that load significantly on one but not the other, and only one complex variable exists in the data set (Animacy (Move)). The only criterion this new oblique rotation does not meet is the first, which is that Animacy (Move) does not produce a zero loading on either factor—this is likely because there are only two factors in the solution, and Animacy

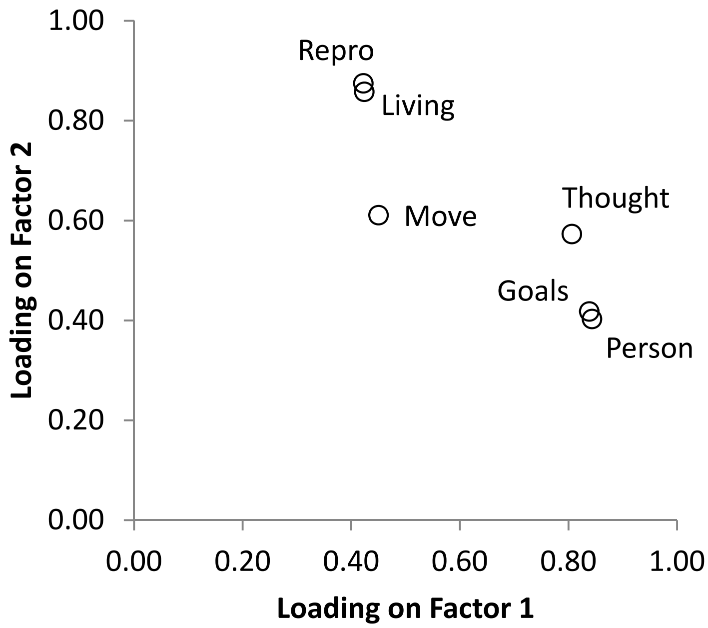

Figure 2. A factor loading plot depicting each variable plotted by its loadings on Factors 1 and 2 for a 2-factor solution with varimax rotation. While clusters are evident, all variables lie out in the quadrant itself and not along the axes—this factor structure is not a simple solution.

(Move) is at least somewhat related to both of them. Even still, Animacy (Move) does not meet the traditional cutoff (0.30) to be included as a significant contributor to Factor 1. With this new promax rotation, a plot of the factor loadings (Figure 3) reveals data that have separated substantially in comparison to the earlier varimax-rotation-derived plot of the data (Figure 2).

A final simple (and often best) test of whether an oblique rotation is preferred is to correlate the factors an oblique solution extracts. In the present data, Factors 1 and 2 correlate at $r = 0.77$. A general rule is that if factor correlations exceed 0.32, an oblique rotation was appropriate. This is because average correlations in excess of 0.32 imply that 10% or more of variance overlaps among factors (Tabachnick & Fidell, 2013). Clearly, the present data meet this criterion. For all of these reasons, a 2-factor oblique rotation was accepted as the most appropriate factor analysis of the animacy measures.

Discussion

As described briefly above, the two factors that result from analysis of the animacy measures appear to roughly correspond to the “mental” attributes of animate things and to the “physical” attributes of living things. The fact that these two factors separate out from one another normatively is not only interesting, but important. As previously discussed, Gray, Gray, & Wegner (2007) have identified two primary dimensions for what they call “mind perception”. These dimensions are *experience* and *agency*. Namely, they are something’s ability to *experience* the world (e.g., things like hunger, pain, joy, etc.), and something’s ability to *act* on the world (e.g., its ability to control itself and act on others). It is possible that the two factors extracted above correspond to these dimensions. In particular, it is likely that the “Mental” factor

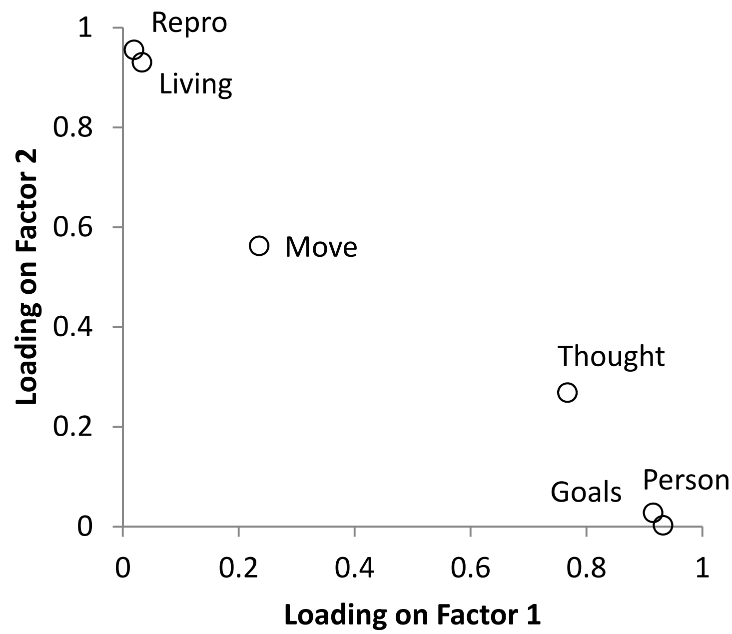

Figure 3. A factor loading plot depicting each variable plotted by its loadings on Factors 1 and 2 for a 2-factor solution with promax rotation. Clusters are still evident in this case, and the majority of variables lie along one of the axes. This factor solution has simple structure.

relates to Agency, while the “Physical” factor relates to Experience. This idea is explored in detail later in the general discussion.

STUDY 2B: FACTOR ANALYSIS OF ALL NORMATIVE DATA

In addition to investigating the degree to which the six newly-collected animacy measures are related to one another, it is also useful to know if they are redundant with extant normative data. For example, Popp & Serra (2015) have posited that animacy advantages in free recall may be a result of animate things being more mentally arousing, perhaps because they attract attention or cause fear. With the present data, hypotheses like this can be tested. If the animacy measures and arousal measure load onto the same factor, then it is indeed likely that they are related. If not, they are probably not related (in terms of whether they are similar enough in the factor analysis to be redundant, anyway).

As mentioned, principal component analysis is more appropriate than factor analysis for analyzing the normative data altogether. This is because rather than asking whether there are underlying factors that are producing the current variables, the primary focus is how the measured variables overlap and correspond with one another.

Analysis of Validity

Once again, while the overall factor structure of the entire normative set provides information about construct validity for the variables (that is, do they group together as expected), it is always important to examine the correlation matrix to look for convergent validity. Convergent validity is simply whether the measures that were expected to be related actually are related on a correlational basis. The correlation matrix for all 21 variables is presented in Table 7. While the vast majority of measures are significantly correlated (due primarily to the large sample size), there are still many notable correspondences among the variables that stand out. For brevity, only relationships with $r > |0.30|$ will be discussed with some exceptions.

First, it is important to note that once again all of the animacy measures correlate with one another, as described above. Working from the top left of the matrix to the bottom right, it can be seen that Animacy (Goals), Animacy (Thought), and Animacy (Person) are all relatively negatively related to both CNC and IMG (correlations range from -.321 to -.372). While this may seem strange at first, upon examination the relationship makes a degree of sense. Many of the words high on these values are words that refer to people—specifically, people in specialized professions or who are performing specific actions. For example, words like *creator*, *inventor*, and *leader* all fall into this category, and are relatively less concrete and imageable than comparatively less-thoughtful words like *frog*, *goose*, and *trout*. While interesting, these correlations are not large the in the context of other observed data.

Continuing down the diagonal, CNC and IMG are highly correlated with one another (.655), and negatively correlated with AoA (-.368 and -.509, respectively). These data make perfect sense: Concrete words tend to be very imageable, and more abstract, less imageable words are learned later in life. The next set of relationships seems to deal with the contextual features of words. That is, with the ways in which the word is used and how frequent it is. AVAIL is negatively correlated with both AoA

Table 7

Correlation Among 21 Properties for 1200 Items

	Living	Goals	Move	Repro	Thought	Person	CNC	FAM	IMG	AVAIL	MNG	VAL	ARO	DOM	AoA	LEN	OrthoN	PhonoN	NSyll	$SUBTL_{CD}$
Goals	**70**																			
Move	**73**	**63**																		
Repro	**93**	**71**	**71**																	
Thought	**83**	**91**	**72**	**84**																
Person	**74**	**88**	**63**	**70**	**92**															
CNC	-13	**-37**	-10	-12	**-32**	**-36**														
FAM	18	21	18	17	21	26	6													
IMG	-17	**-36**	-9	-17	**-34**	**-37**	**66**	2												
AVAIL	-11	-6	-6	-13	-11	-7	14	**34**	26											
MNG	3	11	2	4	7	11	-17	9	-12	22										
VAL	-3	-4	-4	-5	-4	-7	17	15	20	15	-8									
ARO	17	24	28	18	22	20	-18	2	-3	2	8	-20								
DOM	-15	-7	-16	-15	-11	-7	10	13	5	13	-2	**62**	-24							
AoA	12	28	2	15	24	23	**-37**	-24	**-51**	**-53**	0	**-32**	11	-24						
LEN	12	28	8	17	23	21	-14	6	-21	**-32**	6	1	8	-1	**35**					
OrthoN	-7	-18	-3	-9	-14	-15	12	4	12	27	-4	–	-9	1	-27	**-68**				
PhonoN	-12	-23	-7	-15	-19	-17	12	2	12	29	-4	1	-10	4	-28	**-66**	**79**			
NSyll	15	30	9	19	25	22	-17	6	-24	-30	3	1	8	-1	**35**	**83**	**-58**	**-61**		
$SUBTL_{WF}$	8	15	10	6	13	17	-4	21	4	**42**	2	13	7	5	-26	-17	19	17	-14	
$SUBTL_{CD}$	3	13	6	-3	8	15	-5	**31**	6	**59**	9	17	8	10	**-37**	-23	21	22	-21	**87**

Note. Leading decimals omitted.

(-.532) and LEN (-.32), implying that shorter words are learned earlier and come more easily to mind. Further, AVAIL is positively correlated with SUBTL$_{WF}$ and SUBTL$_{CD}$ (at .415 and .592, respectively), evidence that more frequent and contextually diverse words are also easier to come up with on a free response task: No surprises here. Similarly, SUBTL$_{WF}$ and SUBTL$_{CD}$ are very tightly correlated (.866), as more frequent words are more likely to appear in different contexts overall. LEN and NSyll are also related (.826), and NSyll is positively related to AoA in the same way as LEN (.354). SUBTL$_{CD}$ is correlated with FAM (.313), indicating that words that appear in more contexts are more familiar. SUBTL$_{CD}$ is also negatively correlated with AoA (-.373)—words that appear in fewer contexts are learned later in life. This result corroborates a recent study by Hills et al. (2010) that indicates contextual diversity is essential for early word learning.

Another set of relationships among the variables deals with the lexical and phonological features of words: How words are constructed with letters and phonemes. Both LEN and NSyll are negatively related to OrthoN (-.681 and -.575, respectively), and are also negatively related to PhonoN (-.656 and -.614, respectively). In short, longer more syllabically complex words have fewer orthographic and phonographic neighbors. It should come as no surprise also that OrthoN and PhonoN are highly positively related (.787) as well; words that have many orthographic neighbors tend to also have many phonographic neighbors.

A final unsurprising relationship among the correlations was among emotionally-laden variables. VAL correlated highly with DOM (.615), indicating that happy words tend to make one feel in control; this result is corroborated by Warriner et al., (2013), who found that VAL and DOM correlated at $r = .717$ across all nearly 14,000 items in their original dataset.

While relatively small ($r < 0.30$), both FAM and ARO tend to consistently positively correlate with all animacy scales, indicating that some of the variance accounted for by animacy may also be accounted for by these metrics—a close eye should be kept on these measures in the factor analysis. Additionally, it is interesting that MNG did not heavily correlate with any of the other measures; its closest correlate was AVL at $r = .216$. A final observation of these data is that AoA is related to many different variables, as expected (Clark & Paivio, 2004).

Factor Structure of the Normative Dataset

All 21 variables were subjected to a principal components factor analysis with varimax (orthogonal) rotation. There were six components with eigenvalues greater than 1.00, and 7^{th} and 8^{th} components with values relatively close to 1.00 (0.846 and 0.765, respectively). While 7- and 8-component extractions were explored, they did not appear to add much to the interpretability of the factor structure. Additionally, an oblique (promax) rotation was explored but ultimately rejected because correlations among resulting components were not on average greater than the typically-used cutoff of 0.32. Further, the 6-component solution with varimax rotation meets all five of Thurstone's (1947) criteria for simple structure.

Because of these considerations, the 6-component solution was deemed most appropriate. The component loadings are shown in Table 8; component loadings greater than .300 are shown in bold. These six components accounted for over 76% of the variability in the combined normative data. Two of the observed components (2

Table 8

Principal Component Analysis Results for 1200 Nouns

	ANIM 1	LEXICAL 2	CONTEXT 3	SIMPLE 4	EMOTION 5	MNG 6
Thought	**93**	13	7	-23	-3	3
Living	**93**	2	-4	1	-6	-2
Repro	**92**	7	-7	1	-8	-1
Person	**85**	12	14	**-31**	-2	8
Move	**83**	-1	2	10	-15	0
Goals	**83**	19	14	**-31**	-2	7
LEN	11	**88**	-10	-12	2	3
OrthoN	-3	**-86**	10	3	4	-1
PhonoN	-8	**-86**	9	2	6	1
NSyll	13	**83**	-8	-16	3	-1
$SUBTL_{CD}$	5	-16	**94**	-1	4	7
$SUBTL_{WF}$	9	-11	**91**	-4	-1	-11
AVAIL	-9	-26	**60**	27	5	**46**
IMG	-16	-9	6	**87**	0	-4
CNC	-13	-7	-9	**83**	10	-10
AoA	9	28	**-36**	**-61**	-25	-21
DOM	-9	2	9	1	**85**	7
VAL	2	7	17	21	**80**	-3
ARO	20	14	18	1	**-54**	8
MNG	1	3	-3	-16	-10	**88**
FAM	26	7	**35**	16	20	**40**
%Var	23.36	15.51	11.81	10.78	8.72	5.86
Cum%Var	23.36	38.87	50.68	61.46	70.18	76.04

Note. Decimals omitted from main body of table.

and 5) show noticeably “clean” results, meaning that their constituent variables do not have substantial loadings on other components and that other variables do not load on these components. Because they are relatively clear of misleading variables, Component 2 can be easily identified as pertaining to a word’s lexical features, while Component 5 is clearly related to the how emotionally-laden a word is.

Component 1 can be readily identified as a measure of animacy. Importantly, no extraneous variables load significantly onto this animacy component: ARO and FAM are the closest any components get, with loadings of .203 and .263 respectively. It appears that arousal isn’t much related to animacy after all. However, two of the animacy variables (Animacy (Person) and Animacy (Goals)) do load onto Component 4, with loadings of -.307 and -.308 respectively. Component 4 appears to consist primarily of IMG, CNC, and AoA—while Animacy (Person) and Animacy (Goals) load negatively onto this component, they do so only barely. Due to this constellation of variables, Component 4 has been termed the “SIMPLE” component, meaning that it primarily consists of highly imageable, highly concrete words that are learned early in life and are not very complex. That is, they primarily refer to a single, exact concept with little room for error in interpretation. Interestingly, the words that rate most highly on this SIMPLE component includes virtually all animals, a number of edible fruits and vegetables, and words like *parent*, *airplane*, and *finger*. On the opposite end of the SIMPLE component are vague, ill-specified words like *soul*, *thing*, *mind*, *region*, and *expert*. Notably, while there were equal numbers of animate words (that is, words scoring at 5 or above on the Animacy (Living) scale for a rough measure) on each half of this component (243 in the upper half compared to 243 in the bottom half), the types of animate words in each half were vastly different—102 of the 111 animals in the list were in the upper half of the SIMPLE component. The remaining eight consisted of relatively obscure animal words like *fawn*, *mare*, *mole*, and *oyster*. Perhaps if the mental dimension extracted in Study 2A were more well-specified (using additional scales), a revised principal components analysis would help to further differentiate this SIMPLE factor from the mental scales comprising the ANIM factor.

Of the remaining two components, Component 3 is fairly clearly a measure of contextual variables including word frequency, a word's contextual diversity, its familiarity and its availability. AoA loads negatively onto this component as well, as more familiar, available, and frequent words are learned earlier in life. Finally, Component 6 appears to be related primarily to word meaningfulness, that is, how readily a given word makes a person think of other words. Related variables FAM and AVAIL makes sense in this context, as familiar and more available words are likely related to MNG.

Three variables in these data load rather evenly across two or more of the six components, indicating a multidimensional underlying structure for these variables. These variables include AVAIL, AoA, and FAM. The AVAIL measure of availability is based on the occurrence of words as free associations in response to other words, and is known to tap other measures including familiarity, word length, and concreteness (Clark & Paivio, 2004); these relationships are all reflected in the current data. Age of acquisition (AoA) is similarly multidimensional. Low values for AoA typically represent words that are familiar, short, concrete, and occur with significant frequency (Kuperman et al., 2012). These patterns are also reflected in the current data. Finally, word familiarity appears to load across multiple components as well—this pattern is most likely due to the aforementioned relationships with both age of acquisition and availability.

Discussion

The results of principal component analysis on all 21 normative scales have been quite informative. The first and most important observation is that the six newly-collected animacy scales are relatively independent of other word measures, with one possible exception. In the present component extraction, both Animacy (Person) and Animacy (Goals) loaded negatively onto Component 4, dubbed SIMPLE. And while it did not reach the .300 cutoff, Animacy (Thought) did as well. As mentioned, while animate words are distributed evenly across the SIMPLE component, certain kinds of animate words (namely, highly imageable and concrete words such as most animals and many familiar people) rank higher on the SIMPLE component than others. Because of this relationship between SIMPLE and Component 1 (ANIM), these two metrics may not be wholly independent of one another: Some of what may make animate words "interesting" may be captured by this SIMPLE component, what exactly this may mean is not completely clear.

The rest of the results are primarily confirmatory. Each of the six factors makes psychological sense, referring in turn to conglomerates of animacy, lexical components, contextual components, a measure made up primarily of imagery and concreteness, a measure of how emotionally-laden a word is, and a final measure related to meaningfulness and familiarity. Further, these results are encouraging going forward, as they can be used as predictors of recall.

STUDY 3: COLLECTION OF RECALLABILITY NORMS

Study 3 is motivated by the desire to collect a new database of how easily various words are recalled in a free recall task, modeled after Rubin & Friendly's (1986) original exploration of the topic. The primary benefit of collecting new recallability norms is that which words are studied can be chosen. In the Rubin & Friendly dataset, only 157 of the 925 words were agreed-upon as animate by Nairne et al.'s (2013) three raters, which is not a very comprehensive set for studying the effects of animacy on free recall. Nairne and colleagues were forced to study only a subset of the Rubin & Friendly dataset, with each analysis restricted to only 314 words—hardly a large sample in context.

Further, the Rubin & Friendly dataset is not a representative one. With only 157 animate items in the set, it is highly unlikely that the entirety of the animacy construct is being tapped. This problem has been solved in the current dataset by intentionally choosing a broad selection of words (as detailed in Study 1). Additionally, the Rubin & Friendly dataset (and thus Nairne et al.) did not make any attempts to equate animate words along the normative dimensions. This means that animate and inanimate words may vary wildly along these norms. For example, animate words tend to be relatively concrete and imageable, with some exceptions. While repeated analyses were run by Nairne and colleagues to avoid any sampling bias, the Rubin and Friendly dataset contains a wide sampling of nouns along the concreteness dimension. This fact means that a randomly sampled inanimate word is more likely to be more abstract than any randomly sampled animate word.

Indeed, CNC values favored animate words by 146 points on average across all five regression repetitions performed by Nairne and colleagues. It is likely because of this unintentional difference that concreteness explained a surprising amount of variance over and above imagery (a typically highly correlated metric) in Nairne et al.'s (2013) relative-weight analysis of recall. In the current normative data, while no particular efforts were made to control for these variables, the norms consist of concrete nouns regardless of animacy status (the mean CNC for the entire sample was 560 out of a possible 700).

Finally, the Rubin & Friendly dataset is an amalgamation across 13 different recall experiments, each with its own parameters. The current study instead collected recall data on a massive scale in an effort to standardize how each participant experienced the recall procedure. Due to these many limitations of the Rubin & Friendly dataset, it is clear that new recallability norms should be constructed rather than simply norming the existing data along the six newly-created animacy scales. In an effort to remain consistent with prior work however, this recallability study is modeled after that of Rubin & Friendly. Thus, project is not only an analysis of the effects of animacy on recall, but a sorely-needed update to recallability norms in general.

Method

Participants

There were 843 participants in this study. Of these participants, 203 were Purdue University undergraduates who completed the task for partial credit in an introductory psychology course; these participants were tested in groups ranging from one to six in sessions lasting approximately 30 min. The remaining 640 participants were Amazon Mechanical Turk (MTurk) Workers recruited via a Human Intelligence Task (HIT) posted on the MTurk website. MTurk Workers could only accept the HIT if they were located in the United States, had a 95% HIT acceptance rate (or higher), and had completed at least 1000 HITs in total; these restrictions were to ensure high-quality data. Further, all MTurk Workers were unique, and could not accept the HIT if they had completed one of the normative scale studies (Studies 1A and 1B). The entire task took roughly 25 minutes and MTurk Workers were paid $2.50 each ($0.10/min); $1920 was spent in total (including fees to Amazon).

Of the 843 participants, 35 (25 Purdue University students, 10 MTurk Workers) reported a native language other than English, 6 responded “No, delete my data” when asked if they were paying attention and providing honest answers (all MTurk Workers), and a final 2 responded “Yes, I wrote down/copied the words” when asked if they used any outside aids on the memory task (all MTurk Workers). These 43 participants were eliminated from consideration; details on these elimination criteria are provided in the procedure below.

Of the 800 participants whose data were scored, age ranged from 18 to 69, and the median age was 29. Further, 439 self-identified as male (54.9%), 358 self-identified as female (44.8%), 2 self-identified as genderqueer (<0.3%), and 1 self-identified as nonbinary (<0.2%). For race/ethnicity, 609 (76.1%) self-identified as Caucasian/White/European American, 60 (7.5%) as African American, 57 (7.2%) as Asian/Pacific Islander, 49 (6.1%) as Hispanic/Latino, 15 (1.9%) as multiracial, 5 (.6%) as Native American, and 5 (.6%) chose not to provide an answer. While education level was not asked of Purdue University undergraduates (as all were currently taking college-level classes), the modal response for MTurk Workers for education level was Bachelor's Degree (36.5%); complete data on education level is available in Appendix B.

Materials and Design

This study used a repeated measures design such that participants completed three study-and-recall trials as described in the procedure. While word animacy was not truly manipulated, words were assigned a type (animate, inanimate, or ambiguous), based on how participants rated them on the Animacy (Living) scale; this scale was most comparable to how words were divided into groups by Nairne et al. (2013). Recall of items was assessed by this assigned type (discussed below). Importantly, each participant received a completely unique list of words sampled from the 1200-word pool, and all participants received some animate and inanimate words (even though list selection did not specifically control for the number of animate and inanimate items in each list). Thus, list composition varied heavily from participant to participant, meaning that the lists themselves did not afford any consistent cues for recall across participants.

The 1200 selected words for which normative data were collected in Study 1 were the focus of this study. Words were repeatedly randomly divided without replacement into 800 lists of 30 items each such that an increment of 40 lists was guaranteed to contain each word in the sample exactly once. Across participants, this meant that each of the 1200 words was presented exactly 20 times. Notably, this is comparable to the average number of presentations per word in the Rubin and Friendly recall norms (19). There was a mean of 12.15 items per list with ratings on the Animacy (Living) scale of 5 or more; these were considered animate (A). Comparatively, there was a mean of 13.78 items per list with ratings of 3 or below on the Animacy (Living) scale; these were considered inanimate. Standard deviations were comparable ($SD_A = 2.57$ $SD_I = 2.62$). Finally, there was a mean of 4.08 items per list with a rating between 3 and 5 on the Animacy (Living) scale; these items were considered ambiguous (Q; $SD_Q = 1.84$). Descriptive statistics for these words for the original 15 normative measures are available in Table 2; descriptive statistics for these words for the animacy scales collected in Study 1B are available in Table 3.

Procedure

In the lab, participants were tested in groups of six or fewer, while MTurk participants began and completed the study on their own personal computers. Importantly, MTurk participants were blocked from using mobile or tablet devices—a laptop or desktop computer was required. Participants studied and free-recalled the same list of thirty words three times during the course of the study; they were informed before they began that this was a memory experiment. While participants whose data were collected in-lab were monitored (and thus could not cheat by writing down or otherwise copying the words), MTurk participants were simply asked to refrain from writing down or copying the words in any way.

For each study trial, words were presented one at a time on the computer screen for 5 seconds each. Following each study trial was a short, roughly 1-minute distractor task in which participants made decisions about whether a single-digit number was even or odd. This was done to clear working memory, as in Nairne et al.'s (2013) recall experiment. After this distractor task, participants were presented with a new set of instructions that asked them to recall as many of the presented words as they could. Four minutes were given for participants to recall as many words as possible; a small timer at the bottom of the screen showed participants how much time they had remaining. The timer was provided largely so that MTurk participants would be aware of the remaining duration: An invisible timer could encourage participants to open a new browser window while waiting for the task to advance.

This study-distract-recall pattern was repeated twice, for a total of three study-distract-recall trials. Following the completion of all three trials, participants were asked to complete the 13-item Person-Thing Orientation Inventory (Graziano et al., 2011), and a series of demographic questions about gender identity, age, race/ethnicity, native language, and highest level of education completed. Participants who reported a native language other than English or did not report a native language were screened from the final sample; native bilinguals whose native languages included English were accepted. Participants were also asked if any words they saw were unfamiliar to them, and if they used any particular strategy to remember the words: These questions were optional. Finally, participants were asked two questions designed to increase reliability of the sample: Rouse's (2015) question on paying attention and answering honestly (presented in Study 1A), and an additional question asking whether the participant wrote down or copied any of the words to aid in the recall task:

> Finally, because I am interested primarily in people's ability to remember the words that were presented, if you wrote them down to help you on the recall portion of the experiment, it affects the quality of my data. Please select one of the following honestly. Your answer is confidential. It will not affect whether or not you receive payment.
>
> Did you write down or otherwise copy any of the words that you were asked to remember throughout the experiment?

Participants could answer this question with either "Yes, I wrote down/copied the words," or "No, I used only my own memory to help me remember the words." Participants who answered this question in the affirmative were removed from consideration. In-lab participants were not asked this question, as they were monitored during completion of the study. After all of these questions, participants were given an opportunity to provide feedback about the task, given debriefing information, and then either dismissed (in the case of in-lab participants) or provided with a code used to receive payment for completion of the task.

Results and Discussion

All 2400 recall trials (800 participants with three trials each) were inspected by hand, and spelling was corrected to minimize the influence of errors. As a wealth of data was collected, it was analyzed in several ways. First, the recall results were examined on the subject level. While animacy was not truly an independent variable in this study, it is still useful to see if an animacy advantage appears across subjects for clearly animate versus clearly inanimate words. As described in the materials and design section, animate words were defined as words that received a rating of 5 or greater on the Animacy (Living) scale (486 words), inanimate words were words that received a rating of 3 or lower (551 words), and ambiguous words fell between these two extremes (163 words). Using this delineation, the animacy effect was investigated first on the subject level as a means to confirm whether the typical animacy effect was present. Following this analysis, the effects of study environment (in-lab compared to MTurk), list composition (the proportion of animate items in the studied list), participant age, and Person and Thing Orientation were investigated.

Next, the data were explored on the item level—here is where many interesting possibilities lie. First, the relationship between these recall norms and those of Rubin & Friendly (1986) was examined. Then, the data were analyzed according to recall trial and animacy, akin to a between-subjects analysis. Following these initial confirmatory analyses were several investigations of the most interesting aspect of this project—how well the newly-collected normative data from Study 1B predict recall. Both hierarchical regression and relative-weight analyses were performed on the data, with multiple different theoretically-interesting arrangements of predictor variables. These results are discussed as they are presented.

Subject-Level Analyses of Recall Data

Proportion items recalled by recall trial and word type is shown in Figure 4; ambiguous items were not analyzed on the subject level, as they were a disparate group

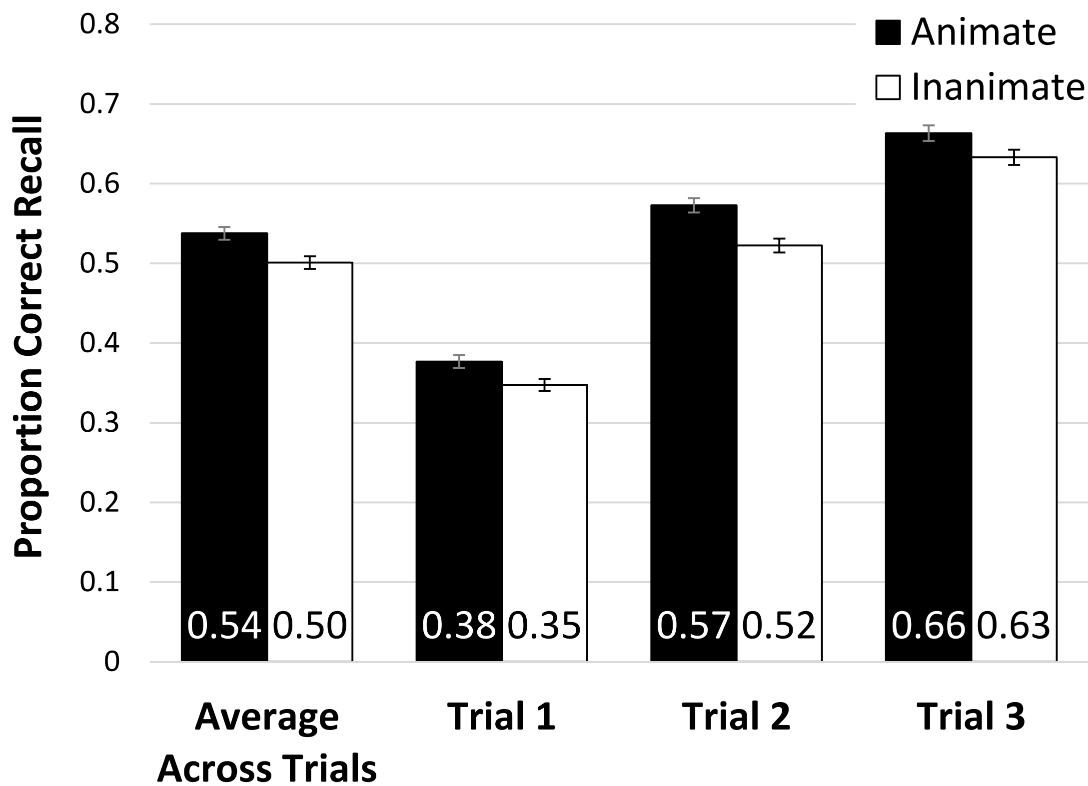

Figure 4. Results from Study 3 presented on the subject level: Mean proportion of items correctly recalled as a function of recall trial and word type. Data shown are averaged across the three recall trials and separately for each trial. Error bars represent standard errors of the mean.

including many different kinds of categories of items including some (but not all) plants, body parts, and "collective" nouns, among others. Additionally, this group was less than half the size of the other two groups. For these reasons, ambiguous words were not analyzed at the subject level: Any meaningful analysis of these items should be done on the item level.

A clear advantage of animate items is visible in these results. A 2 x 3 repeated measures ANOVA with word type and recall trial as variables verifies the pattern, with significant effects of both word type, $F(1, 799) = 62.83$, $MSE = 0.026$, $\eta^2_p = 0.073$, $p < 0.001$, and recall trial, $F(2, 1598) = 1283.08$, $MSE = 0.026$, $\eta^2_p = 0.616$, $p < 0.001$. An interaction also exists between word type and recall trial, $F(2, 1598) = 5.44$, $MSE = 0.010$, $\eta^2_p = 0.007$, $p < 0.01$, illustrating that the size of the animacy effect varies by recall trial (it is largest in the second recall trial). Range is likely to play a role in this interaction, with some participants at floor and ceiling levels of performance in recall trials one and three, respectively. Further, planned comparisons of word type for each recall trial revealed that the animacy advantage was reliable throughout the study, from the beginning to end (all $t > 4.4$, $p < 0.0001$). While the size of the animacy advantage is smaller in these data compared to other studies (about 3-5% here compared to a typical 9-12%), it is important to remember that unlike other investigations of animacy, the words in this analysis were uncontrolled on all other variables.

As MTurk is still fairly new, it is also useful to understand how encoding environment might impact the animacy effect. That is, does the effect differ between in-lab participants and MTurk participants? Figure 5 plots recall as a function of setting (Lab or MTurk), word type, and recall trial. While participants who completed the

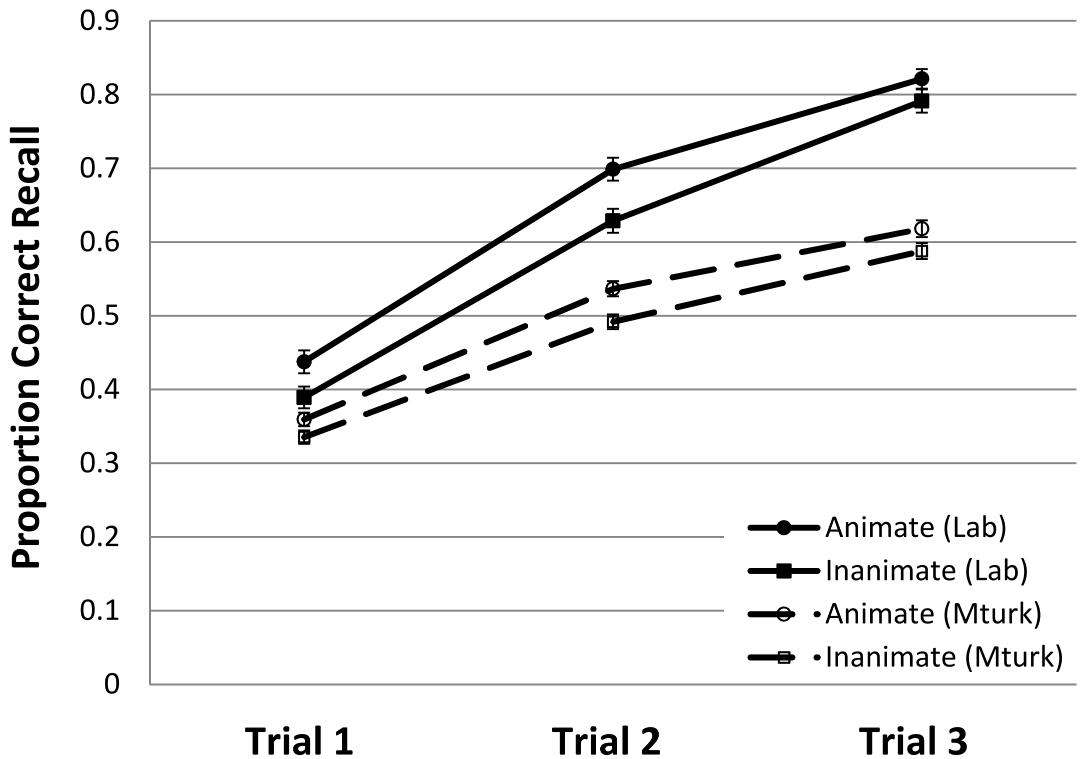

Figure 5. Results from Study 3 presented on the subject level: Mean proportion of items correctly recalled as a function of recall trial, word type, and setting. Data shown are separate for each recall trial. Error bars represent standard errors of the mean.

study in-lab performed better overall, a significant animacy advantage remains in the MTurk sample. These observations are confirmed by a 2 x 3 x 2 mixed ANOVA, adding setting as a between-subjects variable. Effects of setting, $F(1, 798) = 62.79$, $MSE = 0.043$, $\eta^2_p = 0.073$, $p < 0.001$, word type, $F(1, 798) = 55.04$, $MSE = 0.026$, $\eta^2_p = 0.065$, $p < 0.001$, and recall trial, $F(2, 1596) = 1213.87$, $MSE = 0.025$, $\eta^2_p = 0.603$, $p < 0.001$ all exist. The interaction between recall trial and word type remains, $F(2, 1596) = 5.46$, $MSE = 0.010$, $\eta^2_p = 0.007$, $p < 0.01$, indicating once again that the animacy advantage varies by recall trial (notably, is largest in the second trial for both groups).

Additionally, an interaction exists between recall trial and setting, indicating that the overall slope (learning from trial-to-trial) is greater for in-lab participants, $F(2, 1596) = 53.94$ $MSE = 0.025$, $\eta^2_p = 0.063$, $p < 0.001$. This result is likely due to a few reasons. First, age is confounded with setting—in-lab participants ranged in age from 18 to 40 with a median age of 19, while MTurk participants ranged in age from 18-69 with a median age of 32. This difference in ages may explain the differences in slope—younger participants typically learn lists of words at a faster rate than do older participants (Kausler, 1994). Second, the MTurk environment itself is nearly guaranteed to be more chaotic than that of the lab. While the study was timed, participants were under far less pressure to concentrate on the task continuously compared to in-lab participants. This simple fact likely explains much of the decrement in overall recall when comparing across samples. Despite these factors influencing overall recall patterns, the animacy effect remained reliable overall, and did not reliably interact with setting, $F(1, 798) = 2.19$, $p > 0.10$.

Exploratory analyses were also conducted to see if participant age and list composition (that is, the proportion of the list that consisted of animate items) interacted with the animacy advantage in free recall. Participants were binned into quartiles based on both measures, and overall recall (averaged across trials) was individually plotted as a function of both age and list composition; see Figures 6 and 7. Note that for age, only the MTurk sample was considered—the in-lab sample is heavily weighted toward younger ages, as previously mentioned. Quartiles for age were 18-27, 28-32, 33-40, and 41-69 years; quartiles for list composition were 0.17-0.33, 0.34-0.4, 0.41-0.47, and 0.48-0.67 proportion animate words. For reference, the proportion of animate items in each list ranged from 0.17 to 0.67, with a mean of 0.405 (identical to the proportion of animate items in the sample overall) and a standard deviation of 0.086. For both participant age and list composition, the animacy advantage remained constant, as Figures 6 and 7 show. These results were confirmed using two individual 2 x 4 mixed ANOVAs: Word type acted as a within-subjects factor and quartile as a between-subjects factor.

The analysis of age and word type revealed significant effects of word type, $F(1, 616) = 39.28$, $MSE = 0.009$, $\eta^2_p = 0.060$, $p < 0.001$, and age quartile, $F(3, 616) = 9.60$, $MSE = 0.045$, $\eta^2_p = 0.045$, $p < 0.001$, illustrating how proportion correct recall actually increased with age. These data are unusual, as recall typically declines as age increases (once again, Kausler, 1994). While not verifiable with the present data, the most likely explanation is that MTurk is a poor environment to study the effects of aging. MTurk Workers are computer literate (or at least enough so to complete MTurk HITs), typically college-educated (as per Appendix B), and incentivized to move

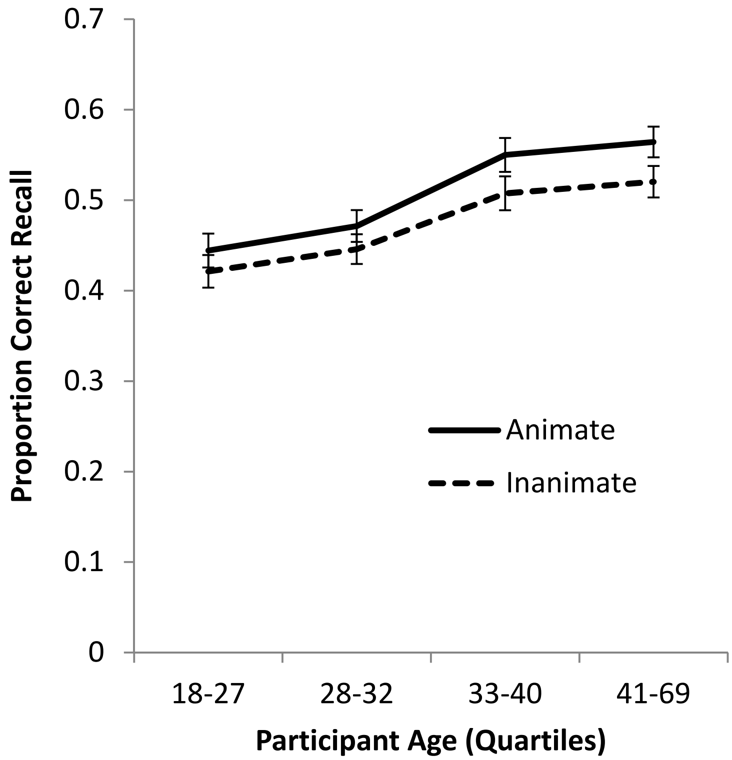

Figure 6. Results from Study 3 presented on the subject level: Mean proportion of items correctly recalled as a function of word type and participant age (divided into quartiles). Data shown are overall recall averages across all three trials. Error bars represent standard errors of the mean.

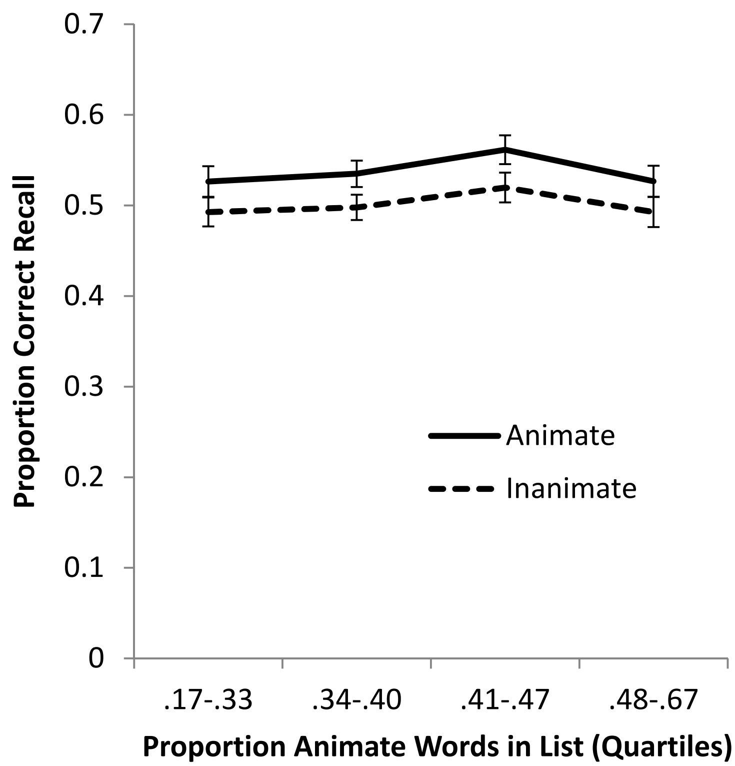

Figure 7. Results from Study 3 presented on the subject level: Mean proportion of items correctly recalled as a function of word type and list composition (divided into quartiles). Data shown are overall recall averages across all three trials. Error bars represent standard errors of the mean.

through HITs quickly. The most parsimonious explanation then is that younger MTurk Workers do not focus as much on the tasks they are doing, while older Workers are more likely to be thoughtful and careful. This analysis also brings into question an age-based explanation for the differences in learning rates between the lab and MTurk settings as well: Rather than age as a primary factor in reducing learning rates for MTurk subjects, the environment itself appears to be the primary explanatory factor, or perhaps even an age by environment interaction—younger participants who completed the study via MTurk do not perform as well as their in-lab peers nor as well as older MTurk workers. As no data exist for older participants in the lab, it is impossible to conduct a true comparative analysis. Regardless of these explanations however, the animacy advantage in free recall did not interact with age, $F(3, 616) = 1.04$, $MSE = 0.009$, $\eta^2_p = 0.005$, $p > 0.10$, and is present across all age quartiles.

For list composition, only a significant effect of word type existed, $F(1, 796) = 60.36$, $MSE = 0.009$, $\eta^2_p = 0.070$, $p < 0.001$, with all other Fs < 1. This analysis confirms the results shown in Figure 7—that list composition (at least for the range observed) does not interact with the animacy advantage in free recall.

Finally, a similar set of exploratory analyses were conducted on participant-reported Person and Thing Orientation (Graziano et al., 2011). Table 9 reports descriptive statistics for observed Person and Thing Orientation scores both overall and by reported gender identification—it is important to note that scores were only available for 90% of the sample (720 participants) due to an error in the survey (10% of participants did not receive the PTO Scale). While Person Orientation did not differ by gender identity ($F < 1$), men reported higher levels of Thing Orientation than did

Table 9

Person and Thing Orientation Descriptive Statistics by Gender

Scale	*N*	Mean	*SD*	
Person Orientation		717	2.91	0.73
Female		328	2.93	0.68
Male		389	2.89	0.76
Thing Orientation		717	2.81	1.09
Female		328	2.37	1.01
Male		389	3.17	1.01

women, $F(1, 716) = 111.39$, $\eta^2_p = 0.135$, $p < 0.001$. Participants who did not identify as either male or female were ignored in these analyses. These results are mostly consistent with extant data on Person and Thing Orientation: Typically, men report much higher levels of Thing Orientation than women, while women report somewhat higher levels of Person Orientation than men (Graziano et al., 2011). The numerical difference in Person Orientation by gender is usually much smaller than the difference for Thing Orientation, however. Therefore, it is somewhat unsurprising that a gender difference did not emerge for Person Orientation.

Participants were binned into quartiles based on both Person and Thing Orientation, and Figures 8 and 9 plot proportion of words correctly recalled by both word type and quartile. For Person Orientation, a 2 x 4 mixed ANOVA with word type

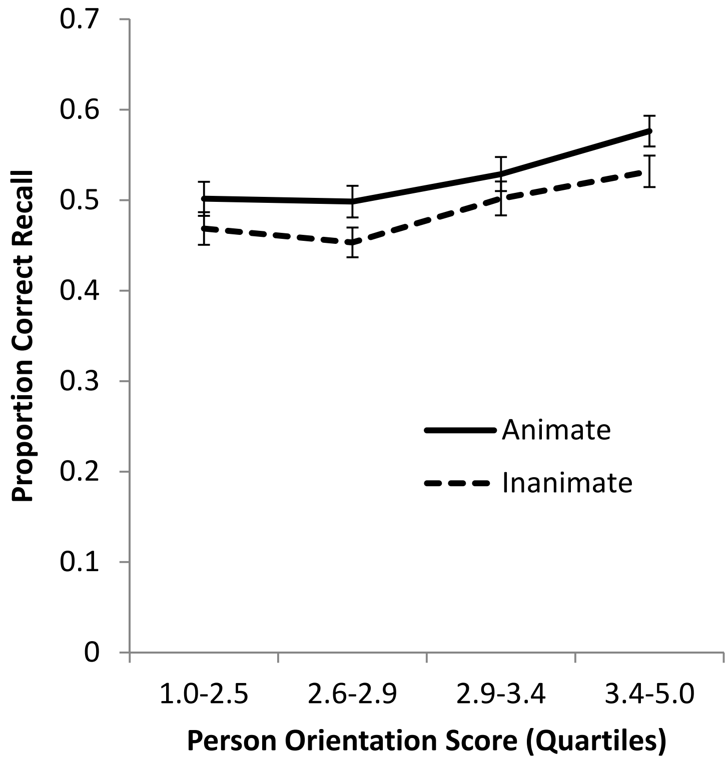

Figure 8. Results from Study 3 presented on the subject level: Mean proportion of items correctly recalled as a function of word type and participant Person Orientation (divided into quartiles). Data shown are overall recall averages across all three trials. Error bars represent standard errors of the mean.

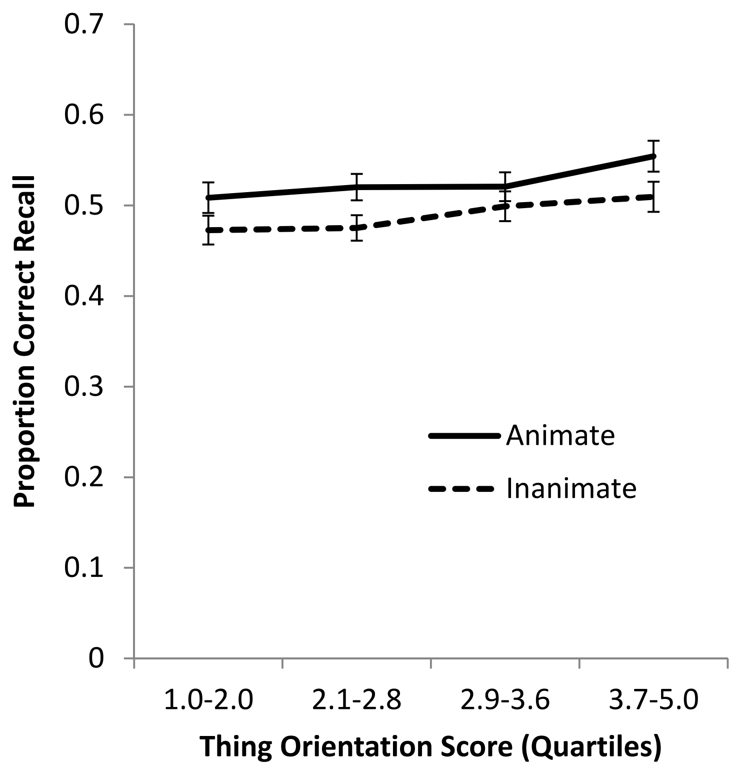

Figure 9. Results from Study 3 presented on the subject level: Mean proportion of items correctly recalled as a function of word type and participant Thing Orientation (divided into quartiles). Data shown are overall recall averages across all three trials. Error bars represent standard errors of the mean.

as a within-subject factor and quartile as a between-subjects factor confirmed an effect of word type, $F(1, 716) = 57.53$, $MSE = 0.009$, $\eta^2_p = 0.074$, $p < 0.001$, but also an effect of quartile, $F(3, 716) = 4.46$, $MSE = 0.092$, $\eta^2_p = 0.018$, $p < 0.01$. These results indicate that participants with higher levels of PO recalled more words overall, regardless of type (an interaction for these factors was not present, $F < 1$). While an explanation for this pattern is not immediately clear, it is important to note that PO did not interact with the animacy advantage in free recall. A similar analysis for Thing Orientation confirmed a main effect of word type, $F(1, 716) = 56.55$, $MSE = 0.009$, $\eta^2_p = 0.073$, $p < 0.001$, no effect of Thing Orientation, $F(3, 716) = 1.26$, $MSE = 0.094$, $\eta^2_p = 0.005$, $p > 0.10$, and no interaction between these factors, $F(3, 716) = 1.25$, $MSE = 0.009$, $\eta^2_p = 0.005$, $p > 0.10$. These results indicate that the animacy advantage in free recall also does not interact with Thing Orientation. Apparently, individual differences in interest for people and things do not moderate the animacy effect in any grand sense, though further examination may still be warranted.

Item-Level Analyses of Recall Data

There are 292 words in common between the Rubin & Friendly (1986) dataset and the current dataset. Average recall data (that is, averaged across the three trials) correlates between these two sets at $r(290) = 0.391$, which is significant at $p < 0.001$. Furthermore, mean recall values for these words differ only slightly, but significantly ($M_{RF} = 0.549$, $SD_{RF} = 0.108$; $M_V = 0.531$, $SD_V = 0.109$; $t(291) = 2.24$, $p < 0.05$, $d = 0.151$). The Rubin & Friendly dataset however has relatively few observations per word in many cases. Analyzing only cases where the number of subjects exposed to a given word was 20 or more (to match the current dataset, but this reduces the number of shared words to 128) modestly increases the relationship between the two recall metrics, $r(126) = 0.468$, $p < 0.001$, and eliminates the statistical difference in mean recall scores ($M_{RF} = 0.541$, $SD_{RF} = 0.099$; $M_V = 0.525$, $SD_V = 0.117$; $t(127) = 1.65$, $p > 0.10$, $d = 0.147$). While the relationship could be stronger, it is encouraging that some relationship exists between the original normative data for recall and the present study. The difference in overall recall levels may be partially explained by the MTurk sample as well, which performed worse on the task than in-lab participants—all of the data in the Rubin & Friendly norms were collected in-lab (the Internet had not yet been invented).

Proportion animate and inanimate items correctly recalled plotted by recall trial is presented in Figure 10. These data mirror those of the subject-level analysis (Figure 4), but word type is now a between-subjects variable, as the subject of analysis is now the words themselves. Like in the subject-level analysis, there are effects of both word type $F(1, 1035) = 38.22$, $MSE = 0.032$, $\eta^2_p = 0.036$, $p < 0.001$, and recall trial, $F(2, 2070) = 3177.64$, $MSE = 0.007$, $\eta^2_p = 0.754$, $p < 0.001$. Further mirroring the subject level analysis, an interaction exists between the two variables, $F(2, 2070) = 4.65$, $MSE = 0.007$, $\eta^2_p = 0.004$, $p < 0.05$. Once again, the interaction appears to represent how the animacy advantage is larger in the second recall trial. Further, planned comparisons of word type for each recall trial revealed that the animacy advantage was reliable throughout the study, from the beginning to end (all $t > 4.1$, $p < 0.001$). Altogether, the fact that the item-level analysis mirrors the subject-level analysis suggests that the animacy advantage in free recall is independent of the list any given participant saw.

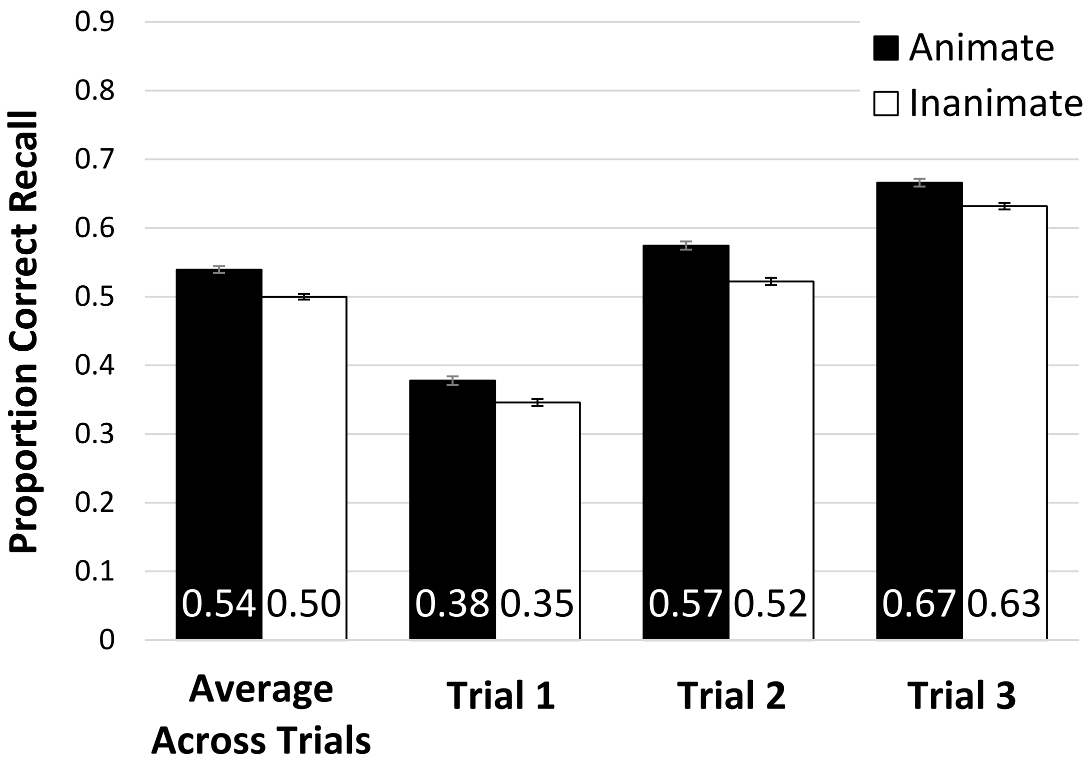

Figure 10. Results from Study 3 presented on the item level: Mean proportion of items correctly recalled as a function of recall trial and word type. Data shown are averaged across the three recall trials and separately for each trial. Error bars represent standard errors of the mean.

Regression Analysis of Recall Data: The Animacy (Living) Scale

A first step in analyzing the present data with regression is to use the Animacy (Living) scale as a benchmark. The primary reason for this is so that the results can be compared to Nairne et al. (2013)—a living-nonliving judgment was the basis of Nairne et al.'s decision process for whether a given word should be considered animate or not. It makes sense then to start with an analysis of the Animacy (Living) scale in the context of both old and new data.

First, a series of regression analyses were performed on the 292 words that are shared between the Rubin & Friendly (1986) dataset and the current dataset. Predictor variables were the 15 variables Nairne et al. (2013) used in their analysis, plus the new Animacy (Living) scale in place of their Animacy measure. As 93 of the 292 shared items were deemed "living" by Nairne et al., the resulting analysis should be interpretable. Rubin and Friendly's average recall measure was used as the outcome variable, in an effort to replicate Nairne et al. as much as possible.

The values from the regression analyses are shown in Table 10. The zero-order correlations indicate that many variables correlate with recall, but typically incremental importance estimates are used to provide an idea of which variables uniquely contribute to the explained variance (R^2) above and beyond other predictors. Nairne et al. (2013) reported that their Animacy metric was the single largest contributor to the explainable variance, followed by imagery, Goodness (similar to VAL), and Kučera-Francis word frequency. A strikingly similar pattern was found in the present data, using Animacy (Living) in place of Nairne et al.'s simple Animacy measure. Rather

Table 10

Estimates of the Importance of Word Attributes in Predicting Recall (as Measured by Rubin & Friendly, 1986)

	Raw importance estimates				
Predictor Variable	*r*	β	Relative weight	Rescaled estimate	Incremental importance (ΔR^2)
Animacy (Living)	0.32**	0.31**	0.09	0.25	0.078**
Imagery	0.32**	0.26**	0.06	0.16	0.020**
Emotionality	0.17**	0.17*	0.02	0.06	0.011*
Word frequency in Thorndike-Lorge (1944) norms	0.21**	-0.16	0.00	0.01	0.008
Availability in Palermo-Jenkins (1964) norms	0.33**	0.09	0.03	0.09	0.006
Familiarity	0.25**	0.11	0.02	0.05	0.005
Availability in the Kiss, Armstrong, Milroy, & Piper (1973) norms	0.20**	0.08	0.01	0.04	0.005
Goodness	0.15*	0.07	0.01	0.03	0.004
Word frequency in Kučera-Francis (1967) norms	0.18**	0.09	0.01	0.02	0.003
Concreteness	0.23**	0.10	0.03	0.09	0.003

(*table continues*)

Predictor Variable	Raw importance estimates: r	β	Relative weight	Rescaled estimate	Incremental importance (ΔR^2)
First-order approximation to English	0.27**	0.17	0.02	0.04	0.002
Pronounceability	-0.29	-0.07	0.02	0.04	0.001
Emotional Goodness	0.14*	0.03	0.01	0.03	0.000
Second-order approximation to English	0.26**	-0.04	0.01	0.03	0.000
Meaningfulness	0.14*	-0.01	0.01	0.02	0.000
Length in Letters	-0.26**	-0.02	0.01	0.04	0.000

Note. Rescaled estimates show the proportion of R^2 accounted for by the particular variable; ΔR^2 shows incremental importance as a unique contribution of the variable to R^2. Animacy was defined on the basis of the Animacy (Living) scale from Study 1B. Imagery refers to the ease with which a visual image can be generated. Goodness represents how intensely good or bad a word's meaning is to the rater. Availability refers to the ease with which the word comes to mind in free association. Emotionality indicates the extent to which the word generates an emotion. First- and second-order approximations to English are measures of the probability of generating a word on a letter-by-letter basis. All other normed values were taken from the sources reported in Rubin and Friendly (1986).

Total R^2 = .363. *$p < .05$. **$p < .01$

than Goodness, however, Emotionality (a less specific measure of how emotionally laden a word is) followed imagery in the current data.

As Nairne et al. (2013) note, however, incremental importance can be a flawed indicator of variable importance when variables are correlated (LeBreton et al., 2007). As such, they applied a technique known as relative-weight analysis to their data (see Tonidandel & LeBreton, 2011, for a review of the technique). The primary benefit of relative-weight analysis is that it incorporates variable intercorrelations into the estimation of relative importance, yielding an additive decomposition of the model R^2. In their data, Nairne et al. found that Animacy remained the primary predictor of recall in this analysis, followed by imagery, concreteness, a measure of availability, and meaningfulness.

A comparison of relative-weight analyses for both the present data and those of Nairne et al. (2013) is shown in Figures 11A and 11B. As can be seen, using Animacy (Living) as a predictor rather than the simple Animacy metric devised by Nairne and colleagues works just as well, if not better: An additional 4% of explainable variance is attributed to the Animacy (Living) measure, and Animacy (Living) is nearly ten percentage points larger than its nearest competitor, Imagery. This analysis confirms that the Animacy (Living) scale is clearly tapping the same construct as Nairne et al., adding further validity to it.

A second analysis using only the Animacy (Living) measure is to see how well it predicts average recall for the new set of 1200 words, in a another pseudoreplication of Nairne et al. (2013). While the current set of 1200 words uses a few different predictor variables, effort was made during norm selection to ensure that similar

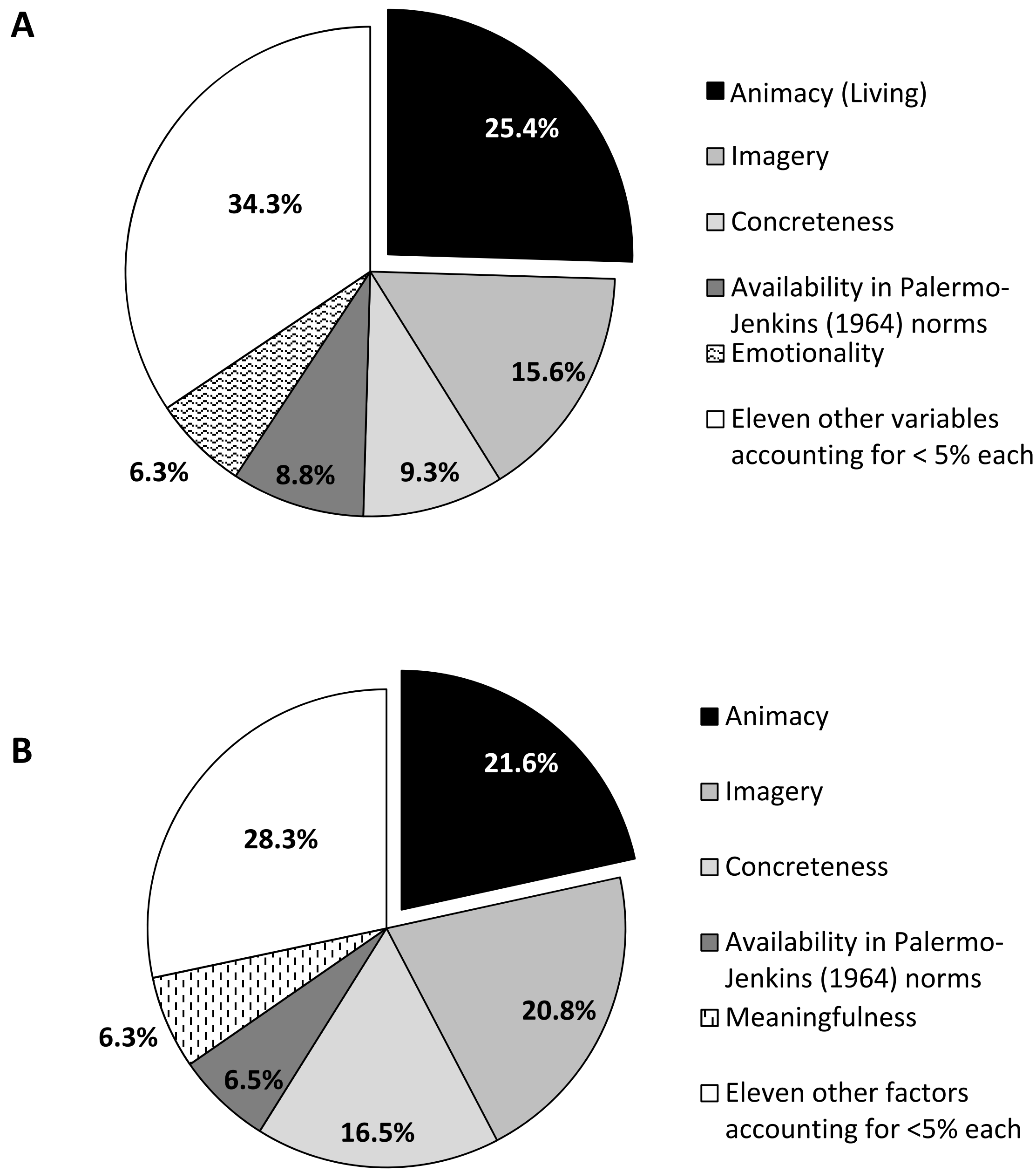

Figure 11. A comparison of relative-weight analyses of Rubin & Friendly (1986) recall data using the current Animacy (Living) scale (11A; top) and the living-nonliving decisions Nairne et al. (2013) (11B; bottom).

constructs were being tapped. For example, the current data set contains values for Valence, Arousal, and Dominance, rather than Emotionality and Goodness contained in Rubin & Friendly (1986). However, these scales all likely tap an "emotion" factor that describes words. Because of these similarities in variables, comparisons can easily be made between the two studies.

The values from this series of regression analyses are shown in Table 11. Once again, many variables significantly correlate with recall. An examination of the incremental importance estimates reveals that once more, the Animacy (Living) scale is the single largest contributor to explainable variance. In this analysis however, Availability (as calculated from Nelson et al., 1998) is the second largest predictor of recall, followed by Imagery, Dominance (which is *negatively* related to recall), number of syllables, Arousal, and orthographic neighborhood. Dominance and Arousal are interesting, and appear to be taking the place of Emotionality from the previous investigation. Clearly, emotional factors are contributing unique variance to free recall. Additionally, there are two measures related to lexical features that significantly contribute to R^2.

However, an examination of the relative-weight analysis for these data (Figure 12) shows that these lexical factors do not in fact explain much variance in recall. The incremental importance estimates are somewhat misleading in regard to both these variables as well as the emotion variables, Dominance and Arousal. Instead, once again Concreteness moves upward in the analysis, explaining upwards of 6.5% of the variance in R^2. Interestingly, more variables account for larger shares of the variance in these data compared to previous analyses; one potential explanation for this is that the

Table 11

Estimates of the Importance of Word Attributes and the Animacy (Living) Scale in Predicting Current Recall Data

Predictor Variable	Raw importance estimates			Rescaled estimate	Incremental importance (ΔR^2)
	r	β	Relative weight		
Animacy (Living)	0.20**	0.21**	0.04	0.26	0.039**
Availability	0.21**	0.16**	0.02	0.12	0.011**
Imagery	0.19**	0.12**	0.02	0.11	0.007**
Dominance	-0.09*	-0.11**	0.01	0.05	0.007**
Number of syllables	-0.03	0.13**	0.00	0.02	0.005**
Arousal	0.10**	0.07*	0.01	0.05	0.004*
Orthographic neighborhood	0.13**	0.12*	0.01	0.05	0.004*
Concreteness	0.14**	0.06	0.01	0.07	0.002
Meaningfulness	-0.03	-0.05	0.00	0.01	0.002
Valence	0.06*	0.07	0.00	0.02	0.002
Age of acquisition	-0.18**	-0.04	0.01	0.06	0.001
Word frequency in SUBTL norms	0.17**	0.06	0.01	0.06	0.001
Familiarity	0.13**	0.00	0.00	0.03	0.000

(*table continues*)

	Raw importance estimates				Incremental
			Relative	Rescaled	importance
Predictor Variable	*r*	β	weight	estimate	(ΔR^2)
Length in Letters	-0.07*	-.0.01	0.00	0.02	0.000
Phonological neighborhood	0.09**	0.02	0.00	0.02	0.000
Contextual diversity in SUBTL norms	0.18**	0.01	0.01	0.05	0.000

Note. Rescaled estimates show the proportion of R^2 accounted for by the particular variable; ΔR^2 shows incremental importance as a unique contribution of the variable to R^2. Animacy was defined on the basis of the Animacy (Living) scale from Study 1B. All other normed values are defined

in the overall materials section of Study 1.

Total $R^2 = .158$. $^*p < .05$. $^{**}p < .01$

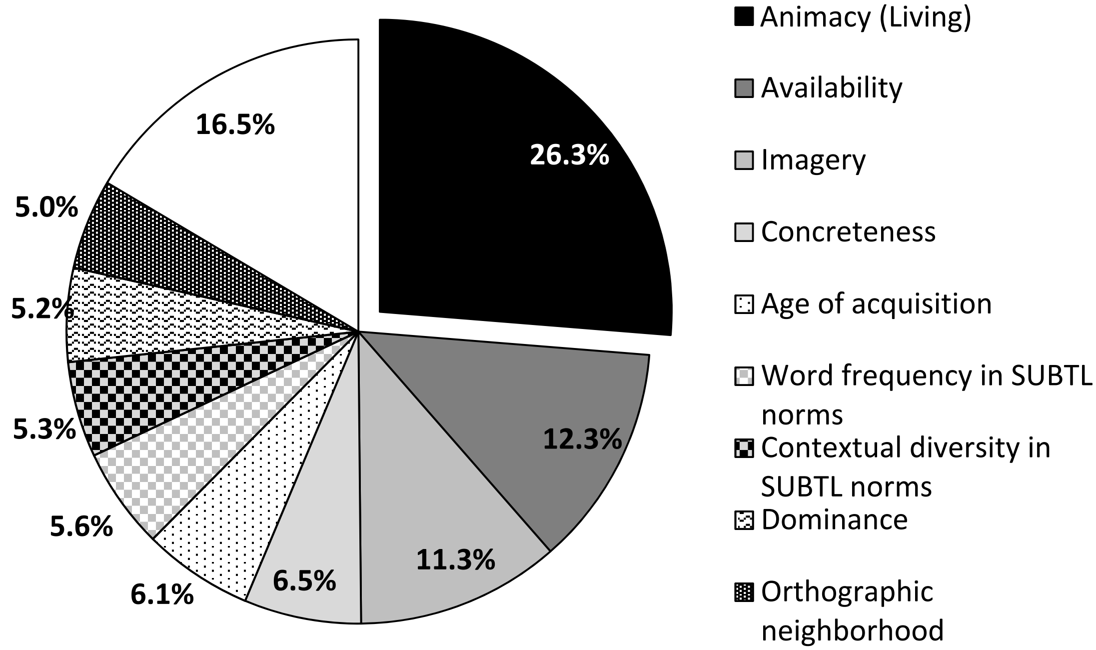

Figure 12. Relative-weight analysis of the current recall data with the Animacy (Living) scale and 15 other normative values as predictor variables

variables chosen for inclusion in the current study tap *additional* constructs compared those in Nairne et al., (2013). One potential candidate for an additional construct in these data is contextual diversity. Contextual diversity is known to be a significant predictor of both early word learning in children as well as lexical decision and word naming times (Adelman et al., 2006; Hills et al., 2010); it is therefore unsurprising that both $SUBTL_{WF}$ and $SUBTL_{CD}$ (measures of word frequency and contextual diversity) together make up nearly 11% of R^2. Further, Availability and Age of acquisition, both large components of the total R^2, are highly related to contextual diversity as well—the principle component analysis in Study 2B found that these four variables all loaded highly onto a single component. Further analysis of recall using these components as predictor variables should be interesting moving forward—contextual features of a word may be a hidden juggernaut in free recall.

Most obviously and importantly, however, the Animacy (Living) scale is the largest contributor to R^2 for both incremental importance estimates and in the relative-weight analysis—a convincing pattern. In the present data, the Animacy (Living) scale accounts for more than double the variance of its nearest competitor, Imagery (or Availability in the incremental analysis). These data should be taken as yet more evidence that animacy is a highly reliable predictor of recall.

Regression Analysis of Recall Data: Comparing the Mental and Physical Factors

The next set of analyses aims to discover how the two factors that appear to make up the animacy dimension, the Mental and Physical factors found through factor analysis in Study 2A, relate to recall. It is possible that most of the variance in recall could relate primarily to only one of these factors, or the variance could be split relatively evenly. Either way, this analysis will be helpful in determining what exactly about animate things makes them memorable.

A series of regression analyses was performed again on the 1200 words in the current dataset, this time with rescaled factor scores for the Mental and Physical factors extracted in Study 2A as predictors of recall in addition to the other 15 normative measures. Table 12 presents importance estimates uncovered via regression and relative-weight analysis; Figure 13 represents the relative-weight analysis graphically. For the non-animacy measures, the pattern of incremental importance estimates is almost identical to that found when only the Animacy (Living) scale is used as a predictor variable: Availability, Imagery, and a few measures of emotionality and lexical characteristics contribute significantly to the incremental importance. In the relative-weight analysis, Availability and Imagery make up the bulk of the non-animacy factors, followed by Concreteness, and measures of contextual diversity once more.

How the Mental and Physical animacy factors account for portions of R^2 compared to a regression analysis with only the Animacy (Living) scale yields some useful comparisons. Further, because these two analyses are on exactly the same data, they can be compared more directly than has been previously possible. First, having both Mental and Physical factors in the regression model compared to the Animacy (Living) scale alone meant that animacy accounted for an additional 2.9 percentage points of R^2 in total. This amount is likely not very noteworthy, and is likely subsuming portions of variance formerly accounted for by the imagery, concreteness, and age of acquisition measures—in the earlier principal component analysis performed in Study

Table 12

Estimates of the Importance of Word Attributes and the Mental and Physical Animacy Factors in Predicting Current Recall Data

	Raw importance estimates				Incremental
Predictor	r	β	Relative weight	Rescaled estimate	importance (ΔR^2)
$\text{Animacy}_{\text{Physical}}$	0.19^{**}	0.32^{**}	0.04	0.23	0.030^{**}
Availability	0.21^{**}	0.16^{**}	0.02	0.12	0.011^{**}
Imagery	0.19^{**}	0.11^{**}	0.02	0.11	0.006^{**}
Dominance	-0.07^{*}	-0.10^{**}	0.01	0.05	0.006^{**}
$\text{Animacy}_{\text{Mental}}$	0.08^{**}	-0.15^{**}	0.01	0.06	0.005^{**}
Number of syllables	-0.03^{*}	0.13^{**}	0.00	0.02	0.005^{**}
Arousal	0.10^{**}	0.07^{*}	0.01	0.04	0.004^{*}
Orthographic neighborhood	0.13^{**}	0.11^{*}	0.01	0.05	0.004^{*}
Meaningfulness	-0.03	-0.05	0.00	0.01	0.002
Valence	0.06^{*}	0.06	0.00	0.02	0.002
Concreteness	0.14^{**}	0.04	0.01	0.06	0.001
Familiarity	0.13^{**}	0.01	0.00	0.03	0.000
Age of acquisition	-0.18^{**}	-0.02	0.01	0.06	0.000

(*table continues*)

	Raw importance estimates				
Predictor	r	β	Relative weight	Rescaled estimate	Incremental importance (ΔR^2)
Length in Letters	-0.07*	0.00	0.00	0.01	0.000
Phonological neighborhood	0.09**	0.01	0.00	0.02	0.000
Word frequency in SUBTL norms	0.17**	0.05	0.01	0.05	0.000
Contextual diversity in SUBTL norms	0.18**	0.04	0.01	0.06	0.000

Note. Rescaled estimates show the proportion of R^2 accounted for by the particular variable; ΔR^2 shows incremental importance as a unique contribution of the variable to R^2. Animacy was defined on the basis of both the $\text{Animacy}_{\text{Physical}}$ and $\text{Animacy}_{\text{Mental}}$ factors found in Study 2A. All other normed values are defined in the overall materials section of Study 1.

Total R^2 = .161. *$p < .05$. **$p < .01$.

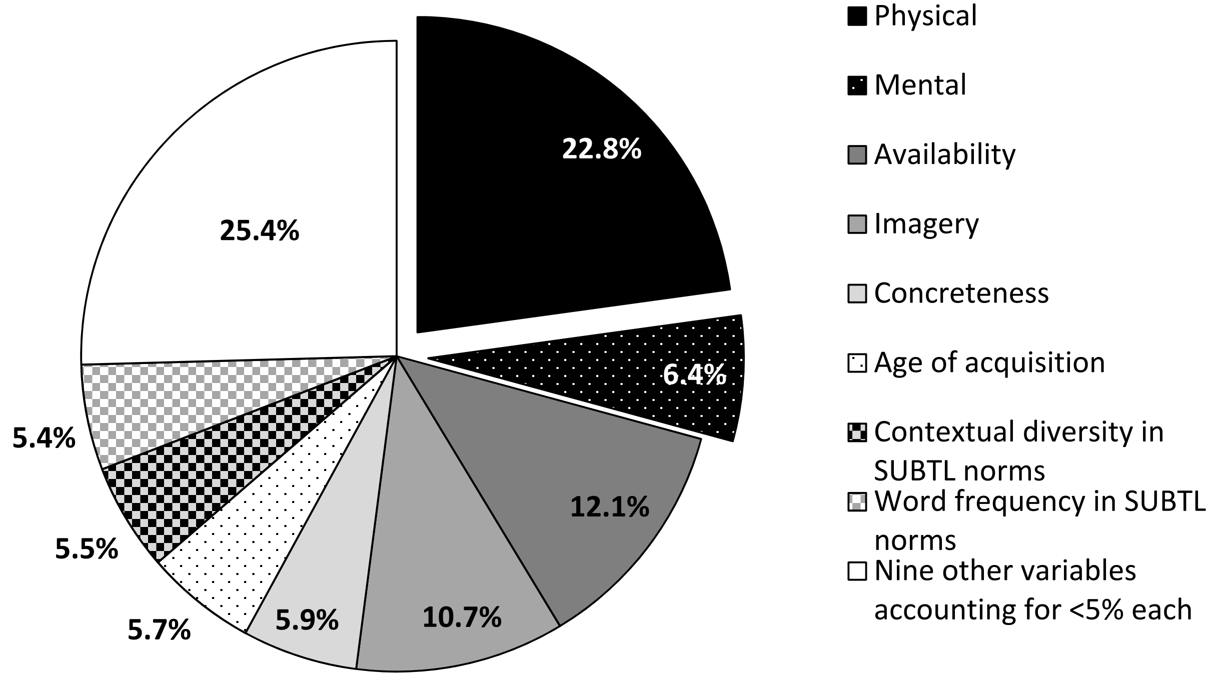

Figure 13. Relative-weight analysis of the current recall data with the $\text{Animacy}_{\text{Physical}}$ and $\text{Animacy}_{\text{Mental}}$ factors and 15 other normative values as predictor variables.

2B, the variables that make up the Mental factor were negatively related to a factor that implied words that were "simple" (imageable, concrete, and learned early) group together. The rest of the Mental component is likely from cannibalizing the Animacy (Living) scale; while the Animacy (Living) and Physical metrics correlate highly (r = 0.986; $p < 0.001$), some portion of the Mental factor appears to be taken from the more general Animacy (Living) dimension.

In sum, this test of how the two observed factors that make up the animacy dimension explain recall yielded a rather one-sided result: While the Mental factor appears to have played some role in determining the recallability of words, Physical factors (i.e., a simple "is it a living thing?" judgment) appear to make up the majority of the effect. The implications of these data are explored further in the general discussion.

Regression Analysis of Recall Data: Minimizing the Number of Predictors

The final regression analysis of interest for this project is exploring the relationship between the 6-component solution of the variables extracted in Study 2B and recall. Table 13 describes the various estimates of importance uncovered via regression and relative-weight analysis, while Figure 14 shows the relative-weight analysis graphically.

A few interesting patterns emerge in these data. First, the estimates of incremental importance match the relative-weight measures. This pattern is because the regression analysis was run with orthogonally-rotated principal components—the math behind relative-weight analysis is the same. Relative-weight analysis rotates predictor variables so that they are no longer correlated, that is, orthogonal. Because the

Table 13

Estimates of the Importance of Word Principal Components in Predicting Current Recall Data

	Raw importance estimates				Incremental
			Relative	Rescaled	importance
Predictor Component	*r*	β	weight	estimate	(ΔR^2)
Simple	0.23**	0.23**	0.05	0.43	0.054**
Animacy	0.18**	0.18**	0.03	0.25	0.031**
Contextual	0.18**	0.18**	0.03	0.25	0.031**
Lexical	-0.07*	-0.07**	0.01	0.04	0.005**
Emotion	-0.06	-0.06*	0.00	0.03	0.003*
Meaningfulness	0.01	0.01	0.00	0.00	0.000

Note. Rescaled estimates show the proportion of R^2 accounted for by the particular variable; ΔR^2 shows incremental importance as a unique contribution of the variable to R^2. Animacy was defined on the basis of the ANIM component extracted in Study 2B; the other five factors were similarly extracted in Study 2B. Total $R^2 = .125$. *$p < .05$. **$p < .01$.

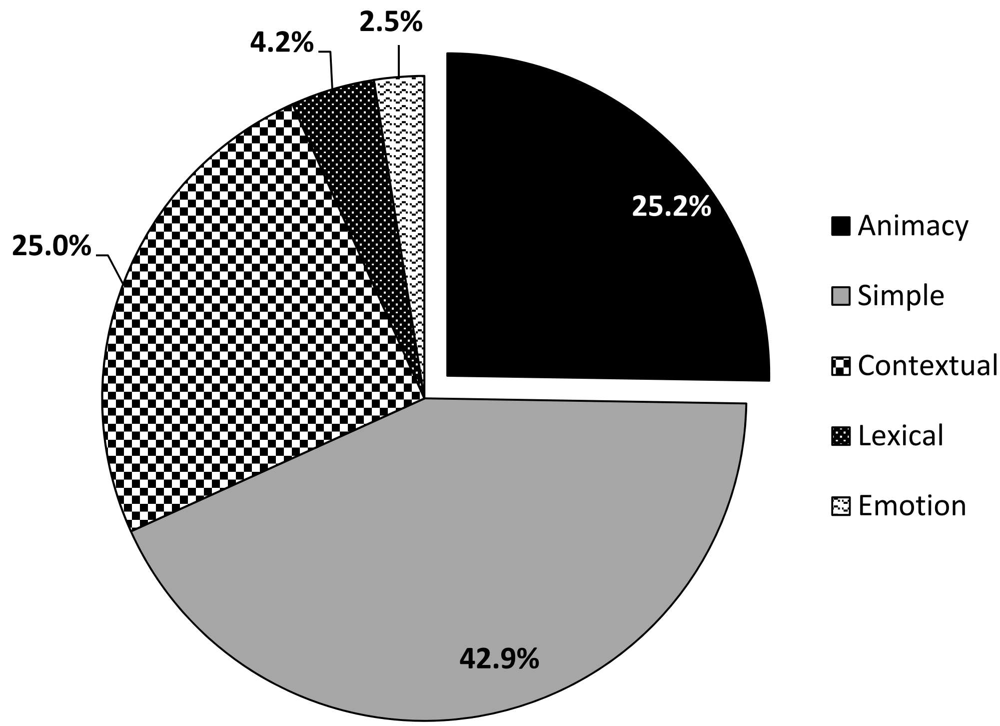

Figure 14. Relative-weight analysis of the current recall data with the six principal components extracted in Study 2B as predictor variables.

predictor variables were already orthogonal, relative weights are identical to the estimates of incremental importance discovered through hierarchical regression.

Beyond this quirk of mathematics, the pattern of results the analysis yields is illuminating as well. Comparing these results with the previous analyses, the amount of variance that the Animacy component explains is remarkably consistent. For each analysis, the sum total percent R^2 of the factors related to animacy has been between 25.2% and 29.2%. This consistency of results while using multiple different predictors for animacy (the Animacy (Living) scale, the $\text{Animacy}_{\text{Physical}}$ and $\text{Animacy}_{\text{Mental}}$ factors, and the extracted ANIM component) implies that these animacy scales are all tapping a dimension important to recall that is fundamentally different from the other variables. While the construct of animacy is multifaceted (dealing with ideas about agency and experience, as well as physical cues for animacy), it simultaneously appears to be largely unrelated to most other measured word variables.

One exception to this may be visible in the present analysis, however. The “SIMPLE” component—so named because its constituent variables indicate that it is related to highly imageable, highly concrete, and relatively specific words that are learned early in life—accounts for an incredible 42.9% of R^2 in the current analysis. However, unlike the ANIM component, it does not appear to be a very pure measure. Indeed, its shared factor loadings with all three of the Mental variables (Animacy (Person), Animacy (Goals), and Animacy (Thought) to a lesser extent) indicate that these variables *negatively* relate to the Simple factor. As described earlier, while the ANIM and SIMPLE factors are technically orthogonal, the way in which kinds of animate items are distributed along the SIMPLE factor seems important, and reflects the negative loading of Mental variables on the component. Many of the words that rank highest on the Simple factor are in fact animate themselves (including most animal words), but are comparatively low on the Mental scales, and the inverse is true as well: Most of the animate words low on the Simple factor are both relatively vague and relatively high on the Mental scales (e.g., *soul*, *mind*, and *expert*). Therefore, it seems as though at least some portion of this large slice of R^2 may also be somewhat attributable to the mental component of animacy. As discussed, perhaps if the mental dimension were more well-specified (using additional scales), the SIMPLE and Mental scales could be pulled apart more readily in a factor analysis.

GENERAL DISCUSSION

In three multi-part studies, both the makeup of the animacy dimension as well as its effects on recall were explored. In Study 1, normative data were collected for 1200 words that sampled widely from the animacy construct. While normative data were available for most of the words along the majority of the dimensions of interest, a portion of the words had not previously been rated for one or more of Concreteness, Imagery, or Familiarity. For each word that was missing values along one or more of these dimensions, 25 ratings were collected using Amazon Mechanical Turk. Interrater reliability was assessed and deemed adequate, and the values obtained from Study 1A were entered into the larger set of norms so as to complete them.

With a complete set of normative data in hand, Study 1B began. Normative data for six scales believed to relate to the animacy construct were collected for all 1200 words, with an average of 25 ratings per word per scale. Scale reliability was estimated, and found to be highly reliable for all six measures, indicating that for any given scale, all participants appeared to interpret and use it fairly similarly to other participants given the same scale. Separating words by category proved illustrative in terms of examining scale validity on a qualitative level, with various categories of words rated appropriately along the six scales.

Study 2 sought to examine the factor structure of the gathered normative data using methods of dimensional analysis. For Study 2A, the six newly-collected animacy scales were analyzed in an attempt to see whether some aspects of the animacy dimension separate out from others. It was found through factor analysis that two primary aspects of the current scales existed, a mental aspect ($\text{Animacy}_{\text{Mental}}$) and a physical aspect ($\text{Animacy}_{\text{Physical}}$). Each of these factors was comprised primarily of three of the six measured scales, with $\text{Animacy}_{\text{Mental}}$ composed of the personhood (Animacy (Person)), goal-directedness (Animacy (Goals)), and ability to think (Animacy (Thought)) scales and $\text{Animacy}_{\text{Physical}}$ composed of the living/nonliving (Animacy (Living)), ability to reproduce (Animacy (Repro)), and a portion of the movement likelihood (Animacy (Move)) scales.

An examination of the relationships among the six animacy metrics and the 15 other word variables was done in Study 2B. A six-component solution was extracted using principal component analysis with varimax rotation, and the results were investigated. The six components extracted appeared to make psychological sense, and were related to animacy (ANIM), lexical and phonological word features (LEXICAL), contextual features of words (CONTEXT), emotional features of words (EMOTION), word meaningfulness (MNG), and a final factor that appeared to be a composite of several variables indicating that it corresponded primarily to how simple and clear the concept the word refers to is (the SIMPLE factor). It was speculated that with additional predictor variables to better specify the mental component of animacy found in Study 2A, the SIMPLE factor may be able to be differentiated from Animacy

(Person) and Animacy (Goals) into a purer composite measure of word imagery and concreteness.

Finally, Study 3 collected recall data from 800 participants in an effort to create a new set of normative data on the recallability of words. Following data collection, the data were analyzed in multiple ways. Subject-level analyses confirmed that an animacy effect exists for the newly-collected recall norms, and that this effect was independent of setting (in-lab versus MTurk), participant age, the proportion of the list that was made up of animate items, and both Person and Thing Orientation. Item-level analyses mirrored these results, indicating that the animacy effect is fairly independent of any particular list presented to participants.

Further, comparative analyses between the current data and those of Nairne et al. (2013) revealed that the Animacy (Living) scale is at least as good if not a better predictor of recall compared to Nairne and colleagues' initial estimates of animacy. Breaking down the animacy dimension into its mental and physical components revealed that the majority of the variance in recall explained by animacy can be attributed to the physically apparent dimensions involved. While the mental component of animacy still appeared to account for some of the variance in recall (it was the fourth largest predictor out of 17 overall), it was roughly one-quarter as much as the physical component explained. Additional comparisons among several regression analyses showed that animacy (no matter how it is constructed or analyzed) was always a significant predictor of recall, if not the largest individual predictor of recall. Overall, the present data continue to confirm the leading role of animacy in episodic memory.

Specific Contributions and Future Directions

This project has yielded a wealth of new data about both animacy and recall, and as such makes a number of important contributions to the literature surrounding both. The first major contribution that this project makes is that it creates a set of normative data related to the animacy dimension for 1200 words. Not only does this project provide data related to the six collected animacy scales, but rescaled factor scores for the mental and physical components of the animacy dimension are also made available—Appendix C displays normative data for each individual word. These data will be immensely useful moving forward, as no normative data exists at present for the animacy dimension. With these norms in hand, future researchers can easily select word pools that are matched along the animacy dimension, whether they wish to study recall or something else entirely. One possible future direction with these data is to find words that are matched along one aspect of animacy but not others, to see how various components of the animacy dimension impact recall when under experimental control.

Secondly, the set of normative data produced here is also a complete, comprehensive set of data. Very few studies on the normative components of words (with the possible exception of Clark & Paivio, 2004) gather and present all of the data in a single place: Most are only concerned with a particular aspect, such as age of acquisition or emotionality. Because these norms are unified, future researchers can easily consult a single dataset to find normative values for a wide range of words—even if they are not concerned about animacy at all, although they probably should be given the present results. Additionally, if further normative data are collected in the future (say, to better specify the mental component of animacy), it can easily be added to this set. On the other hand, if an outcome measure is gathered for words in this sample, these norms can be used as predictors in a new regression model.

An additional contribution to the literature that this project makes is that it places word animacy in a larger context with other word variables. The principal component analysis from Study 2B is the first attempt to see if word animacy can be easily explained by other word factors—and it clearly cannot. Animacy does not appear to be directly related to any of the other variables in this project, with the possible exception of a somewhat negative relationship between animacy and imagery and concreteness for items particularly high on the mental component of animacy. That this mental component seems somewhat under-specified in the current data is also another place where future directions are likely warranted. As discussed briefly earlier, the two dimensions of what Gray et al. (2007) call "mind perception" are *experience* and *agency*. That is, the ability to experience the world, and to act on it. Gray et al. have further measured these two dimensions using factor analysis as well, although only for a small set of 13 "minds": Different kinds of people (yourself, men, women, children, babies, the dead, and those in a persistent vegetative state), animals (frogs, chimps, and dogs), as well as God, robots, and fetuses. Some of these minds are high on experience but not agency (animals, babies, and people in persistent vegetative states), some are high in agency but not experience (God, robots), and some are high in both or neither (adult humans and the dead, respectively).

The present data appear to mimic these results somewhat. Animals were clearly living and could reproduce, but they were not so clearly goal-directed, capable of thought, or similar to a people. Thus, the extracted mental component in Study 2B corresponds to the agency dimension, while the extracted physical component corresponds to the experience dimension. It is interesting to note that judgments about whether something is a living thing or can reproduce are not quite about experience per se, however. In the Gray et al. study, experience included measures like the ability to feel hunger, pain, or various emotional states—these may be indirectly tapped by making a judgment as simple as whether or not something is alive. The other possibility of course is that experience is not so much about ability to experience at all, really, but in whether *physical* markers or features for animacy exist: The ability to feel hunger, fear, pain, or pleasure (the measures that loaded highest onto their experience component) are definitely related to questions about reproduction when thought of as simply *markers for being alive*. Perhaps in this way the Animacy (Living) scale is so diagnostic for predicting recall because it serves as a way to quickly gauge *all* of these components. It should be used cautiously however if more ambiguous stimuli are of interest: Robots, for example rate quite low on this scale (*robot*—138).

Comparatively, the agency construct of Gray et al. (2007) included measures related to the amount of/ability related to self-control, morality, memory, emotion recognition, planning, communication, and thought something had. These measures align directly with the current mental component of animacy made up of goal-directedness, ability to think, and similarity to a person. Once again, person-similarity may be a kind of indicator measure for these factors. Clearly, future work could be done here (as has been mentioned) to better specify the physical and mental components of animacy, perhaps using the metrics employed by Gray et al. to compose a more representative factor analysis.

Another major contribution that this project makes is that it creates a newly-updated set of normative data on *recall*. This year marks the thirtieth anniversary of the publication of the Rubin & Friendly (1986) recallability norms, and their data were collected over several years preceding its publication. An update is certainly warranted after thirty years. Additionally, the current set of data is arguably better than that collected previously, as it contains a few unique features. First and most obvious, it is more representative of the animacy dimension, which is important in free recall. Second, it contains more “useful” words for many kinds of recall experiments: The majority of words are relatively concrete and imageable. Finally, a standardized collection process was used to gather the data. Rubin & Friendly collected their data over a series of thirteen different experiments, all with slightly different procedures, numbers of items in the to-be-remembered lists, and other differences that may have impacted recall. The present data were collected using the same procedure and materials for all participants, minimizing the influence of potential confounds. Future researchers interested in predicting free recall are likely to benefit, because if an interesting new word variable is discovered, these norms could be used to see how that variable predicts recall—much like how Nairne et al. (2013) recoded the Rubin & Friendly data for animacy.

In addition to the valuable contributions that the mere existence of the normative data makes, the conclusions drawn in this project itself are important too. First, this project both confirms and disconfirms several hypotheses about recall. The obvious comparison is that this project effectively replicates the findings of Nairne et al. (2013), both with the Rubin & Friendly (1986) data, and with the newly-collected normative data on recall. Additionally, it corroborates Rubin & Friendly's original findings that (not including animacy) imagery, availability, and measures related to emotionality are important in predicting recall. The current data also appear to disconfirm the hypothesis that the animacy effect in free recall is due to mental arousal (Popp & Serra, 2015), given that word arousal did not load significantly with the Animacy component in a principal component analysis, nor did its inclusion in regression or relative-weight analyses substantially detract from the amount of variance explained by animacy. Finally, the data also indicate that contextual diversity may be important for word learning and memory, as indicated by Hills et al. (2010).

Several new extensions of the animacy effect were also discovered in the course of this project. First, the animacy effect occurs regardless of list composition—the proportion of animate items in the studied list did not affect the size of the animacy effect at all. This finding is important, because it indicates that the animacy effect is at least somewhat independent of whether it is manipulated within- or between-subject. While Popp & Serra (2015) have previously shown that the animacy effect in free recall occurs in between-list designs, these data further illustrate that the proportion of animate items in the list does not appear to affect whether the animacy advantage occurs—additional evidence against a distinctiveness account of the effect.

Further, this project has shown more definitively that the animacy effect is persistent both over the lifespan (it did not interact with participant age) and also occurs regardless of two potentially-relevant personality dimensions, Person and Thing Orientation. Because of these findings, the present data are the first to demonstrate how robust the animacy effect in free recall is in regard to individual differences.

A final contribution that this project makes is that it meets an original goal of the study: To decompose the animacy effect in free recall into its components. Interestingly, the physical component of the animacy dimension appears to account for nearly all of animacy's effect on free recall. While the mental component still significantly predicts recall (both for estimates of incremental importance and using relative-weight analysis), it accounts for only a quarter of the variance that the physical component predicts. This result is interesting, and warrants further analysis. The biggest implication of this result is that the majority of the time, whether a given word will contribute to an animacy effect in free recall can be answered by a single question: "How similar is this word to a living thing?" This finding is important, because it gives researchers a shorthand method of predicting the animacy effect, and investigating potential influences of animacy in their own data.

This result also asks the question, however: Why doesn't the mental component of animacy influence recall more? Well, as discussed previously, the mental component of animacy as it stands may not be well-specified. That is, more, different kinds of questions need to be asked about concepts to fully specify the components of what it means to have a mind. This answer is unattractive, however. A more compelling answer may be that the perception of mind is primarily about context—context that is not captured when simply rating words in a list. While participants in the current studies were willing to say that some non-living things had a degree of personhood, goal-directedness, or ability to think (for example, hurricanes are rated somewhat highly on personhood compared to other nonliving items, *hurricane*—219, likely because they are given names and are "responsible" for damage), data exist that illustrate how much of the perception of agency is done in the context of action (e.g., Scholl & Tremoulet, 2000; Tremoulet & Feldman, 2000).

Most events in the environment have clear cause and effect, especially those involving animate agents like people. When a person does something, especially something blameworthy or praiseworthy, we know exactly who to blame—the person who did it. Wegner & Gray (2016) conceptualize how we do this as *dyadic completion* among two types of animate beings, agents and patients. Agents are thinkers and doers, they make events happen. On the other side is the patient, the person or thing that is affected by the event. Imagine a murderer is caught "red-handed", so to speak. The murderer in this example is the agent in the situation, while the person who was killed is the patient. Wegner and Gray contend that we understand situations in which there are clear agents and patients easily and readily, because these situations form a *complete dyad*. Most "obviously" immoral acts involve complete dyads: Murder, theft, abuse, and fraud (to use their examples). Yet when the dyad is incomplete (that is, an effect exists with no clear agent to cause it), people have an innate urge to try to explain the situation and complete the dyad by *imparting* agency on otherwise inanimate objects, or casting aspersions on otherwise less-agentic beings (Wegner and Gray provide a humorous anecdote of how a pig went on trial for murder in medieval France). Wegner and Gray claim that efforts to resolve events into complete agent-patient dyads is the reason why people see "God's plan" in otherwise random events, believe in conspiracy theories, and experience the fundamental attribution error (Jones & Harris, 1967). In all cases, they are looking for an agent to blame for the event that occurred, even where none may exist.

Specific evidence for the somewhat contingent nature of agency comes from research by Morewedge (2009), who had participants play an ultimatum game. In his study, participants played were told that their partners in this game could potentially be all human, all computers, or a mixture of both. Of course in reality, the partner was always a computer. In the game itself, participants were presented with a proposed split of money where if accepted, the participant would get any money offered. For example, the participant's partner may offer a reasonable split of $10 such that the participant is offered $4 while the partner would keep $6. Of course, some splits are less favorable than others, but the logical thing to do in all cases is to always accept any money offered. This is not what people do. When splits were particularly uneven, many participants rejected the offers in an effort to punish their partner for being greedy. Interestingly, participants were more likely to believe that they were interacting with a person when the offers they were exposed to were negative. Morewedge calls this the *negativity bias*. These data are of course explainable through the lens of dyadic completion: What participants were in fact doing was looking to complete an agent-patient dyad for the negative event. Wegner & Gray personalize this idea somewhat by offering an anecdote. People who own older, less reliable cars are more likely to anthropomorphize them than are people who own newer, reliable ones. Because a new car runs well and rarely "needs encouragement", they are not anthropomorphized nearly as often as older cars (or any older technology, really) that are more likely to fail and cause us to experience a negative event.

Even still, imparting agency may be easier for some ideas than others. For example, Lowder & Gordon (2015) found that while both instruments and natural forces (such as weather phenomena) are inanimate, participants in an eye-tracking study treated sentences with natural forces as subjects (e.g., “The tornado injured the farmer in the field beside the barn,”) as though they had animate word as the subject; the same did not occur for sentences with instruments as subjects (e.g., “The revolver injured the farmer in the field beside the barn.”) This tendency for some words to more likely be treated as agents than others could be what the current mental component in the present data is measuring.

Altogether, much of what is involved in the mental component of animacy may not be directly represented by thinking about a particular concept itself, but instead emerge from a context in which an agent is required to explain an event. Only in these circumstances might we see certain otherwise inanimate things begin to take on the characteristics of animates. While many of the physical indicators of animacy are readily apparent, mental features may only take on particular salience when they are needed to explain why an event occurred. If true, then an interesting prediction is generated: Perhaps in cases where an expectation is violated or when an explanation is otherwise required, the mental component of animacy will be more likely to explain differences in recall.

Conclusion

Altogether, this project has been successful at providing insight into both the makeup of the animacy dimension in general and as the dimension pertains to free recall. And yet this understanding is arguably not the largest contribution that the project makes. The biggest and most obvious impact of the present project is much simpler: Animacy is an incredibly important dimension for predicting the recall of words. Across several different types of regression analyses, measures of animacy were most often the single largest predictor of recall, resoundingly confirming the findings of Nairne et al. (2013). Yet for some reason, animacy as a dimension is all too often ignored by researchers conducting studies with words.

Animacy as a word factor is mostly likely ignored by many word-variable researchers because it began as a functional-evolutionary hypothesis: It was predicted that word animacy may be important for recall because animates were likely to be important over the course of evolution. Many domains of cognitive psychology support this hypothesis, from the ways in which animates capture visual attention (Johansson, 1973; Pratt, Radulescu, Guo, & Abrams, 2010), to language research that claims animacy as a linguistic universal (Comrie, 1989), to research in neuroscience that implies a critical role of animacy in how semantic knowledge is stored (Capitani, Laiacona, Mahon, & Caramazza, 2003), to the rapidity with which the animate-inanimate distinction emerges in development (Opfer & Gelman, 2011). There is even a name for the evolutionary account for why animates are likely to play a key role in human cognition: The *animate monitoring hypothesis* (New et al., 2007).

Thus, while the hypothesis that led to the current project is somewhat intuitive, it had not yet been fully explored. Now that it has been explored in much more detail, both strong evidence in favor of the animacy effect in free recall and a wealth of normative data are now in the literature. With any luck, this project and the resources it contributes to the literature will do more to convince researchers that animacy is an important dimension of words, and spur forward work on the topic in the years to come.

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APPENDICES

Appendix A

Instructions for Study 1A

General instructions:

Thank you for choosing to participate in the experiment!

In this task, we would like you to rate a series of words that will appear on the screen in sets of about thirty.

Scale-specific instructions:

Concreteness

Words differ in the extent to which they refer to concrete objects, persons, places, or things that can be seen, heard, smelled, or tasted, as contrasted with abstract concepts that cannot be experienced by our senses. The purpose of this experiment is to rate a list of words with respect to their "concreteness" in terms of sense experience. Any word that refers to objects, materials, or persons should be given a high concreteness rating (at the upper end of the numerical scale). Any word that refers to an abstract concept that cannot be experienced by the senses should be given a high abstractness rating (at the lower end of the numerical scale). For example, think of the word "carpet," which can be experienced by our senses and therefore rated as highly concrete; the word "ambiguous" cannot be experienced by the senses as such and therefore should be rated as highly abstract (low concrete). Because words tend to make you think of other words as associates, it is important that your ratings not be based on this and that you judge only the concreteness of sense experiences as directly aroused by each word.

Keeping this information in mind, we would like you to rate the words that will appear on their concreteness—that is, on the extent to which the thing represented by the word can be experienced by the senses. Words that are easily experienced by the senses get high ratings. Words that are not easily experienced by the senses get low ratings.

This scale will be presented again at the top of the screen for your reference on the next page.

Click on the ARROW below to continue when you are ready.

1 = highly abstract; 7 = highly concrete

Familiarity

Words differ in their familiarity – that is, in how commonly or frequently they have been experienced or how familiar they appear to be. Some words are very familiar, whereas others may be almost totally unfamiliar. The purpose of this experiment is to rate a list of words with respect to how familiar or common they are – that is, their familiarity. Any word that appears very common or familiar should be given a high familiarity rating (at the upper end of the numerical scale). Any word that you are unfamiliar with, or that is very new to you, should be given a low familiarity rating (at the lower end of the numerical scale). For example, the word "person" should be familiar to you and would be rated as highly familiar. A word such as "amorphous," on the other hand, is likely to be very unfamiliar to you and therefore should be rated as low familiarity. Because words also differ in many other ways, such as how many other words they make you think of or how easily they can be mentally imaged, it is important that your ratings not be based on these other characteristics and that you judge only how familiar each word is to you.

Keeping this information in mind, we would like you to rate the words that will appear on their familiarity—that is, on the extent to which the thing represented by the word is familiar or common to you. Words that are very familiar to you get high ratings. Words that are not very familiar to you get low ratings.

This scale will be presented again at the top of the screen for your reference on the next page.

Click on the ARROW below to continue when you are ready.

1 = highly unfamiliar; 7 = highly familiar

Imagery

Words differ in their capacity to arouse mental images of things or events. Some words arouse a sensory experience, such as a mental picture or sound, very quickly and easily, whereas others may do so only with difficulty (i.e., after a long delay) or not at all. The purpose of this experiment is to rate a list of words on the ease or difficulty with which they arouse mental images. Any word that in your estimation arouses a mental image (i.e., a mental picture, or sound, or other sensory experience) very quickly and easily should be given a high imagery rating (at the upper end of the numerical scale); any word that arouses a mental image with difficulty or not at all should be given a low imagery rating (at the lower end of the numerical scale). For example, think of the word "rooster." "Rooster" would probably arouse an image relatively easily and would be rated as high imagery; "relevant" would probably do so with difficulty and be rated as low imagery. Because words tend to make you think of other words as associates, it is important that your ratings not be based on this and that you judge only the ease with which you get a mental image of an object or event in response to each word.

Keeping this information in mind, we would like you to rate the words that will appear on their imagery—that is, on the extent to which the thing represented by the word arouses a mental image. Words that arouse mental imagery quickly and easily get high ratings. Words that do not arouse mental images, or arouse mental images with difficulty get low ratings.

This scale will be presented again at the top of the screen for your reference on the next page.

Click on the ARROW below to continue when you are ready.

1 = low imagery; 7 = high imagery

Instructions for Study 1B

General instructions:

Thank you for choosing to participate in our experiment!

In this task, we would like you to rate a series of words that will appear on the screen in sets of thirty.

Scale-specific instructions:

Living-Nonliving

Things differ in whether they are living or nonliving. Some things may be very clearly living, whereas others may be very clearly nonliving. The purpose of this experiment is to rate a list of words with respect to the extent to which the thing represented by each word is living or nonliving.

Your ratings will be made on a seven-point scale, where one is the nonliving end of the scale and seven is the living end of the scale. Make your rating by selecting the bubble that corresponds to the number from 1 to 7 that best indicates your judgment of whether the thing is living or nonliving. Anything that you believe is definitely a living thing should be given a high living rating (at the upper end of the numerical scale). Anything that you believe is definitely a nonliving thing should be given a high nonliving rating (at the lower end of the numerical scale).

For example, the word “weatherman” should be given a high living rating, because weathermen are people, and people are living things. A word such as “keg”, on the other hand, should be given a high nonliving rating, because kegs are nonliving objects. Things that you believe are only mostly living or mostly nonliving should of course be rated appropriately between the two extremes. Feel free to use the entire range of numbers from 1 to 7; at the same time, don’t be concerned about how often you use a particular number as long as it is your true judgment.

Because words also differ in many other ways, it is important that your ratings not be based on these other characteristics and that you judge only how living or nonliving each thing is to you. Work fairly quickly, but do not be careless in your ratings.

A condensed version of this scale will be presented again at the top of the screen for your reference on the next page.

Click on the ARROW below to continue when you are ready.

1 = high nonliving; 7 = high living

<u>Ability to reproduce</u>

Things differ in their ability to reproduce—that is, the extent to which they are capable of reproduction. Some things may be able to reproduce easily and often, whereas others do so infrequently or not at all. The purpose of this experiment is to rate a list of words with respect to the extent to which the thing represented by each word is capable of reproduction.

Your ratings will be made on a seven-point scale, where one is the low ability to reproduce end of the scale and seven is the high ability to reproduce end of the scale. Make your rating by selecting the bubble that corresponds to the number from 1 to 7 that best indicates your judgment of the thing's ability to reproduce. Anything that you believe can reproduce easily or frequently should be given a high ability to reproduce rating (at the upper end of the numerical scale). Anything that does not reproduce or reproduces with difficulty or infrequently should be given a low ability to reproduce rating (at the lower end of the numerical scale).

For example, the word "weatherman" should be given a high ability to reproduce rating, because weathermen are people who are capable of reproduction. A word such as "keg", on the other hand, should be given a low ability to reproduce rating, because kegs are objects that cannot reproduce. Things that you believe have an intermediate ability to reproduce should of course be rated appropriately between the two extremes. Feel free to use the entire range of numbers from 1 to 7; at the same time, don't be concerned about how often you use a particular number as long as it is your true judgment.

Because words also differ in many other ways, it is important that your ratings not be based on these other characteristics and that you judge only how capable of reproduction each thing is to you. Work fairly quickly, but do not be careless in your ratings.

A condensed version of this scale will be presented again at the top of the screen for your reference on the next page.

Click on the ARROW below to continue when you are ready.

1 = low ability to reproduce; 7 = high ability to reproduce

Movement likelihood

Things differ in their movement likelihood—that is, in how likely they are to move or change location. Some things may move easily and often, whereas others do so infrequently or not at all. The purpose of this experiment is to rate a list of words with respect to how likely the thing represented by each word is to move or change location.

Your ratings will be made on a seven-point scale, where one is the low movement likelihood end of the scale and seven is the high movement likelihood end of the scale. Make your rating by selecting the bubble that corresponds to the number from 1 to 7 that best indicates your judgment of the thing's likelihood of moving. Anything that you believe is likely to move easily or frequently should be given a high movement likelihood rating (at the upper end of the numerical scale). Anything that does not move or moves with difficulty or infrequently should be given a low movement likelihood rating (at the lower end of the numerical scale).

For example, the word "weatherman" should be given a high movement likelihood rating, because weathermen are people who are likely to move around easily and often. A word such as "keg", on the other hand, should be given a low movement likelihood rating, because kegs are objects that are unlikely to move around. Things that you believe have an intermediate movement likelihood should of course be rated appropriately between the two extremes. Feel free to use the entire range of numbers from 1 to 7; at the same time, don't be concerned about how often you use a particular number as long as it is your true judgment.

Because words also differ in many other ways, it is important that your ratings not be based on these other characteristics and that you judge only how likely to move each thing is to you. Work fairly quickly, but do not be careless in your ratings.

A condensed version of this scale will be presented again at the top of the screen for your reference on the next page.

Click on the ARROW below to continue when you are ready.

1 = low movement likelihood; 7 = high movement likelihood

<u>Similarity to a person</u>

Things differ in their similarity to a person—that is, the extent to which they are similar or dissimilar to people. Some things may be very similar to people (or be people themselves), whereas others are very dissimilar to people. The purpose of this experiment is to rate a list of words with respect to the extent to which the thing represented by each word is similar to a person.

Your ratings will be made on a seven-point scale, where one is the low similarity to a person end of the scale and seven is the high similarity to a person end of the scale. Make your rating by selecting the bubble that corresponds to the number from 1 to 7 that best indicates your judgment of the thing's similarity to a person. Anything that you believe is very similar to a person (or is a person) should be given a high similarity to a person rating (at the upper end of the numerical scale). Anything that is very dissimilar to a person should be given a low similarity to a person rating (at the lower end of the numerical scale).

For example, the word "weatherman" should be given a high similarity to a person rating, because weathermen are people. A word such as "keg", on the other hand, should be given a low similarity to a person rating, because kegs are objects that are very dissimilar to people. Things that you believe have an intermediate similarity to a person should of course be rated appropriately between the two extremes. Feel free to use the entire range of numbers from 1 to 7; at the same time, don't be concerned about how often you use a particular number as long as it is your true judgment.

Because words also differ in many other ways, it is important that your ratings not be based on these other characteristics and that you judge only how similar to a person each thing is to you. Work fairly quickly, but do not be careless in your ratings.

A condensed version of this scale will be presented again at the top of the screen for your reference on the next page.

Click on the ARROW below to continue when you are ready.

1 = low similarity to a person; 7 = high similarity to a person

Goal-directedness

Things differ in their goal-directedness—that is, in the extent to which they are goal-driven or directed by a goal or goals. Some things may be driven by many goals of varying complexity, whereas others may be driven only by simple goals or not at all. The purpose of this experiment is to rate a list of words with respect to the extent to which the thing represented by each word is directed by a goal or goals.

Your ratings will be made on a seven-point scale, where one is the low goal-directedness end of the scale and seven is the high goal-directedness end of the scale. Make your rating by selecting the bubble that corresponds to the number from 1 to 7 that best indicates your judgment of the thing's goal-directedness. Anything that you believe is driven by many goals or by highly complex goals should be given a high goal-directedness rating (at the upper end of the numerical scale). Anything that is not driven by a goal or has only very simple goals should be given a low goal-directedness rating (at the lower end of the numerical scale).

For example, the word "weatherman" should be given a high goal-directedness rating, because weathermen are people who have many complex goals (such as forecasting the weather). A word such as "keg", on the other hand, should be given a low goal-directedness rating, because kegs are objects that do not have goals. Things that you believe have an intermediate goal-directedness should of course be rated appropriately between the two extremes. Feel free to use the entire range of numbers from 1 to 7; at the same time, don't be concerned about how often you use a particular number as long as it is your true judgment.

Because words also differ in many other ways, it is important that your ratings not be based on these other characteristics and that you judge only how goal-directed each word is to you. Work fairly quickly, but do not be careless in your ratings.

A condensed version of this scale will be presented again at the top of the screen for your reference on the next page.

Click on the ARROW below to continue when you are ready.

1 = low goal-directedness; 7 = high goal-directedness

Ability to think

Things differ in their ability to think—that is, on the extent to which they have internal thought processes. Some things may have complex and elaborate thought processes, whereas others have simple thought processes or none at all. The purpose of this experiment is to rate a list of words with respect to the extent to which the thing represented by the word has these internal thought processes.

Your ratings will be made on a seven-point scale, where one is the low ability to think end of the scale and seven is the high ability to think end of the scale. Make your rating by selecting the bubble that corresponds to the number from 1 to 7 that best indicates your judgment of the thing's ability to think. Anything that you believe has elaborate or complex thought processes should be given a high ability to think rating (at the upper end of the numerical scale). Anything that does not think or has simple, rudimentary thought processes should be given a low ability to think rating (at the lower end of the numerical scale).

For example, the word "weatherman" should be given a high ability to think rating, because weathermen are people who have complex thought processes. A word such as "keg", on the other hand, should be given a low ability to think rating, because kegs are objects that cannot think. Words that you believe have an intermediate ability to think should of course be rated appropriately between the two extremes. Feel free to use the entire range of numbers from 1 to 7; at the same time, don't be concerned about how often you use a particular number as long as it is your true judgment.

Because words also differ in many other ways, it is important that your ratings not be based on these other characteristics and that you judge only how capable of thinking each thing is to you. Work fairly quickly, but do not be careless in your ratings.

A condensed version of this scale will be presented again at the top of the screen for your reference on the next page.

Click on the ARROW below to continue when you are ready.

1 = low ability to think; 7 = high ability to think

Appendix B

Percent Reported Education Levels for Study 1B and Study 3

	Study 1B Scales						Study 3
Education Level	*Move*	*Repro*	*Goals*	*Thought*	*Person*	*Living*	
No schooling completed	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kindergarten -- 8th Grade	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Some high school, no diploma	0.0	4.0	0.0	0.4	0.4	0.0	0.3
High school graduate (diploma or equivalent such as GED)	12.0	13.1	11.2	12.0	13.2	11.6	12.9
Trade/technical/vocational training	2.4	1.0	3.2	2.4	2.0	2.8	2.6
Some college credit, no degree	21.2	16.2	26.8	22.8	27.2	22.4	27.3
Associate degree	11.2	7.1	13.2	11.2	15.2	14.4	9.8
Bachelor's degree	35.6	38.4	34.0	41.6	33.2	36.8	36.5
Master's degree	14.0	16.2	8.4	7.6	6.0	10.4	7.6
Professional degree (M.D., J.D., etc.)	2.0	2.0	2.0	0.8	1.2	0.8	2.1
Doctorate degree	1.2	2.0	1.2	1.2	1.6	0.4	0.8
Prefer not to answer	0.4	0.0	0.0	0.0	0.0	0.4	0.2
	100	100	100	100	100	100	100

Appendix C

Animacy and Recallability Norms for 1200 Words

Word	**Category**	**Living**	**Goals**	**Move**	**Repro**	**Thought**	**Person**	**Anim$_{Mental}$**	**Anim$_{Physical}$**	**R1**	**R2**	**R3**	**AvRecall**
abdomen	B	429	234	369	182	132	358	211	295	0.45	0.55	0.75	0.583
acrobat	H P	685	546	616	596	585	604	586	648	0.2	0.35	0.45	0.333
actor	H P	668	552	627	607	596	656	600	639	0.3	0.7	0.7	0.567
actress	H P	696	564	646	625	648	663	640	673	0.25	0.65	0.7	0.533
addict	H D	617	457	569	576	539	629	537	593	0.3	0.75	0.75	0.600
adolescent	H D	696	452	589	482	571	656	580	614	0.4	0.55	0.6	0.517
adult	H D	638	552	608	600	629	608	620	635	0.15	0.45	0.6	0.400
adversary	H D	605	471	508	491	489	473	497	562	0.3	0.45	0.6	0.450
agency	C	248	473	293	286	331	300	389	273	0.25	0.4	0.7	0.450
agent	L	622	572	575	539	620	616	629	601	0.15	0.55	0.65	0.450
air	O O	226	237	588	167	130	125	177	216	0.45	0.65	0.7	0.600
aircraft	V	120	404	585	163	148	121	228	151	0.4	0.6	0.8	0.600
airplane	V	121	257	654	171	129	168	182	154	0.4	0.55	0.6	0.517
airport	F B	126	308	148	176	171	128	226	154	0.35	0.45	0.6	0.467
ale	O E	187	170	262	182	112	176	154	180	0.45	0.55	0.6	0.533
alligator	A R	679	313	579	648	384	215	322	667	0.5	0.5	0.6	0.533
almond	P E	304	144	180	379	129	120	122	315	0.25	0.5	0.5	0.417
amateur	H D	592	436	491	571	508	617	509	568	0.1	0.4	0.65	0.383
ambulance	V	104	312	678	152	126	164	195	137	0.4	0.65	0.75	0.600
ancestor	H R	363	372	330	408	562	612	559	406	0.2	0.65	0.6	0.483
anchor	O M	145	215	263	200	131	222	181	159	0.15	0.45	0.45	0.350
angel	S	288	514	600	274	432	400	486	316	0.5	0.6	0.65	0.583
animal	A O	700	428	584	612	474	329	437	672	0.45	0.75	0.8	0.667
ankle	B	427	239	535	209	132	275	194	318	0.35	0.65	0.65	0.550
ant	I	667	330	612	629	309	211	271	634	0.35	0.7	0.8	0.617
antelope	A M	684	369	629	609	444	226	388	672	0.3	0.55	0.65	0.500
apartment	F B	111	239	139	148	104	152	167	119	0.35	0.6	0.7	0.550
ape	A M	682	375	615	629	493	335	436	676	0.45	0.5	0.75	0.567
appendage	B	385	254	458	195	130	318	205	281	0.15	0.4	0.35	0.300
apple	P E	419	164	254	396	144	188	146	381	0.5	0.6	0.75	0.617
appliance	O M	111	289	215	128	158	129	219	131	0.3	0.45	0.65	0.467
architect	H P	656	658	520	578	626	639	652	623	0.4	0.55	0.7	0.550
arm	B	504	275	562	175	125	446	227	325	0.55	0.75	0.85	0.717
armor	O C	104	250	319	132	104	165	172	115	0.3	0.6	0.65	0.517
army	C	571	592	604	571	522	420	528	580	0.45	0.65	0.8	0.633
arrow	O W	117	238	476	111	109	146	173	126	0.25	0.4	0.55	0.400
artery	B	496	350	323	154	115	245	218	323	0.3	0.55	0.7	0.517
artist	H P	665	604	555	600	644	629	647	646	0.5	0.45	0.65	0.533
ass	Q	542	196	538	485	325	331	291	516	0.85	0.95	1	0.933
astronaut	H P	668	662	640	584	686	672	700	649	0.35	0.6	0.7	0.550
athlete	H P	673	636	626	622	645	628	651	658	0.3	0.45	0.7	0.483
atmosphere	W	211	258	469	200	168	114	204	224	0.35	0.55	0.6	0.500
attorney	H P	661	661	529	626	648	622	658	649	0.2	0.65	0.65	0.500
audience	C	658	492	444	511	584	572	585	608	0.4	0.5	0.6	0.500
aunt	H R	700	438	484	600	664	643	625	677	0.35	0.55	0.75	0.550
author	H P	681	612	526	589	650	644	658	650	0.2	0.45	0.65	0.433
automobile	V	146	315	600	137	141	138	208	160	0.3	0.55	0.5	0.450
autumn	W	173	200	246	162	109	108	154	171	0.55	0.55	0.55	0.550
avenue	F B	132	219	164	129	122	123	176	136	0.3	0.4	0.65	0.450
baby	H D	700	400	574	261	486	648	541	527	0.35	0.75	0.9	0.667
backbone	B	354	248	426	157	129	293	206	255	0.3	0.5	0.7	0.500
bacon	O E	167	173	252	196	107	154	146	174	0.65	0.7	0.9	0.750
bacteria	L	638	356	516	593	240	212	233	582	0.35	0.35	0.6	0.433
badge	O C	100	191	152	176	123	175	168	128	0.4	0.6	0.6	0.533
ball	O M	120	163	577	159	100	135	137	150	0.3	0.35	0.35	0.333
ballerina	H P	683	560	658	600	639	635	633	660	0.5	0.75	0.75	0.667
balloon	O M	104	185	523	154	121	121	158	144	0.25	0.65	0.7	0.533
banana	P E	421	168	233	388	119	144	124	377	0.45	0.7	0.8	0.650
band	Q	468	448	450	325	404	426	449	418	0.3	0.6	0.7	0.533
bandage	O M	100	204	208	163	100	130	150	124	0.25	0.55	0.65	0.483
bandit	H P	662	504	574	558	565	575	564	623	0.1	0.4	0.5	0.333
bank	F B	116	388	148	168	169	180	252	134	0.45	0.5	0.55	0.500
banker	H P	685	652	600	640	621	672	640	656	0.25	0.45	0.5	0.400
bar	F B	129	167	187	148	144	119	176	151	0.35	0.7	0.75	0.600
barn	F B	172	173	136	141	100	138	150	155	0.5	0.6	0.85	0.650
barrel	O M	105	123	170	154	104	163	140	125	0.45	0.5	0.8	0.583
bartender	H P	677	535	618	604	617	660	613	649	0.2	0.4	0.45	0.350
basement	F B	108	156	152	146	112	129	151	128	0.45	0.65	0.7	0.600
basket	O M	116	172	224	121	119	143	166	127	0.35	0.5	0.65	0.500
bass	Q	354	242	474	441	204	200	199	377	0.35	0.65	0.6	0.533
bat	Q	524	292	638	580	333	240	290	547	0.4	0.7	0.55	0.550

bay	F L	208	185	256	200	112	138	150	201	0.55	0.5	0.7	0.583
beach	F L	241	223	184	131	114	171	178	188	0.6	0.75	0.7	0.683
bean	P E	385	132	277	356	112	142	114	349	0.5	0.8	0.85	0.717
beard	B	354	176	289	342	108	326	147	300	0.4	0.6	0.7	0.567
beast	L	638	304	596	577	350	246	309	611	0.4	0.55	0.65	0.533
beaver	A M	654	313	662	626	368	244	316	642	0.4	0.55	0.65	0.533
bed	O F	104	196	204	179	129	135	167	139	0.35	0.6	0.7	0.550
bedroom	F B	132	229	100	138	117	163	179	129	0.3	0.55	0.8	0.550
bee	I	692	364	639	668	367	227	318	673	0.75	0.8	1	0.850
beer	O E	125	174	252	165	121	193	166	140	0.55	0.65	0.75	0.650
beetle	I	648	248	584	641	245	163	196	620	0.35	0.45	0.5	0.433
beggar	H P	662	493	548	600	600	595	583	643	0.35	0.55	0.65	0.517
beginner	H D	543	471	409	533	535	439	520	555	0.15	0.15	0.45	0.250
bell	O I	100	171	330	119	138	143	179	127	0.25	0.5	0.7	0.483
belly	B	428	223	338	196	150	313	214	309	0.35	0.45	0.4	0.400
belt	O C	108	200	323	204	104	144	145	145	0.55	0.7	0.7	0.650
bench	O F	100	165	152	167	120	121	155	133	0.45	0.6	0.65	0.567
beverage	O E	135	185	225	135	158	138	195	152	0.2	0.3	0.6	0.367
bicycle	V	100	240	567	129	107	124	164	128	0.3	0.3	0.55	0.383
biologist	H P	676	592	593	652	688	648	670	680	0.5	0.4	0.7	0.533
bird	A B	667	350	664	608	375	224	330	646	0.5	0.6	0.75	0.617
biscuit	O E	112	150	204	162	100	136	138	133	0.25	0.5	0.65	0.467
bishop	H P	662	528	491	515	627	589	626	621	0.45	0.65	0.6	0.567
blackberry	P E	392	148	257	377	128	152	128	361	0.3	0.55	0.7	0.517
blade	O W	113	191	350	180	100	138	144	141	0.25	0.4	0.45	0.367
blanket	O M	108	164	239	168	108	177	151	130	0.45	0.65	0.6	0.567
blaze	Q	171	196	511	192	123	136	159	190	0.4	0.4	0.55	0.450
blood	B	404	296	540	367	146	350	201	345	0.65	0.75	0.85	0.750
bloom	P	408	222	317	283	131	160	164	338	0.15	0.6	0.7	0.483
blossom	P	504	204	346	444	156	162	153	450	0.35	0.6	0.6	0.517
blouse	O C	104	121	281	134	108	193	148	120	0.3	0.6	0.65	0.517
blueberry	P E	435	188	230	419	124	156	129	392	0.5	1	0.75	0.750
bluejay	A B	681	300	633	570	354	222	310	638	0.45	0.75	0.7	0.633
boat	V	127	281	532	130	100	131	171	136	0.5	0.6	0.7	0.600
body	B	619	343	617	475	319	483	343	528	0.4	0.65	0.6	0.550
bomb	O W	118	283	338	160	148	144	206	145	0.45	0.7	0.65	0.600
bone	B	348	207	332	236	136	324	193	272	0.25	0.5	0.55	0.433
book	O M	148	195	233	133	122	146	172	147	0.2	0.4	0.55	0.383
boot	O C	100	180	414	150	113	160	157	129	0.35	0.4	0.55	0.433
border	F A	112	279	150	156	117	157	186	123	0.15	0.35	0.6	0.367
boss	H P	673	596	604	664	652	637	641	674	0.55	0.75	0.85	0.717
bottle	O M	100	210	304	129	108	121	161	121	0.25	0.3	0.45	0.333
boundary	F A	108	263	184	152	122	164	187	123	0.2	0.3	0.45	0.317
bouquet	P	348	237	220	200	108	131	161	273	0.25	0.4	0.4	0.350
bowl	O M	104	176	270	114	110	150	161	116	0.35	0.65	0.7	0.567
box	O M	122	155	216	152	100	104	137	140	0.4	0.75	0.7	0.617
boxer	H P	673	523	619	555	541	581	551	621	0.4	0.6	0.7	0.567
boy	H D	692	492	636	391	617	667	640	594	0.55	0.6	0.7	0.617
boyfriend	H D	692	500	604	616	584	693	583	649	0.6	0.65	0.8	0.683
bra	O C	100	196	296	152	113	242	173	114	0.45	0.8	0.9	0.717
bracelet	O C	110	170	270	122	107	113	151	126	0.35	0.55	0.6	0.500
brain	B	550	441	329	229	596	404	608	486	0.15	0.35	0.5	0.333
branch	P	429	188	340	233	115	160	153	333	0.55	0.5	0.6	0.550
brat	H D	608	379	588	460	461	575	472	542	0.25	0.65	0.7	0.533
bread	O E	156	135	200	167	132	174	164	164	0.45	0.75	0.75	0.650
breakfast	O E	141	171	215	154	113	150	156	148	0.3	0.55	0.7	0.517
breast	B	446	217	305	208	148	389	219	311	0.55	0.6	0.7	0.617
breath	B	263	329	448	150	132	316	230	196	0.2	0.35	0.65	0.400
breeze	W	165	169	615	161	136	143	167	185	0.2	0.65	0.65	0.500
brick	O M	115	217	196	168	120	156	171	136	0.3	0.45	0.75	0.500
bride	H A	700	565	544	600	600	670	611	649	0.35	0.55	0.7	0.533
bridge	F B	130	176	177	104	140	121	183	136	0.35	0.4	0.5	0.417
broccoli	P E	465	150	252	354	135	188	144	391	0.4	0.6	0.6	0.533
brook	F L	217	162	438	140	117	184	163	190	0.4	0.45	0.7	0.517
broom	O T	123	200	371	146	113	132	160	142	0.35	0.5	0.55	0.467
brother	H R	696	476	589	608	592	633	577	659	0.6	0.65	0.8	0.683
brunette	H D	631	385	474	584	570	616	541	614	0.45	0.65	0.65	0.583
brush	O T	165	246	304	150	115	164	177	157	0.15	0.25	0.35	0.250
bubble	O N	136	137	464	165	108	148	139	158	0.4	0.5	0.65	0.517
bucket	O M	100	145	209	104	124	152	167	114	0.3	0.7	0.8	0.600
buddy	H D	638	491	576	615	573	616	562	625	0.25	0.45	0.7	0.467
bug	I	692	300	538	619	279	185	242	639	0.25	0.5	0.7	0.483
builder	H P	648	623	577	592	581	605	602	619	0.3	0.7	0.7	0.567
building	F B	104	267	158	193	112	154	172	130	0.25	0.55	0.6	0.467
bulb	Q	113	235	208	271	104	150	145	161	0.25	0.5	0.55	0.433
bull	A M	675	313	644	609	363	273	319	642	0.25	0.6	0.65	0.500

bullet	O W	120	200	564	171	114	115	152	157	0.5	0.65	0.8	0.650
bully	H D	664	432	581	612	491	559	480	626	0.25	0.4	0.4	0.350
bum	H D	585	327	444	452	485	480	469	544	0.35	0.5	0.8	0.550
bunny	A M	696	271	672	609	381	207	314	671	0.35	0.7	0.75	0.600
bureau	Q	172	354	200	200	169	212	243	175	0.45	0.65	0.75	0.617
burglar	H A	696	569	623	560	520	600	549	624	0.45	0.65	0.7	0.600
bush	P	461	174	263	373	108	174	124	388	0.35	0.45	0.75	0.517
butler	H P	669	539	573	572	604	659	610	629	0.2	0.25	0.4	0.283
butter	O E	142	170	309	189	125	217	167	157	0.6	0.6	0.65	0.617
butterfly	I	626	312	608	612	288	216	255	601	0.4	0.55	0.6	0.517
button	O M	117	204	281	125	104	152	162	123	0.2	0.25	0.35	0.267
buyer	H A	678	513	534	526	622	576	615	636	0.45	0.5	0.55	0.500
cabbage	P E	422	164	184	382	113	154	121	371	0.35	0.7	0.75	0.600
cabin	F B	115	200	108	100	125	146	182	115	0.45	0.65	0.8	0.633
cabinet	O F	104	175	183	113	135	122	177	123	0.25	0.5	0.45	0.400
cake	O E	122	167	257	128	108	117	151	134	0.25	0.5	0.65	0.467
calf	A M	684	271	591	442	391	219	353	612	0.4	0.65	0.6	0.550
camel	A M	664	319	605	652	405	221	338	666	0.4	0.65	0.45	0.500
camera	O T	115	263	365	119	126	154	192	126	0.3	0.5	0.55	0.450
camp	F B	131	273	260	142	148	158	209	142	0.35	0.5	0.6	0.483
canary	A B	693	268	613	627	381	200	310	674	0.4	0.7	0.6	0.567
cancer	Q	385	314	396	531	144	240	163	392	0.35	0.55	0.65	0.517
candidate	H P	640	641	543	588	600	635	625	612	0.55	0.75	0.7	0.667
candle	O T	119	170	248	104	142	136	184	131	0.35	0.5	0.7	0.517
candy	O E	119	150	218	152	107	138	146	136	0.4	0.65	0.55	0.533
cane	O T	155	186	368	185	120	136	157	173	0.25	0.6	0.6	0.483
cannon	O W	122	310	304	135	108	114	183	129	0.25	0.4	0.55	0.400
canoe	V	100	208	486	164	120	178	169	134	0.15	0.55	0.65	0.450
captain	H P	696	597	626	633	680	600	662	690	0.4	0.5	0.65	0.517
captive	H D	534	425	372	496	467	424	463	523	0.1	0.3	0.3	0.233
car	V	118	241	652	129	117	161	176	138	0.65	0.8	0.75	0.733
cardinal	A B	683	396	557	608	384	315	361	639	0.5	0.5	0.5	0.500
carpenter	H P	674	608	611	664	650	646	643	672	0.55	0.65	0.7	0.633
carriage	V	112	228	572	127	130	152	183	137	0.3	0.45	0.7	0.483
carrot	P E	404	168	222	377	123	196	135	358	0.5	0.6	0.75	0.617
cart	V	104	196	484	135	100	105	146	132	0.25	0.3	0.7	0.417
cashier	H P	620	583	588	633	616	638	615	625	0.25	0.45	0.4	0.367
cast	Q	236	325	256	177	207	360	288	198	0.25	0.55	0.65	0.483
castle	F B	135	197	127	174	104	164	155	141	0.5	0.55	0.5	0.517
cat	A M	700	300	650	654	463	265	382	700	0.6	0.7	0.8	0.700
catcher	H A	582	586	542	543	548	500	562	573	0.2	0.5	0.4	0.367
caterpillar	I	660	327	567	559	321	204	291	612	0.35	0.45	0.6	0.467
cathedral	F B	117	288	123	173	111	162	181	128	0.45	0.7	0.75	0.633
cattle	C	681	304	587	635	400	272	341	662	0.2	0.4	0.55	0.383
cauliflower	P E	504	162	221	381	107	154	118	415	0.45	0.65	0.65	0.583
cave	F L	140	148	121	150	104	154	147	141	0.3	0.5	0.6	0.467
cavern	F L	180	148	168	204	154	126	171	199	0.5	0.7	0.8	0.667
celery	P E	521	158	220	378	122	140	127	430	0.35	0.4	0.5	0.417
cell	Q	432	288	356	504	148	238	165	411	0.35	0.6	0.55	0.500
cellar	F B	104	175	119	123	127	152	174	118	0.25	0.2	0.55	0.333
cereal	O E	119	185	259	163	141	156	179	146	0.4	0.45	0.7	0.517
chair	O F	104	207	263	131	100	173	161	113	0.35	0.6	0.6	0.517
chalk	O T	100	182	262	146	117	124	159	128	0	0.2	0.4	0.200
champion	H D	609	577	570	573	536	579	557	585	0.15	0.5	0.55	0.400
character	H D	452	370	493	379	328	481	371	403	0.45	0.6	0.7	0.583
chauffeur	H P	632	465	584	624	537	562	520	623	0.4	0.6	0.75	0.583
cheek	B	484	167	296	125	156	340	222	318	0.45	0.6	0.6	0.550
cheerleader	H A	688	554	652	668	548	648	553	657	0.65	0.55	0.75	0.650
cheese	O E	176	136	154	168	127	119	154	179	0.55	0.7	0.7	0.650
chef	H P	692	611	608	618	654	619	651	672	0.5	0.5	0.7	0.567
chemist	H P	644	646	600	608	611	636	631	626	0.2	0.65	0.85	0.567
cherry	P E	485	146	238	386	152	129	143	424	0.65	0.55	0.9	0.700
chest	Q	292	192	378	176	116	329	184	220	0.45	0.5	0.7	0.550
chick	L	692	250	588	444	307	408	309	569	0.45	0.45	0.65	0.517
chicken	A B	670	280	613	638	300	283	261	631	0.45	0.65	0.7	0.600
chief	H P	668	577	550	584	630	670	638	635	0.35	0.65	0.65	0.550
child	H D	684	464	638	289	567	619	607	552	0.5	0.55	0.6	0.550
children	C	685	416	664	292	615	658	637	566	0.65	0.7	0.8	0.717
chimney	F B	132	246	167	146	126	131	183	140	0.2	0.55	0.65	0.467
chimpanzee	A M	658	324	622	618	460	344	402	653	0.25	0.65	0.8	0.567
chipmunk	A M	700	354	640	633	357	185	309	670	0.35	0.4	0.55	0.433
chocolate	O E	133	146	270	238	120	123	137	178	0.35	0.7	0.8	0.617
choir	C	556	530	529	425	571	493	586	533	0.2	0.45	0.75	0.467
chorus	C	438	421	488	277	377	481	437	375	0.15	0.4	0.75	0.433
church	F B	172	389	183	188	214	219	288	180	0.6	0.75	0.8	0.717
cigar	O M	108	138	264	132	111	173	153	123	0.3	0.6	0.65	0.517

cinnamon	P E	150	146	222	185	121	129	149	169	0.45	0.5	0.6	0.517
circus	F B	292	345	563	182	188	207	255	255	0.4	0.7	0.7	0.600
citizen	H D	700	514	592	612	628	674	617	666	0.45	0.55	0.6	0.533
city	F A	272	388	136	219	162	200	243	230	0.4	0.5	0.75	0.550
clam	A O	593	227	336	513	173	159	161	523	0.45	0.45	0.6	0.500
clarinet	O I	104	258	281	175	156	116	200	147	0.35	0.6	0.55	0.500
claw	B	222	227	392	172	130	148	178	206	0.2	0.55	0.65	0.467
clay	O N	124	150	244	182	112	127	142	152	0.3	0.7	0.6	0.533
clerk	H P	681	521	571	552	568	650	581	621	0.2	0.35	0.55	0.367
cloak	O C	125	181	328	136	117	154	164	137	0.25	0.5	0.6	0.450
clock	O M	119	275	404	119	111	156	184	124	0.5	0.35	0.6	0.483
closet	F B	100	193	129	195	113	152	155	133	0.45	0.55	0.6	0.533
cloud	W	211	167	548	260	127	170	147	233	0.6	0.45	0.8	0.617
clove	P E	370	174	197	309	117	150	138	322	0.3	0.4	0.6	0.433
clown	H P	669	444	629	562	585	619	569	634	0.4	0.75	0.85	0.667
club	Q	139	285	204	164	112	217	190	133	0.35	0.4	0.45	0.400
coach	H P	616	578	571	568	608	600	615	605	0.4	0.45	0.55	0.467
coal	O N	126	146	180	150	100	123	138	138	0.35	0.55	0.55	0.483
coast	F L	172	204	238	141	138	144	184	167	0.5	0.65	0.6	0.583
coat	O C	117	154	261	172	100	200	145	132	0.3	0.45	0.5	0.417
cobra	A R	688	324	591	628	425	214	358	678	0.3	0.55	0.75	0.533
cocktail	O E	108	246	275	188	127	165	180	139	0.35	0.7	0.7	0.583
coffee	Q	172	236	304	213	100	156	152	177	0.25	0.45	0.5	0.400
coffin	O M	136	181	135	188	100	189	149	143	0.4	0.55	0.65	0.533
coin	O M	100	226	280	132	130	212	192	114	0.2	0.45	0.55	0.400
collar	O C	104	209	222	150	108	180	165	118	0.4	0.5	0.55	0.483
colonel	H P	673	571	568	627	608	648	610	648	0.45	0.8	0.7	0.650
comedian	H P	669	583	589	604	608	663	619	637	0.35	0.45	0.4	0.400
commander	H P	604	641	571	657	663	673	665	628	0.6	0.85	0.8	0.750
committee	C	500	546	460	413	455	465	501	465	0.45	0.75	0.7	0.633
communist	H D	644	523	519	542	558	611	571	598	0.5	0.65	0.75	0.633
community	C	492	492	276	504	408	404	431	480	0.35	0.6	0.7	0.550
companion	H D	627	474	488	617	608	607	584	629	0.3	0.55	0.65	0.500
company	C	265	496	285	290	379	305	430	295	0.3	0.35	0.5	0.383
compass	O T	100	232	473	169	121	127	167	141	0.3	0.55	0.65	0.500
computer	Q	150	339	236	196	267	165	306	197	0.3	0.5	0.5	0.433
conductor	H P	656	509	519	596	613	665	607	631	0.35	0.8	0.7	0.617
congress	C	454	623	385	481	472	533	529	450	0.4	0.85	0.8	0.683
consumer	H A	641	543	596	577	555	638	570	604	0.35	0.35	0.4	0.367
continent	F A	235	200	208	152	115	159	168	196	0.2	0.5	0.6	0.433
contractor	H P	604	635	536	596	627	674	647	598	0.45	0.5	0.65	0.533
convent	F B	192	283	163	176	191	250	252	183	0.3	0.3	0.45	0.350
convict	H D	636	383	536	530	556	641	542	595	0.45	0.45	0.65	0.517
cop	H P	654	600	620	650	608	665	614	643	0.55	0.5	0.85	0.633
coral	Q	487	226	252	404	158	123	162	429	0.65	0.75	0.75	0.717
cord	O O	104	180	260	135	108	126	154	124	0.35	0.55	0.65	0.517
corn	P E	491	180	292	418	120	164	125	424	0.3	0.35	0.5	0.383
corporal	H P	622	496	552	520	629	513	608	615	0.45	0.75	0.75	0.650
corpse	B	125	150	117	208	104	531	185	101	0.3	0.5	0.65	0.483
corridor	F B	113	188	126	138	116	132	164	126	0.4	0.5	0.5	0.467
costume	O C	100	172	220	113	119	182	172	110	0.3	0.35	0.5	0.383
cottage	F B	150	192	136	154	143	164	187	155	0.3	0.55	0.75	0.533
cotton	P	276	179	293	400	123	115	121	307	0.35	0.65	0.65	0.550
couch	O F	112	164	169	138	108	148	153	124	0.4	0.5	0.8	0.567
cougar	A M	684	363	677	636	428	270	374	672	0.4	0.45	0.8	0.550
county	F A	152	296	142	177	163	150	221	164	0.35	0.4	0.55	0.433
court	F B	252	400	193	196	346	219	389	263	0.3	0.55	0.7	0.517
cousin	H R	700	421	542	650	591	628	556	677	0.35	0.45	0.65	0.483
cow	A M	692	293	521	646	396	228	329	675	0.4	0.7	0.8	0.633
coward	H D	671	404	538	570	572	561	542	640	0.3	0.55	0.6	0.483
cowboy	H P	685	488	604	625	608	656	591	660	0.3	0.5	0.75	0.517
cowgirl	H P	662	487	612	596	600	613	584	642	0.6	0.75	0.95	0.767
crab	A O	650	256	563	629	325	222	268	631	0.35	0.5	0.7	0.517
cradle	O F	104	212	323	148	104	125	155	127	0.25	0.45	0.5	0.400
crater	F L	104	113	167	115	104	140	141	116	0.35	0.4	0.5	0.417
creator	H A	681	612	524	559	640	528	641	652	0.45	0.6	0.75	0.600
creature	L	639	348	563	619	390	315	352	623	0.35	0.45	0.55	0.450
creek	F L	242	204	538	183	104	129	148	222	0.2	0.45	0.7	0.450
crew	C	642	528	631	546	536	558	547	603	0.45	0.4	0.45	0.433
cricket	I	669	313	596	576	271	196	247	611	0.2	0.4	0.45	0.350
criminal	H D	638	552	589	608	628	623	620	635	0.65	0.5	0.7	0.617
critic	H A	657	564	504	571	656	622	651	637	0.2	0.3	0.55	0.350
crocodile	A R	683	288	636	600	387	196	323	662	0.5	0.7	0.85	0.683
crook	H D	617	477	548	585	554	579	545	604	0.25	0.4	0.55	0.400
cross	Q	108	178	211	135	100	129	149	122	0.3	0.45	0.5	0.417
crow	A B	684	342	636	648	365	258	319	660	0.35	0.55	0.6	0.500

crowd	C	627	425	600	554	454	467	448	591	0.4	0.5	0.7	0.533
crown	O C	104	192	184	120	132	159	182	118	0.3	0.65	0.7	0.550
crumb	O E	126	138	259	216	104	142	129	161	0.2	0.45	0.7	0.450
crutch	O T	119	223	359	164	146	144	189	150	0.3	0.35	0.5	0.383
crystal	O N	115	161	163	261	141	148	157	173	0.35	0.5	0.55	0.467
cub	A M	661	268	523	335	348	231	340	550	0.3	0.5	0.65	0.483
cucumber	P E	438	158	188	408	114	159	117	387	0.65	0.7	0.7	0.683
culture	Q	275	392	322	258	273	270	327	273	0.25	0.5	0.5	0.417
cup	O M	104	223	213	165	116	164	170	127	0.4	0.65	0.9	0.650
customer	H A	692	548	571	592	630	656	629	655	0.15	0.45	0.6	0.400
dad	H R	674	575	589	619	670	652	659	664	0.5	0.65	0.75	0.633
dagger	O W	108	167	304	152	130	168	169	135	0.45	0.6	0.8	0.617
daisy	P	592	163	236	535	140	179	120	518	0.35	0.35	0.65	0.450
dancer	H P	668	544	663	622	539	650	552	630	0.6	0.6	0.7	0.633
dandruff	O N	192	148	296	226	125	183	152	202	0.45	0.5	0.6	0.517
dart	O W	109	187	531	124	115	133	160	134	0.45	0.45	0.55	0.483
date	Q	208	286	345	312	183	364	236	222	0.25	0.45	0.55	0.417
daughter	H R	692	578	585	585	617	638	625	650	0.45	0.65	0.8	0.633
deck	F B	127	169	205	109	122	152	171	128	0.25	0.5	0.55	0.433
decoration	O M	108	204	212	131	117	115	166	126	0.25	0.4	0.5	0.383
deer	A M	663	332	635	643	442	268	377	668	0.35	0.5	0.7	0.517
democrat	H D	670	548	508	573	569	628	583	621	0.65	0.7	0.75	0.700
demon	S	368	388	458	288	367	256	390	367	0.65	0.8	0.85	0.767
dentist	H P	681	607	569	648	671	636	661	676	0.3	0.45	0.65	0.467
deputy	H P	632	595	577	636	625	624	623	635	0.25	0.5	0.75	0.500
desert	F L	142	185	223	185	104	176	151	151	0.4	0.65	0.6	0.550
designer	H A	640	591	538	584	612	600	618	622	0.25	0.4	0.45	0.367
desk	O F	104	158	200	148	104	123	144	127	0.55	0.6	0.75	0.633
detective	H P	663	658	600	604	670	684	685	645	0.25	0.45	0.7	0.467
device	O T	104	333	286	146	163	156	233	131	0.3	0.4	0.75	0.483
devil	S	342	454	504	235	461	346	496	349	0.6	0.7	0.65	0.650
diamond	O N	119	192	212	152	100	168	154	128	0.4	0.4	0.75	0.517
dictator	H P	674	600	544	546	604	652	628	620	0.2	0.35	0.5	0.350
dime	O M	118	188	307	170	100	196	153	133	0.45	0.45	0.45	0.450
diner	Q	269	296	225	215	215	252	268	245	0.15	0.45	0.45	0.350
dinner	O E	168	285	273	219	128	172	186	179	0.5	0.5	0.75	0.583
dinosaur	A R	419	317	482	395	339	215	329	430	0.65	0.7	0.8	0.717
director	H P	596	607	543	579	642	641	651	599	0.2	0.45	0.5	0.383
dirt	O N	204	126	220	163	100	136	134	186	0.5	0.7	0.9	0.700
disease	Q	424	321	420	470	138	204	165	398	0.4	0.75	0.7	0.617
ditch	F L	130	162	140	141	104	138	149	134	0.25	0.45	0.8	0.500
diver	H A	680	542	629	650	613	646	602	665	0.35	0.5	0.6	0.483
doctor	H P	691	665	656	640	592	659	619	654	0.5	0.75	0.85	0.700
dog	A M	696	335	620	672	442	288	375	691	0.7	0.9	0.85	0.817
doll	O M	117	165	295	108	114	283	179	106	0.4	0.55	0.65	0.533
dollar	O M	119	211	384	154	116	104	160	146	0.35	0.75	0.7	0.600
dolphin	A M	696	408	637	622	519	265	456	697	0.35	0.55	0.85	0.583
donkey	A M	681	279	588	608	415	281	352	659	0.35	0.6	0.6	0.517
donor	H A	562	566	532	509	586	583	603	552	0.15	0.5	0.7	0.450
door	O M	143	257	408	135	108	124	171	147	0.5	0.7	0.7	0.633
dope	Q	231	193	346	185	230	208	251	235	0.4	0.7	0.8	0.633
dough	O E	204	188	274	166	144	200	189	189	0.45	0.6	0.65	0.567
dove	A B	673	296	655	604	340	229	293	640	0.5	0.65	0.65	0.600
dragon	S	358	381	604	381	341	168	340	400	0.35	0.6	0.7	0.550
dress	O C	100	196	321	142	107	208	166	115	0.4	0.8	0.8	0.667
dresser	O F	150	217	230	184	100	152	153	155	0.4	0.6	0.7	0.567
drill	O T	104	231	404	152	150	160	197	139	0.45	0.6	0.55	0.533
driver	H A	629	528	605	600	631	668	623	624	0.25	0.5	0.55	0.433
drug	O M	179	261	246	174	108	144	170	169	0.55	0.45	0.55	0.517
drum	O I	100	204	289	183	112	180	161	130	0.4	0.25	0.6	0.417
duck	A B	669	335	616	665	326	254	285	646	0.3	0.65	0.75	0.567
dungeon	F B	126	188	111	126	165	150	206	141	0.2	0.4	0.55	0.383
dust	O N	124	127	404	152	100	152	134	143	0.35	0.55	0.6	0.500
dwarf	H D	627	413	539	571	512	554	497	600	0.3	0.6	0.75	0.550
dynasty	C	250	391	208	254	242	236	302	250	0.4	0.65	0.65	0.567
eagle	A B	672	392	644	648	419	227	367	670	0.3	0.45	0.6	0.450
ear	B	500	241	274	156	174	341	248	336	0.35	0.75	0.6	0.567
earth	F C	468	327	522	242	152	217	218	358	0.3	0.5	0.75	0.517
egg	Q	342	192	238	250	125	204	164	284	0.55	0.75	0.75	0.683
ego	B	232	444	248	223	231	342	324	211	0.2	0.35	0.55	0.367
elbow	B	492	209	516	150	144	424	227	321	0.45	0.6	0.7	0.583
electrician	H P	673	608	504	633	643	628	642	658	0.25	0.45	0.55	0.417
elephant	A M	700	300	563	622	400	192	332	679	0.35	0.6	0.6	0.517
elevator	V	105	200	556	192	135	150	168	156	0.4	0.5	0.6	0.500
elf	S	420	312	571	400	341	359	346	418	0.35	0.6	0.75	0.567
elk	A M	681	292	610	640	438	235	360	682	0.55	0.85	0.95	0.783

elm	P	604	236	185	452	164	163	169	501	0.6	0.55	0.75	0.633
emerald	O N	135	135	216	192	112	172	143	155	0.3	0.65	0.6	0.517
emperor	H P	673	632	608	576	643	585	651	649	0.25	0.45	0.6	0.433
empire	C	312	481	230	259	274	224	345	291	0.2	0.55	0.55	0.433
employee	H P	689	558	633	648	644	613	625	682	0.15	0.35	0.6	0.367
employer	H P	662	596	524	592	619	586	622	640	0.45	0.5	0.45	0.467
enemy	H D	634	510	531	627	595	495	566	646	0.2	0.5	0.5	0.400
engine	O M	140	312	377	130	135	127	205	146	0.25	0.6	0.6	0.483
engineer	H P	632	631	577	612	692	679	693	638	0.65	0.5	0.75	0.633
envelope	O M	100	192	324	158	100	163	151	124	0.4	0.55	0.7	0.550
executive	H P	552	656	623	596	604	577	621	577	0.4	0.5	0.65	0.517
expert	H D	548	625	527	588	696	658	695	587	0.25	0.45	0.7	0.467
eye	B	516	363	605	136	178	324	278	346	0.45	0.6	0.7	0.583
face	B	436	223	465	123	192	420	270	293	0.35	0.35	0.8	0.500
factory	F B	113	331	205	154	158	192	233	129	0.35	0.6	0.65	0.533
fairy	S	388	319	600	269	279	357	323	344	0.15	0.4	0.6	0.383
fall	W	154	184	320	163	135	162	175	165	0.35	0.4	0.5	0.417
family	C	676	575	579	533	585	604	604	621	0.55	0.8	0.9	0.750
fan	Q	275	250	500	252	169	317	221	251	0.25	0.5	0.55	0.433
farm	F A	272	400	167	292	121	154	196	247	0.35	0.6	0.75	0.567
farmer	H P	697	600	626	628	585	650	599	655	0.2	0.6	0.6	0.467
fat	B	215	181	200	181	150	269	199	191	0.45	0.75	0.75	0.650
father	H R	696	572	587	621	671	640	658	679	0.6	0.55	0.9	0.683
fawn	A M	683	231	656	456	342	220	303	606	0.35	0.6	0.6	0.517
feast	O E	129	292	204	172	121	161	189	139	0.35	0.5	0.6	0.483
feather	B	161	141	474	222	108	168	134	187	0.15	0.55	0.65	0.450
female	L	688	483	629	657	576	632	558	666	0.35	0.75	0.65	0.583
fence	F B	104	184	167	152	119	141	163	127	0.3	0.4	0.7	0.467
fiddle	O I	122	260	412	131	126	142	188	137	0.35	0.35	0.5	0.400
fighter	H A	662	590	585	640	600	612	601	648	0.1	0.5	0.7	0.433
fin	B	360	216	470	173	119	122	166	286	0.35	0.7	0.75	0.600
finger	B	470	232	576	138	135	335	215	315	0.45	0.6	0.6	0.550
fireman	H P	688	605	626	604	588	668	609	641	0.4	0.55	0.9	0.617
fireplace	F B	119	254	154	100	126	154	196	114	0.2	0.45	0.4	0.350
fish	A F	635	280	636	596	327	219	279	615	0.55	0.65	0.65	0.617
fist	B	412	236	512	158	108	326	191	280	0.25	0.6	0.7	0.517
flag	O M	100	162	446	167	107	113	140	141	0.4	0.6	0.7	0.567
flask	O M	118	162	267	108	119	123	162	129	0.25	0.6	0.5	0.450
flea	I	679	235	644	608	208	220	178	612	0.3	0.75	0.65	0.567
flesh	B	525	200	344	282	160	308	202	394	0.3	0.5	0.55	0.450
flood	W	138	207	538	200	114	152	155	170	0.35	0.45	0.6	0.467
flour	O E	129	156	224	139	139	150	175	145	0.25	0.5	0.65	0.467
flower	P	624	238	271	554	128	209	130	530	0.5	0.45	0.7	0.550
flute	O I	112	223	268	156	117	148	170	132	0.4	0.55	0.55	0.500
foe	H D	584	477	471	607	532	521	518	591	0.45	0.75	0.7	0.633
fog	W	129	167	470	235	130	104	146	186	0.4	0.5	0.65	0.517
follower	H A	648	404	572	567	584	528	547	636	0.3	0.4	0.45	0.383
fool	H D	659	270	571	442	396	542	398	557	0.3	0.55	0.85	0.567
foot	B	522	262	592	131	115	414	219	324	0.3	0.4	0.4	0.367
forehead	B	488	152	438	144	135	377	202	321	0.45	0.5	0.45	0.467
forest	P	500	215	181	381	126	150	144	414	0.4	0.6	0.75	0.583
fork	O T	100	223	375	115	121	111	174	123	0.25	0.55	0.75	0.517
foundation	F B	168	367	160	152	154	155	236	159	0.2	0.5	0.6	0.433
fountain	F B	107	177	381	150	124	164	166	135	0.2	0.55	0.65	0.467
fox	A M	684	336	629	664	452	324	389	681	0.35	0.7	0.65	0.567
fraternity	C	342	413	392	295	338	411	393	323	0.2	0.75	0.75	0.567
fraud	Q	250	314	292	190	239	217	288	240	0.3	0.3	0.55	0.383
freak	L	496	308	569	505	425	468	405	502	0.3	0.8	0.8	0.633
friend	H D	650	558	587	513	614	663	632	602	0.4	0.65	0.75	0.600
frog	A O	700	262	623	592	315	217	267	647	0.55	0.85	0.8	0.733
fruit	P E	567	165	293	465	127	164	120	482	0.3	0.7	0.95	0.650
fugitive	H D	696	546	623	574	552	617	567	637	0.2	0.4	0.6	0.400
fungus	P	522	324	263	604	154	154	152	498	0.4	0.5	0.75	0.550
fur	B	216	142	291	204	125	135	148	214	0.35	0.6	0.7	0.550
furniture	O F	112	244	236	164	117	148	174	132	0.2	0.6	0.7	0.500
gal	H D	654	419	582	608	588	671	564	634	0.5	0.65	0.75	0.633
galaxy	F C	348	312	412	296	167	143	206	319	0.45	0.65	0.95	0.683
gang	C	596	430	552	496	475	496	479	556	0.3	0.65	0.45	0.467
gangster	H P	657	548	656	609	613	636	608	641	0.25	0.7	0.7	0.550
garden	P	470	317	152	415	136	130	167	406	0.5	0.75	0.8	0.683
garlic	P E	380	138	233	400	114	126	108	361	0.45	0.6	0.55	0.533
gavel	O T	136	177	314	170	118	148	157	155	0.3	0.65	0.65	0.533
gazelle	A M	640	318	659	578	346	169	299	622	0.4	0.7	0.85	0.650
gem	O N	133	228	257	216	120	133	162	164	0.3	0.4	0.7	0.467
gender	Q	200	237	271	218	196	468	265	180	0.4	0.5	0.8	0.567
genius	H D	577	593	512	538	663	585	663	589	0.4	0.6	0.65	0.550

gentleman	H D	665	529	567	664	627	650	608	663	0.3	0.65	0.75	0.567
germ	Q	532	300	491	552	146	244	159	484	0.25	0.6	0.55	0.467
ghost	S	152	300	446	172	316	352	360	191	0.4	0.7	0.85	0.650
ghoul	S	315	235	504	204	252	293	285	286	0.45	0.75	0.8	0.667
giant	S	458	328	512	346	440	408	441	441	0.3	0.55	0.65	0.500
gift	O M	154	331	289	167	100	123	178	151	0.05	0.3	0.45	0.267
giraffe	A M	671	320	608	596	404	223	348	652	0.35	0.5	0.7	0.517
girl	H D	693	505	607	636	557	667	557	651	0.6	0.75	0.7	0.683
girlfriend	H D	684	542	617	626	626	679	620	659	0.4	0.7	0.7	0.600
glacier	W	186	196	360	200	121	135	158	194	0.2	0.4	0.55	0.383
glass	O O	100	156	288	135	104	163	150	119	0.25	0.65	0.6	0.500
glove	O C	104	215	265	157	104	180	162	121	0.4	0.55	0.7	0.550
goat	A M	689	281	608	615	444	216	364	683	0.7	0.55	0.85	0.700
goddess	S	520	485	521	396	372	517	433	448	0.5	0.6	0.8	0.633
gold	O N	104	263	187	132	130	148	194	119	0.45	0.65	0.75	0.617
goose	A B	696	288	600	589	320	250	282	638	0.4	0.6	0.65	0.550
gorilla	A M	665	377	604	640	508	322	444	676	0.6	0.8	0.75	0.717
government	C	420	616	293	259	448	381	528	373	0.5	0.65	0.9	0.683
governor	H P	685	675	604	600	665	658	683	656	0.3	0.55	0.55	0.467
gown	O C	128	168	286	116	123	146	168	135	0.35	0.3	0.55	0.400
grain	P E	346	188	228	364	108	144	123	323	0.35	0.5	0.6	0.483
grandma	H R	696	513	568	408	627	636	647	605	0.7	0.7	0.75	0.717
grandpa	H R	672	527	540	465	615	676	637	599	0.45	0.75	0.85	0.683
granite	O N	119	167	173	155	119	104	154	142	0.25	0.4	0.45	0.367
grape	P E	461	177	228	379	109	136	120	393	0.6	0.7	0.75	0.683
grass	P	529	230	292	500	113	152	117	466	0.5	0.5	0.6	0.533
grasshopper	I	640	238	580	588	304	179	249	615	0.3	0.55	0.65	0.500
grave	F B	108	184	129	138	146	196	194	124	0.35	0.5	0.6	0.483
gravel	O N	114	132	300	112	116	115	151	131	0.5	0.4	0.65	0.517
gravy	O E	107	158	304	143	104	125	144	130	0.35	0.45	0.6	0.467
groom	H D	638	540	522	633	572	619	571	625	0.2	0.55	0.5	0.417
group	C	533	438	522	470	479	496	487	513	0.15	0.45	0.4	0.333
guard	H P	670	508	540	558	632	600	619	641	0.35	0.45	0.65	0.483
guardian	H D	648	586	500	586	619	563	618	633	0.45	0.7	0.75	0.633
guest	H D	677	417	565	615	617	596	575	666	0.35	0.45	0.5	0.433
guide	H P	456	529	535	425	485	483	518	455	0.15	0.3	0.45	0.300
guitar	O I	116	220	389	160	113	137	163	141	0.25	0.6	0.7	0.517
gun	O W	105	256	404	113	108	146	177	116	0.7	0.85	1	0.850
guy	H D	688	525	619	610	633	674	624	660	0.35	0.7	0.7	0.583
gymnast	H P	657	636	627	608	600	641	621	630	0.25	0.35	0.6	0.400
hail	W	130	216	596	152	122	185	174	150	0.3	0.5	0.65	0.483
hair	B	360	181	444	278	119	242	155	303	0.45	0.5	0.65	0.533
hallway	F B	108	222	118	113	129	144	188	115	0.4	0.45	0.55	0.467
hammer	O T	133	193	364	132	140	138	182	150	0.35	0.65	0.65	0.550
hand	B	500	250	587	164	152	342	229	343	0.5	0.65	0.55	0.567
handkerchief	O M	100	204	223	114	131	158	185	115	0.2	0.55	0.75	0.500
hare	A M	676	291	625	625	369	252	313	653	0.5	0.75	0.85	0.700
hat	O C	115	125	275	124	119	164	156	129	0.5	0.55	0.65	0.567
hatchet	O W	114	200	362	127	104	124	156	129	0.4	0.55	0.7	0.550
hawk	A B	692	360	646	571	429	212	379	664	0.35	0.4	0.65	0.467
hay	P	217	132	204	256	104	152	124	220	0.35	0.7	0.65	0.567
haze	W	113	132	328	161	112	135	141	142	0.25	0.5	0.6	0.450
head	B	467	264	508	196	383	436	413	384	0.45	0.6	0.75	0.600
heart	B	613	345	463	173	171	325	265	404	0.4	0.55	0.7	0.550
heaven	S	272	412	204	178	178	165	262	228	0.45	0.75	0.65	0.617
hedge	P	438	148	192	360	104	115	110	376	0.35	0.4	0.6	0.450
heel	B	321	155	454	142	114	296	174	234	0.3	0.75	0.65	0.567
hell	S	185	187	163	122	113	189	172	154	0.55	0.9	0.75	0.733
helmet	O C	150	175	221	191	113	135	149	166	0.5	0.5	0.6	0.533
helper	H A	641	539	604	546	604	596	605	615	0.3	0.45	0.55	0.433
hen	A B	654	345	587	600	381	177	330	641	0.45	0.7	0.8	0.650
herb	P E	530	196	228	404	117	170	132	436	0.35	0.7	0.75	0.600
hero	H D	635	574	641	584	619	636	623	621	0.2	0.7	0.6	0.500
heroine	H D	467	496	500	458	512	500	527	478	0.5	0.55	0.6	0.550
highway	F B	158	358	157	148	116	136	203	144	0.3	0.5	0.55	0.450
hill	F L	142	128	136	158	120	150	152	151	0.45	0.55	0.7	0.567
hive	C	363	348	233	300	207	148	247	331	0.35	0.6	0.6	0.517
hobo	H D	652	356	556	548	500	650	492	595	0.45	0.65	0.7	0.600
hoe	O T	123	171	348	156	112	160	155	141	0.65	0.6	0.9	0.717
hog	A M	673	307	556	632	433	188	357	676	0.4	0.55	0.7	0.550
honey	O E	158	148	235	133	133	192	175	153	0.35	0.65	0.6	0.533
hook	O T	104	175	163	167	115	165	159	128	0.15	0.55	0.5	0.400
horn	Q	123	188	244	175	112	141	154	145	0.3	0.5	0.8	0.533
hornet	I	680	312	650	604	296	233	264	630	0.25	0.6	0.6	0.483
horse	A M	683	352	615	650	412	291	361	667	0.7	0.65	0.75	0.700
hospital	F B	183	350	137	192	138	160	214	174	0.55	0.7	0.8	0.683

host	L	642	477	572	526	524	588	534	591	0.3	0.4	0.55	0.417
hostage	H D	696	490	412	536	608	645	608	633	0.35	0.6	0.55	0.500
hostess	H A	692	550	632	626	619	648	613	665	0.3	0.55	0.7	0.517
hotel	F B	119	285	150	163	148	169	211	136	0.35	0.5	0.7	0.517
hound	A M	677	371	592	561	396	216	359	640	0.2	0.3	0.35	0.283
house	F B	125	217	141	168	130	200	185	136	0.65	0.9	0.9	0.817
human	H D	688	607	648	670	689	685	676	689	0.45	0.6	0.65	0.567
hurricane	W	173	258	663	174	163	219	215	187	0.35	0.55	0.75	0.550
husband	H R	674	575	609	642	592	619	592	654	0.45	0.7	0.75	0.633
hut	F B	100	200	174	169	121	180	170	125	0.4	0.5	0.65	0.517
ice	W	133	192	262	131	115	132	164	139	0.6	0.75	0.85	0.733
idiot	H D	623	272	529	558	423	589	404	573	0.55	0.95	0.9	0.800
individual	Q	612	500	630	630	592	604	573	623	0.2	0.5	0.6	0.433
infant	H D	688	367	500	343	456	640	496	538	0.45	0.8	0.85	0.700
infection	Q	435	313	421	396	115	172	156	380	0.3	0.55	0.6	0.483
inn	F B	126	260	171	183	127	152	184	145	0.3	0.45	0.6	0.450
insect	I	652	300	604	615	278	244	248	610	0.6	0.65	0.65	0.633
instructor	H P	665	600	588	574	617	664	634	627	0.15	0.45	0.45	0.350
instrument	O I	100	283	362	126	117	121	184	120	0.25	0.4	0.45	0.367
intelligence	Q	356	348	250	196	323	323	374	306	0.45	0.6	0.7	0.583
inventor	H A	696	664	563	624	613	617	632	660	0.35	0.35	0.5	0.400
island	F L	267	213	175	130	148	128	197	218	0.3	0.65	0.7	0.550
item	O O	212	171	291	174	112	141	151	196	0.4	0.5	0.65	0.517
jacket	O C	100	204	254	133	122	167	176	119	0.4	0.55	0.65	0.533
jail	F B	122	288	108	154	135	129	199	135	0.6	0.65	0.6	0.617
jeep	V	108	256	596	168	104	157	163	139	0.55	0.7	0.75	0.667
jelly	O E	123	138	328	165	120	129	147	152	0.45	0.8	0.85	0.700
jet	V	119	263	662	142	150	152	203	153	0.55	0.75	0.75	0.683
jewel	O N	104	180	236	125	129	165	177	121	0.4	0.45	0.6	0.483
journal	O M	128	216	245	192	154	182	195	158	0.3	0.35	0.6	0.417
judge	H P	665	604	492	559	654	633	663	633	0.35	0.65	0.8	0.600
jug	O M	100	146	219	129	113	112	149	124	0.35	0.35	0.6	0.433
juice	O E	116	174	275	161	104	156	149	135	0.2	0.45	0.6	0.417
jungle	F L	395	196	279	350	164	200	177	356	0.3	0.65	0.65	0.533
junior	H D	558	424	554	387	517	523	530	511	0.2	0.45	0.55	0.400
jury	C	592	623	504	538	556	517	581	573	0.45	0.55	0.55	0.517
juvenile	L	656	419	656	474	532	617	538	587	0.3	0.8	0.85	0.650
kangaroo	A M	675	278	623	656	404	243	330	674	0.35	0.45	0.65	0.483
keeper	H A	522	508	404	471	467	486	494	496	0.1	0.45	0.65	0.400
kettle	O M	100	213	246	116	104	140	164	111	0.35	0.55	0.6	0.500
key	O M	109	291	296	185	108	126	171	136	0.3	0.7	0.7	0.567
kid	H D	696	442	604	312	570	585	597	571	0.5	0.75	0.65	0.633
king	H P	674	636	528	614	635	644	647	648	0.55	0.5	0.7	0.583
kingdom	C	235	423	152	274	221	223	288	239	0.25	0.55	0.7	0.500
kite	O M	122	196	605	128	113	125	158	145	0.3	0.55	0.6	0.483
kitten	A M	700	328	633	589	368	250	327	653	0.55	0.7	0.6	0.617
knee	B	454	229	560	208	123	356	196	321	0.4	0.6	0.6	0.533
knife	O W	112	196	244	165	108	145	156	134	0.4	0.6	0.75	0.583
knuckle	B	408	200	400	110	104	321	188	261	0.2	0.35	0.5	0.350
labyrinth	F B	121	229	173	162	175	114	211	156	0.25	0.5	0.7	0.483
ladder	O T	100	313	283	132	116	130	192	115	0.2	0.5	0.7	0.467
lady	H D	691	430	620	650	667	633	614	695	0.3	0.55	0.6	0.483
lake	F L	319	183	330	232	131	126	158	281	0.65	0.7	0.8	0.717
lamb	A M	692	300	577	552	316	238	287	624	0.65	0.6	0.7	0.650
lamp	O F	100	213	224	135	114	160	171	116	0.35	0.65	0.85	0.617
landscape	F L	348	231	131	204	138	123	182	281	0.2	0.4	0.55	0.383
lap	B	325	221	248	157	115	310	192	228	0.4	0.65	0.7	0.583
lawn	F L	488	152	188	335	141	130	145	404	0.45	0.55	0.85	0.617
lawyer	H P	652	610	633	638	600	639	609	639	0.6	0.7	0.9	0.733
leader	H A	656	685	537	565	680	635	700	634	0.35	0.6	0.75	0.567
leaf	P	500	148	472	288	121	164	139	397	0.25	0.55	0.75	0.517
leg	B	521	314	581	132	150	315	245	343	0.65	0.7	0.7	0.683
lemon	P E	435	193	262	435	129	156	131	399	0.5	0.7	0.8	0.667
lemonade	O E	126	168	259	189	111	167	149	149	0.3	0.65	0.7	0.550
leopard	A M	683	336	596	646	465	185	384	695	0.45	0.75	0.8	0.667
letter	O M	116	223	315	140	126	144	179	134	0.15	0.5	0.7	0.450
lettuce	P E	452	200	209	388	148	159	156	397	0.45	0.8	0.8	0.683
lever	O T	112	289	438	117	116	108	184	127	0.35	0.5	0.65	0.500
liar	H A	560	461	535	596	515	591	511	564	0.35	0.5	0.45	0.433
library	F B	122	300	138	212	171	212	229	152	0.2	0.45	0.7	0.450
lieutenant	H P	664	621	583	559	628	642	647	627	0.4	0.6	0.55	0.517
life	Q	511	463	532	484	246	395	303	451	0.35	0.55	0.5	0.467
lightning	W	223	211	604	242	165	146	186	247	0.35	0.5	0.6	0.483
limb	B	486	248	504	172	132	364	216	326	0.35	0.8	0.65	0.600
lime	P E	484	150	191	322	118	164	134	388	0.4	0.65	0.75	0.600
limousine	V	104	238	604	156	104	145	160	136	0.45	0.55	0.7	0.567

lion	A M	692	304	587	575	438	204	371	670	0.55	0.55	0.7	0.600
lip	B	432	175	587	126	123	393	201	284	0.4	0.6	0.65	0.550
liquor	O E	115	196	258	135	123	175	176	127	0.45	0.45	0.55	0.483
litter	Q	188	130	352	204	192	136	195	220	0.4	0.7	0.65	0.583
liver	B	512	285	230	329	122	239	178	390	0.4	0.65	0.75	0.600
lizard	A R	672	348	546	622	304	179	270	634	0.45	0.65	0.6	0.567
loaf	O E	118	173	217	135	122	104	160	138	0.2	0.55	0.6	0.450
lobby	F B	108	227	142	160	132	152	183	130	0.15	0.4	0.5	0.350
lobster	A O	650	271	537	662	337	179	270	648	0.3	0.6	0.75	0.550
lock	O T	100	237	190	165	107	144	165	123	0.35	0.5	0.55	0.467
lodge	F B	108	219	129	126	124	135	180	120	0.4	0.45	0.6	0.483
log	P	168	168	204	183	100	117	137	172	0.45	0.6	0.75	0.600
lord	H P	600	596	437	540	563	563	586	574	0.4	0.75	0.7	0.617
loser	H D	576	288	491	508	563	516	512	578	0.3	0.4	0.6	0.433
lover	H D	672	519	596	632	648	635	625	667	0.35	0.45	0.6	0.467
lunch	O E	196	229	244	160	100	144	159	174	0.3	0.45	0.45	0.400
lung	B	524	258	396	226	181	308	241	380	0.25	0.45	0.65	0.450
macaroni	O E	122	159	204	121	104	126	149	128	0.25	0.45	0.65	0.450
machine	O M	126	255	389	192	184	142	220	173	0.4	0.5	0.5	0.467
mafia	C	508	522	558	396	526	560	563	478	0.45	0.6	0.65	0.567
magazine	O M	105	270	257	183	104	152	168	129	0.2	0.3	0.45	0.317
magician	H P	655	520	580	633	623	660	609	647	0.35	0.65	0.6	0.533
magnet	O O	100	196	250	124	129	156	179	119	0.25	0.35	0.5	0.367
maid	H P	663	504	600	630	596	644	584	646	0.4	0.5	0.8	0.567
mailman	H P	692	614	618	576	644	623	652	656	0.2	0.6	0.7	0.500
majority	Q	275	361	316	276	331	268	360	297	0.2	0.45	0.55	0.400
maker	H A	460	454	468	388	458	464	485	443	0.35	0.6	0.7	0.550
male	L	650	460	608	638	609	581	573	656	0.55	0.75	0.9	0.733
mammal	A M	663	426	619	644	491	458	460	651	0.35	0.7	0.7	0.583
man	H D	688	568	646	667	616	688	613	669	0.45	0.7	0.7	0.617
manager	H P	668	600	600	600	625	630	631	644	0.35	0.65	0.7	0.567
mansion	F B	129	257	140	124	115	167	186	122	0.4	0.65	0.75	0.600
map	O M	100	308	227	159	146	104	206	134	0.3	0.4	0.65	0.450
maple	P	404	181	242	388	104	142	115	363	0.3	0.6	0.85	0.583
marble	O N	104	122	365	157	107	129	135	138	0.25	0.35	0.5	0.367
mare	A M	675	308	592	558	400	244	351	639	0.45	0.55	0.6	0.533
marijuana	P E	370	148	252	440	140	158	127	370	0.65	0.75	0.9	0.767
marine	H P	523	527	564	530	550	515	553	539	0.15	0.5	0.65	0.433
market	F A	168	340	257	207	179	181	241	185	0.5	0.55	0.55	0.533
mask	O M	100	191	242	142	128	192	179	120	0.45	0.3	0.65	0.467
master	H D	643	600	576	414	658	558	679	591	0.35	0.45	0.7	0.500
mate	H D	665	546	492	609	576	573	574	638	0.45	0.6	0.75	0.600
mattress	O M	127	177	219	133	125	150	170	137	0.25	0.5	0.8	0.517
mayor	H P	663	588	550	648	609	658	613	646	0.25	0.7	0.65	0.533
maze	F A	126	181	189	154	109	152	156	136	0.2	0.45	0.6	0.417
meadow	F L	369	161	142	237	168	132	183	314	0.25	0.4	0.65	0.433
meat	B	227	133	212	232	116	185	142	218	0.55	0.7	0.85	0.700
mechanic	H P	616	550	596	604	642	626	630	625	0.35	0.55	0.7	0.533
medicine	O M	156	320	277	196	128	163	197	164	0.5	0.55	0.55	0.533
member	H D	616	463	488	529	509	560	515	574	0.4	0.65	0.65	0.567
mermaid	S	427	264	544	327	333	419	350	391	0.35	0.6	0.55	0.500
microscope	O T	119	319	177	192	108	148	182	136	0.5	0.6	0.65	0.583
midget	H D	670	419	596	544	579	604	561	630	0.25	0.3	0.55	0.367
mildew	P	411	161	244	408	163	148	152	390	0.2	0.5	0.65	0.450
milk	O E	167	142	236	159	104	140	141	165	0.5	0.55	0.65	0.567
mind	B	546	523	412	190	565	391	608	463	0.05	0.35	0.35	0.250
miner	H P	675	515	617	625	600	617	586	656	0.45	0.65	0.55	0.550
minister	H P	640	552	571	592	622	642	621	625	0.3	0.55	0.75	0.533
mink	A M	526	200	536	496	307	180	257	525	0.3	0.65	0.85	0.600
minor	Q	509	374	521	354	436	445	453	463	0.2	0.35	0.55	0.367
mirror	O M	116	165	196	138	100	171	151	122	0.45	0.6	0.75	0.600
missile	O W	126	412	596	146	133	129	223	144	0.55	0.55	0.6	0.567
mist	W	165	176	492	200	135	154	164	191	0.2	0.35	0.65	0.400
mister	H D	615	428	500	517	486	658	504	554	0.15	0.5	0.65	0.433
model	Q	454	374	507	531	542	604	521	496	0.3	0.45	0.65	0.467
molasses	O E	167	132	258	152	119	144	151	168	0.25	0.45	0.7	0.467
mole	A M	552	228	465	485	322	244	286	528	0.6	0.65	0.65	0.633
mom	H R	654	612	587	672	613	583	606	660	0.7	0.9	0.9	0.833
monarch	H P	665	520	496	620	560	468	541	653	0.45	0.3	0.55	0.433
monastery	F B	152	308	170	168	226	218	281	171	0.35	0.55	0.6	0.500
monk	H P	676	564	463	404	631	658	666	583	0.45	0.65	0.65	0.583
monkey	A M	693	315	613	635	458	357	398	675	0.5	0.6	0.6	0.567
monster	L	469	278	552	320	288	331	310	411	0.3	0.45	0.6	0.450
monument	F B	116	191	160	138	116	174	170	123	0.2	0.45	0.55	0.400
moon	F C	275	252	517	157	139	150	193	236	0.3	0.5	0.65	0.483
moose	A M	675	312	596	643	374	204	313	663	0.5	0.65	0.65	0.600

moron	H D	624	256	504	508	324	569	333	532	0.35	0.65	0.55	0.517
mosquito	I	677	258	646	650	285	192	230	648	0.4	0.55	0.75	0.567
moth	I	665	222	596	623	267	152	208	634	0.3	0.65	0.75	0.567
mother	H R	696	591	588	674	650	665	641	685	0.6	0.65	0.9	0.717
motor	O M	137	281	464	162	150	136	204	162	0.25	0.6	0.6	0.483
mountain	F L	204	215	142	185	136	178	185	189	0.45	0.7	0.75	0.633
mouse	A M	670	285	650	625	389	258	327	656	0.45	0.6	0.75	0.600
mouth	B	513	324	546	145	173	372	270	340	0.2	0.5	0.6	0.433
movie	O M	124	326	373	191	140	145	204	154	0.35	0.5	0.55	0.467
mud	O N	135	128	208	188	118	176	148	155	0.6	0.65	0.65	0.633
muffin	O E	160	158	300	163	110	127	146	167	0.3	0.4	0.65	0.450
mug	Q	100	180	267	141	127	152	170	126	0.45	0.6	0.75	0.600
mule	A M	652	270	556	532	363	270	322	606	0.25	0.5	0.65	0.467
mummy	Q	143	168	223	171	150	436	217	128	0.3	0.45	0.65	0.467
murderer	H A	625	521	588	592	600	631	595	615	0.65	0.75	0.7	0.700
muscle	B	473	300	525	196	127	331	215	327	0.35	0.45	0.6	0.467
mustard	P E	181	163	261	227	114	112	138	200	0.3	0.5	0.75	0.517
nag	L	272	363	304	380	318	327	341	315	0.35	0.35	0.65	0.450
nail	O T	164	168	188	189	104	177	147	164	0.4	0.45	0.7	0.517
napkin	O M	100	160	250	170	100	135	138	130	0.35	0.5	0.6	0.483
nation	C	392	519	233	212	352	288	430	332	0.25	0.35	0.5	0.367
navigator	H A	530	569	619	481	578	596	603	526	0.3	0.45	0.65	0.467
navy	C	385	526	504	304	329	339	402	352	0.55	0.75	0.8	0.700
neck	B	391	224	496	150	127	413	215	261	0.3	0.55	0.65	0.500
necklace	O C	138	124	332	116	100	152	141	137	0.2	0.4	0.55	0.383
needle	O T	100	164	281	169	132	130	162	141	0.45	0.5	0.65	0.533
neighbor	H D	650	465	533	648	576	608	552	644	0.25	0.5	0.55	0.433
nephew	H R	685	443	596	616	618	629	587	666	0.4	0.55	0.45	0.467
nerve	B	500	344	326	196	188	267	266	357	0.15	0.55	0.5	0.400
nest	O N	162	216	181	164	126	150	176	162	0.35	0.55	0.45	0.450
net	O T	113	188	276	169	133	131	169	146	0.3	0.5	0.7	0.500
newspaper	O M	138	256	275	196	108	164	167	153	0.4	0.6	0.65	0.550
nickel	O M	120	123	308	135	104	114	136	139	0.3	0.4	0.45	0.383
niece	H R	654	479	631	583	562	641	559	620	0.4	0.7	0.8	0.633
nightgown	O C	112	154	304	165	133	196	170	139	0.55	0.7	0.9	0.717
nomad	H D	622	395	630	560	520	552	500	601	0.3	0.45	0.55	0.433
nose	B	422	256	371	155	110	343	202	277	0.3	0.45	0.7	0.483
nun	H P	652	496	533	384	559	626	595	555	0.45	0.7	0.7	0.617
nurse	H P	688	626	596	638	646	652	650	668	0.6	0.75	0.85	0.733
nursery	F B	254	344	183	181	129	196	213	204	0.3	0.4	0.4	0.367
oak	P	507	212	148	427	128	130	135	434	0.55	0.7	0.7	0.650
oar	O T	104	215	465	182	100	120	145	142	0.35	0.35	0.55	0.417
oatmeal	O E	161	165	221	244	113	138	138	188	0.25	0.65	0.75	0.550
object	O O	125	175	308	135	113	159	161	135	0.3	0.5	0.45	0.417
ocean	F L	334	224	543	196	133	122	173	285	0.45	0.7	0.85	0.667
octopus	A O	685	400	600	600	400	200	360	658	0.4	0.5	0.75	0.550
office	F B	135	329	160	196	152	196	223	150	0.2	0.7	0.5	0.467
officer	H P	700	641	600	634	644	688	658	668	0.55	0.6	0.75	0.633
onion	P E	412	140	244	421	108	142	103	381	0.35	0.55	0.55	0.483
operator	H A	648	570	616	561	674	615	665	639	0.25	0.35	0.7	0.433
opponent	H D	628	496	612	548	642	554	618	628	0.4	0.55	0.6	0.517
orange	P E	476	126	287	383	117	160	116	407	0.5	0.7	0.7	0.633
orchard	C	512	240	175	452	133	157	145	442	0.3	0.35	0.55	0.400
orchestra	C	493	527	500	327	523	448	559	460	0.3	0.5	0.65	0.483
oregano	P E	328	196	195	363	116	156	133	312	0.5	0.4	0.6	0.500
organ	Q	463	300	258	228	120	260	199	328	0.5	0.65	0.8	0.650
ornament	O M	108	175	232	200	100	123	136	144	0.3	0.5	0.55	0.450
orthodontist	H P	675	654	596	628	664	656	672	661	0.55	0.7	0.65	0.633
otter	A M	595	292	619	604	380	238	322	607	0.4	0.7	0.85	0.650
outfit	O C	108	211	275	144	116	252	182	114	0.3	0.3	0.45	0.350
outlaw	H D	659	479	565	533	538	600	545	604	0.25	0.55	0.7	0.500
oven	O M	100	238	192	161	115	131	170	125	0.35	0.4	0.65	0.467
owl	A B	688	361	620	615	496	214	422	692	0.45	0.75	0.8	0.667
owner	H A	654	587	492	631	636	600	629	650	0.35	0.3	0.6	0.417
ox	A M	692	346	585	621	338	204	298	653	0.55	0.9	0.85	0.767
oyster	A O	660	204	367	531	246	167	208	587	0.35	0.7	0.75	0.600
package	O M	124	174	429	162	104	154	147	145	0.2	0.4	0.6	0.400
page	Q	150	196	328	165	115	181	165	155	0.5	0.6	0.6	0.567
painter	H P	639	574	624	607	627	638	626	632	0.35	0.5	0.6	0.483
pal	H D	654	425	541	586	565	600	544	628	0.35	0.55	0.5	0.467
palace	F B	113	248	141	139	121	158	185	121	0.35	0.65	0.7	0.567
palm	Q	423	187	470	244	142	277	184	330	0.3	0.5	0.55	0.450
pan	O T	105	167	291	156	104	160	148	127	0.55	0.4	0.6	0.517
panther	A M	688	354	656	609	458	233	395	679	0.25	0.7	0.8	0.583
pants	O C	100	174	292	152	163	184	198	137	0.5	0.55	0.7	0.583
paper	O M	107	173	320	154	100	167	148	127	0.65	0.75	0.75	0.717

parade	C	317	259	596	208	196	280	246	276	0.3	0.5	0.5	0.433
parcel	O M	108	204	376	116	129	123	177	130	0.2	0.4	0.65	0.417
parent	H R	685	652	623	642	642	642	651	667	0.2	0.6	0.7	0.500
park	F L	276	228	185	118	122	158	186	207	0.15	0.5	0.6	0.417
parrot	A B	676	320	645	646	359	243	308	657	0.4	0.65	0.65	0.567
parsley	P E	450	173	225	454	112	139	109	411	0.5	0.55	0.65	0.567
partner	H D	657	537	586	658	604	612	588	655	0.25	0.3	0.4	0.317
passenger	H D	658	424	568	567	585	632	566	626	0.4	0.6	0.8	0.600
paste	O M	107	214	183	158	117	148	169	128	0.2	0.4	0.8	0.467
pasture	F L	289	209	161	212	156	143	190	255	0.3	0.5	0.6	0.467
path	F L	126	283	124	156	108	122	176	132	0.35	0.45	0.7	0.500
patriot	H D	661	478	560	571	614	561	591	643	0.3	0.4	0.65	0.450
peach	P E	492	167	192	483	133	119	117	450	0.45	0.65	0.65	0.583
peak	F L	117	186	158	154	126	138	168	136	0.25	0.2	0.35	0.267
peanut	P E	392	140	226	371	118	150	120	356	0.35	0.55	0.65	0.517
pear	P E	412	127	204	343	120	133	122	361	0.4	0.55	0.55	0.500
pearl	O N	177	208	224	208	116	144	158	184	0.4	0.5	0.8	0.567
pebble	O N	104	130	233	138	120	168	156	125	0.3	0.6	0.55	0.483
pedal	O M	150	196	464	131	126	152	174	156	0.1	0.45	0.5	0.350
pedestrian	H D	670	512	640	657	633	664	611	667	0.15	0.4	0.7	0.417
peer	H D	526	404	529	540	565	512	534	556	0.35	0.3	0.5	0.383
pen	O T	104	238	425	179	108	157	162	136	0.6	0.6	0.85	0.683
pencil	O T	112	179	365	192	100	125	137	148	0.45	0.35	0.65	0.483
pendulum	O M	116	286	496	167	135	130	191	149	0.35	0.55	0.6	0.500
penguin	A B	692	319	574	657	396	250	335	676	0.45	0.55	0.75	0.583
people	C	684	540	642	665	638	656	618	678	0.55	0.6	0.65	0.600
pepper	P E	239	163	243	316	119	124	129	258	0.25	0.45	0.7	0.467
person	H D	681	532	662	644	654	688	637	672	0.2	0.4	0.45	0.350
pest	L	604	308	535	600	320	283	289	583	0.35	0.35	0.6	0.433
pet	L	681	377	622	592	424	271	383	653	0.35	0.6	0.7	0.550
phantom	S	283	296	436	181	255	329	310	251	0.45	0.5	0.65	0.533
philosopher	H P	670	572	554	577	648	654	650	641	0.4	0.7	0.8	0.633
phone	O T	104	235	333	125	117	141	177	121	0.3	0.4	0.55	0.417
photo	O M	112	192	260	167	123	236	177	127	0.15	0.2	0.3	0.217
physician	H P	695	671	596	675	636	661	648	677	0.4	0.55	0.65	0.533
piano	O I	124	215	188	142	108	133	164	132	0.35	0.5	0.55	0.467
pickle	O E	241	119	212	170	128	137	153	217	0.4	0.7	0.55	0.550
picture	O M	122	196	200	171	115	193	167	135	0.3	0.45	0.6	0.450
pier	F B	105	204	184	179	100	131	148	131	0.3	0.75	0.8	0.617
pig	A M	677	284	609	626	358	246	303	651	0.35	0.65	0.75	0.583
pigeon	A B	683	317	642	648	323	252	281	650	0.35	0.65	0.65	0.550
pillow	O M	112	185	224	129	141	148	184	131	0.35	0.55	0.7	0.533
pilot	H P	664	632	600	625	625	610	632	650	0.45	0.55	0.75	0.583
pimple	B	300	157	227	227	122	223	159	252	0.35	0.6	0.65	0.533
pine	P	496	224	220	427	136	125	142	433	0.3	0.5	0.8	0.533
pipe	O M	108	254	180	156	112	148	175	123	0.45	0.55	0.65	0.550
pirate	H P	664	483	600	552	583	639	582	621	0.35	0.7	0.7	0.583
pistol	O W	135	204	308	154	100	156	154	141	0.35	0.35	0.55	0.417
piston	O M	120	305	513	191	167	105	212	171	0.4	0.6	0.5	0.500
pitcher	Q	335	338	542	361	348	336	360	361	0.1	0.45	0.5	0.350
plane	V	108	304	629	130	142	170	211	134	0.5	0.75	0.65	0.633
planet	F C	480	374	516	239	274	168	315	402	0.4	0.75	0.75	0.633
plant	P	590	296	278	504	129	196	150	495	0.35	0.6	0.75	0.567
plasma	Q	358	208	367	288	174	239	201	317	0.55	0.6	0.75	0.633
plate	O M	119	170	263	157	113	140	153	139	0.3	0.5	0.8	0.533
platform	F B	100	179	150	135	104	125	152	117	0.2	0.3	0.4	0.300
player	H A	660	617	622	509	622	640	650	609	0.25	0.3	0.35	0.300
pledge	Q	167	347	200	204	162	184	231	175	0.4	0.65	0.6	0.550
pliers	O T	108	242	356	177	108	104	157	142	0.25	0.4	0.6	0.417
plum	P E	452	173	225	404	100	136	108	394	0.35	0.45	0.5	0.433
plumber	H P	689	612	584	650	577	588	585	661	0.6	0.55	0.7	0.617
pocket	O M	107	162	208	115	108	142	156	117	0.2	0.35	0.35	0.300
poet	H P	648	576	560	604	600	646	609	625	0.4	0.65	0.45	0.500
poison	O O	138	222	273	188	148	115	184	170	0.4	0.65	0.8	0.617
pole	O M	100	144	191	168	108	123	140	132	0.35	0.75	0.6	0.567
policeman	H P	669	596	642	600	630	648	636	645	0.6	0.75	0.75	0.700
politician	H P	685	640	668	620	563	630	590	642	0.35	0.6	0.6	0.517
pony	A M	696	328	600	579	420	212	364	666	0.35	0.55	0.65	0.517
pool	F B	119	158	232	113	108	156	157	122	0.35	0.55	0.8	0.567
pope	H P	696	600	572	468	648	658	676	621	0.5	0.7	0.6	0.600
population	C	556	422	484	519	542	477	521	561	0.2	0.55	0.7	0.483
porcupine	A M	689	319	552	612	388	244	336	658	0.4	0.6	0.45	0.483
pork	B	322	188	259	226	122	204	165	265	0.3	0.6	0.6	0.500
portrait	O M	104	204	186	148	130	259	192	113	0.2	0.65	0.65	0.500
potato	P E	517	132	183	392	137	180	135	431	0.5	0.7	0.6	0.600
prairie	F L	289	148	170	232	161	142	176	267	0.25	0.4	0.65	0.433

preacher	H P	671	613	600	600	664	667	668	651	0.4	0.45	0.6	0.483
predator	L	674	552	652	617	476	423	478	642	0.4	0.7	0.8	0.633
president	H P	667	692	619	639	646	624	662	657	0.3	0.55	0.75	0.533
prey	L	504	421	562	504	361	322	365	500	0.45	0.55	0.6	0.533
priest	H P	658	604	554	489	648	656	672	606	0.35	0.5	0.7	0.517
primate	A M	680	377	585	600	431	371	400	643	0.2	0.5	0.7	0.467
prince	H P	665	584	563	600	648	650	648	646	0.55	0.7	0.9	0.717
princess	H P	681	529	552	637	574	627	570	651	0.45	0.7	0.8	0.650
principal	H P	646	600	567	608	604	670	620	622	0.4	0.5	0.7	0.533
prison	F B	112	308	120	141	200	235	268	129	0.35	0.5	0.55	0.467
prisoner	H D	652	377	508	574	596	636	563	629	0.45	0.65	0.8	0.633
prize	O O	127	223	248	161	108	156	164	138	0.4	0.35	0.5	0.417
producer	H P	646	600	536	574	644	627	650	628	0.45	0.65	0.55	0.550
professor	H P	688	657	575	607	679	677	691	662	0.4	0.6	0.7	0.567
property	F A	165	257	180	165	136	146	193	165	0.15	0.2	0.45	0.267
proprietor	H P	622	533	504	642	613	562	591	638	0.2	0.5	0.6	0.433
pudding	O E	119	204	246	167	119	133	164	143	0.35	0.6	0.75	0.567
puddle	F L	121	146	264	200	116	146	143	156	0.45	0.75	0.65	0.617
pupil	Q	589	492	565	476	621	500	606	584	0.6	0.6	0.65	0.617
puppy	A M	696	288	662	476	368	208	332	625	0.6	0.6	0.7	0.633
purse	O M	121	262	276	160	123	128	181	141	0.25	0.7	0.75	0.567
puzzle	O O	105	219	276	168	104	143	157	129	0.1	0.45	0.6	0.383
pyramid	F B	112	246	121	165	122	121	176	133	0.4	0.45	0.6	0.483
quarter	O M	100	142	288	168	136	135	161	142	0.25	0.5	0.75	0.500
queen	H P	675	633	570	604	621	661	640	641	0.35	0.65	0.75	0.583
quilt	O M	107	150	196	150	113	127	149	132	0.25	0.4	0.55	0.400
rabbi	H P	696	570	563	526	588	625	609	627	0.45	0.75	0.75	0.650
rabbit	A M	667	290	658	630	363	233	304	651	0.5	0.6	0.65	0.583
raccoon	A M	688	300	572	625	458	252	383	682	0.4	0.65	0.75	0.600
racket	O T	104	165	386	188	119	144	151	147	0.05	0.15	0.5	0.233
radio	O M	113	275	254	230	109	152	164	149	0.5	0.6	0.8	0.633
raft	V	104	233	515	183	104	187	160	136	0.2	0.45	0.65	0.433
rail	O M	108	154	215	146	120	146	158	130	0.45	0.65	0.7	0.600
railroad	F B	124	285	264	142	152	142	213	141	0.25	0.5	0.6	0.450
rain	W	160	192	593	204	108	136	143	186	0.5	0.75	0.7	0.650
rainbow	W	170	171	319	204	154	158	179	193	0.6	0.6	0.7	0.633
ram	A M	689	288	600	580	337	186	288	645	0.4	0.5	0.6	0.500
raspberry	P E	446	150	265	450	112	162	106	407	0.3	0.8	0.75	0.617
rat	A M	656	348	658	621	336	204	296	635	0.5	0.7	0.9	0.700
razor	O T	104	208	309	142	121	105	166	133	0.4	0.6	0.75	0.583
reader	H A	562	488	463	508	571	592	576	549	0.25	0.55	0.7	0.500
rebel	H D	619	512	535	584	596	567	584	615	0.1	0.55	0.55	0.400
receipt	O M	119	178	208	156	141	146	178	144	0.4	0.5	0.65	0.517
receptionist	H P	666	559	538	609	616	631	614	643	0.3	0.55	0.75	0.533
reef	C	460	188	196	400	169	138	165	414	0.4	0.5	0.7	0.533
referee	H P	668	581	592	579	619	696	635	628	0.3	0.4	0.7	0.467
refrigerator	O M	126	214	165	167	142	145	186	148	0.65	0.8	0.75	0.733
region	F A	188	296	162	183	138	114	196	184	0.2	0.2	0.4	0.267
reindeer	A M	641	304	617	621	433	228	362	653	0.5	0.6	0.65	0.583
relation	L	264	263	336	331	221	314	250	277	0.25	0.4	0.35	0.333
reptile	A R	633	250	573	612	396	236	324	636	0.2	0.4	0.55	0.383
republic	C	248	496	136	243	277	274	360	241	0.25	0.4	0.6	0.417
republican	H D	677	542	480	624	576	613	576	644	0.7	0.7	0.75	0.717
resort	F B	173	289	126	158	123	158	194	157	0.3	0.35	0.55	0.400
restaurant	F B	108	358	175	132	121	152	211	112	0.45	0.6	0.6	0.550
rib	B	372	171	252	137	108	323	182	247	0.45	0.55	0.65	0.550
ribbon	O M	100	177	276	146	113	130	155	127	0.3	0.45	0.65	0.467
rice	P E	269	178	212	292	112	167	138	257	0.3	0.65	0.75	0.567
rider	H A	619	420	581	554	529	517	509	601	0.3	0.55	0.65	0.500
rifle	O W	100	248	317	104	117	178	188	106	0.4	0.6	0.7	0.567
ring	O M	130	221	232	121	124	136	180	134	0.4	0.35	0.6	0.450
river	F L	291	181	627	268	156	144	168	292	0.55	0.6	0.7	0.617
roach	I	673	258	608	625	287	215	239	634	0.2	0.6	0.8	0.533
robber	H A	604	526	631	624	589	596	577	616	0.15	0.35	0.4	0.300
robe	O C	127	188	283	137	104	168	158	131	0.35	0.45	0.6	0.467
robin	A B	663	332	616	558	357	213	320	624	0.3	0.7	0.8	0.600
robot	Q	138	393	500	181	264	279	331	177	0.4	0.5	0.6	0.500
rock	O N	116	130	162	182	124	108	145	152	0.45	0.5	0.75	0.567
rocket	V	119	393	600	121	142	144	230	135	0.4	0.6	0.6	0.533
rodent	A M	675	321	612	596	412	225	354	657	0.35	0.5	0.65	0.500
roof	F B	100	208	168	129	108	124	163	115	0.4	0.65	0.65	0.567
roommate	H D	696	412	619	620	552	664	533	653	0.25	0.45	0.45	0.383
rooster	A B	692	361	615	586	373	177	330	656	0.35	0.45	0.5	0.433
root	P	448	208	226	359	122	164	143	378	0.15	0.4	0.4	0.317
ruby	O N	132	177	200	161	100	129	144	143	0.15	0.4	0.6	0.383
ruler	Q	232	390	273	283	320	417	377	249	0.35	0.4	0.55	0.433

runner	H A	676	563	667	607	553	624	566	636	0.35	0.65	0.9	0.633
rye	P E	420	163	215	304	107	150	129	346	0.35	0.55	0.65	0.517
sack	O M	121	163	204	185	108	161	147	143	0.35	0.65	0.6	0.533
saddle	O M	144	204	232	109	115	167	176	133	0.4	0.35	0.55	0.433
sage	Q	483	254	326	426	208	246	217	433	0.2	0.55	0.6	0.450
sailor	H P	676	558	608	628	604	680	608	647	0.3	0.55	0.65	0.500
saint	H D	438	537	519	428	611	588	627	468	0.35	0.7	0.65	0.567
salad	P E	232	140	196	121	142	123	175	200	0.3	0.45	0.55	0.433
salesman	H P	662	583	623	608	593	688	609	628	0.25	0.4	0.5	0.383
salmon	A F	687	279	615	639	321	164	261	661	0.3	0.35	0.6	0.417
salt	O N	100	144	219	196	100	136	131	138	0.5	0.75	0.8	0.683
sap	Q	221	191	315	246	150	113	169	237	0.25	0.5	0.75	0.500
sapphire	O N	138	128	238	208	126	152	147	170	0.6	0.55	0.6	0.583
savior	H D	496	564	565	463	608	596	627	508	0.35	0.55	0.8	0.567
saxophone	O I	104	195	252	188	146	136	178	149	0.3	0.45	0.4	0.383
scale	Q	113	208	270	175	108	125	154	140	0.2	0.25	0.45	0.300
scapegoat	H D	530	300	421	427	400	483	402	483	0.5	0.55	0.7	0.583
scar	B	235	132	167	140	143	196	181	198	0.3	0.5	0.6	0.467
scarf	O C	104	158	345	119	123	164	167	123	0.4	0.6	0.75	0.583
school	F B	119	424	167	200	138	276	244	123	0.35	0.6	0.7	0.550
scientist	H P	674	658	604	638	667	644	672	665	0.35	0.65	0.7	0.567
scissors	O T	131	213	341	161	133	141	178	153	0.3	0.4	0.55	0.417
scout	H P	596	564	624	513	555	588	578	566	0.2	0.35	0.35	0.300
screw	O T	104	176	279	117	115	121	161	122	0.3	0.4	0.6	0.433
seagull	A B	684	323	631	621	417	200	351	675	0.25	0.65	0.65	0.517
seal	Q	607	283	596	569	408	192	342	616	0.15	0.65	0.65	0.483
seat	O F	119	213	208	135	146	100	188	143	0.3	0.5	0.55	0.450
secretary	H P	654	560	581	615	593	664	599	629	0.2	0.3	0.65	0.383
seed	P	404	241	232	485	121	174	130	389	0.3	0.55	0.45	0.433
self	H D	648	561	615	535	641	620	643	622	0.15	0.3	0.45	0.300
seller	H P	622	565	520	565	600	619	609	602	0.3	0.45	0.5	0.417
senate	C	485	564	433	367	473	438	523	450	0.3	0.7	0.85	0.617
senator	H P	691	636	544	622	588	656	613	645	0.45	0.6	0.65	0.567
sergeant	H P	670	628	604	620	648	665	656	652	0.3	0.35	0.4	0.350
serpent	A R	661	300	635	565	380	208	328	635	0.35	0.45	0.7	0.500
servant	H P	644	452	596	626	596	655	573	636	0.3	0.45	0.6	0.450
shadow	O N	115	127	492	183	109	272	150	138	0.4	0.45	0.6	0.483
shark	A F	685	433	632	604	396	200	364	657	0.6	0.7	0.8	0.700
sheep	A M	675	295	585	638	382	243	321	659	0.45	0.7	0.7	0.617
sheet	O M	127	126	268	144	100	164	139	136	0.4	0.65	0.6	0.550
shell	Q	144	186	296	138	127	146	172	151	0.45	0.55	0.65	0.550
shelter	F B	142	278	189	179	112	124	174	151	0.4	0.6	0.55	0.517
shepherd	H P	658	523	617	638	589	560	571	655	0.4	0.75	0.65	0.600
sheriff	H P	656	586	581	604	656	679	657	641	0.45	0.65	0.8	0.633
shield	O M	130	280	296	158	116	138	181	142	0.2	0.35	0.6	0.383
ship	V	127	230	586	171	115	154	165	155	0.3	0.3	0.55	0.383
shirt	O C	100	195	240	139	156	156	197	131	0.1	0.45	0.8	0.450
shoe	O C	104	146	440	112	114	180	159	120	0.25	0.45	0.5	0.400
shorts	O C	100	154	279	193	123	130	149	146	0.5	0.7	0.85	0.683
shoulder	B	424	246	473	172	104	393	198	279	0.55	0.6	0.75	0.633
shovel	O T	100	211	338	125	100	129	156	117	0.55	0.55	0.8	0.633
shrimp	A O	643	217	560	613	248	180	198	609	0.55	0.7	0.75	0.667
sibling	H R	676	454	582	642	604	625	574	664	0.45	0.7	0.7	0.617
singer	H A	696	569	564	607	592	646	601	651	0.35	0.55	0.6	0.500
siren	Q	121	319	304	150	117	165	196	129	0.25	0.3	0.4	0.317
sister	H R	689	500	556	630	615	676	602	660	0.45	0.8	0.8	0.683
site	F A	115	256	136	133	104	123	171	120	0.3	0.4	0.6	0.433
skeleton	B	169	223	274	136	115	467	214	116	0.45	0.6	0.7	0.583
skillet	O T	107	192	300	165	121	148	164	137	0.35	0.45	0.55	0.450
skin	B	574	217	235	364	171	378	211	435	0.45	0.5	0.55	0.500
skirt	O C	104	170	324	137	104	189	156	119	0.35	0.7	0.7	0.583
skull	B	250	238	263	140	115	348	203	176	0.45	0.65	0.65	0.583
skunk	A M	654	360	600	625	313	229	285	623	0.4	0.65	0.75	0.600
sky	W	167	242	283	152	112	114	168	163	0.3	0.7	0.7	0.567
skyscraper	F B	157	300	162	114	157	135	226	149	0.3	0.7	0.75	0.583
slave	H D	688	471	574	585	582	600	568	649	0.15	0.45	0.65	0.417
sleeve	O C	116	167	338	125	105	156	153	127	0.2	0.5	0.5	0.400
sleigh	V	108	171	546	154	104	130	143	141	0.2	0.35	0.55	0.367
slug	Q	627	272	409	564	252	228	230	570	0.3	0.6	0.45	0.450
slum	F A	219	204	179	219	128	163	168	210	0.55	0.45	0.5	0.500
snail	A O	632	261	411	550	243	215	221	569	0.55	0.65	0.6	0.600
snake	A R	681	317	563	659	389	200	322	674	0.6	0.55	0.7	0.617
snob	H D	608	385	512	571	529	604	510	588	0.3	0.45	0.65	0.467
snow	W	112	117	471	180	137	131	151	161	0.45	0.5	0.75	0.567
soap	O M	115	216	268	196	104	152	152	143	0.3	0.45	0.5	0.417
society	C	426	592	350	471	500	421	530	454	0.25	0.5	0.5	0.417

sock	O C	109	181	286	173	108	165	152	134	0.2	0.6	0.7	0.500
soda	O E	117	146	254	142	125	148	161	137	0.45	0.6	0.7	0.583
sofa	O F	100	150	185	158	108	123	144	129	0.5	0.5	0.65	0.550
soil	O N	321	179	207	193	129	129	164	265	0.25	0.4	0.7	0.450
soldier	H P	684	574	617	584	652	676	654	652	0.25	0.65	0.55	0.483
son	H R	700	496	619	600	632	628	612	671	0.65	0.9	0.8	0.783
soul	S	471	379	358	192	354	456	423	361	0.3	0.25	0.6	0.383
spade	O T	122	120	296	178	126	108	143	160	0.2	0.6	0.6	0.467
sparrow	A B	667	300	648	640	329	183	274	650	0.25	0.5	0.75	0.500
spatula	O T	100	173	252	117	113	133	160	117	0.3	0.45	0.55	0.433
speaker	H A	504	439	335	448	493	538	509	482	0.25	0.3	0.5	0.350
sphere	O O	120	138	258	174	158	120	175	163	0.35	0.5	0.6	0.483
sphinx	S	215	167	271	160	148	133	179	205	0.35	0.5	0.45	0.433
spice	P E	165	238	284	191	123	148	173	174	0.45	0.45	0.6	0.500
spider	I	659	261	612	630	272	179	223	628	0.5	0.8	0.75	0.683
spinach	P E	452	170	264	379	131	124	132	398	0.6	0.8	0.65	0.683
spine	B	426	243	380	181	142	316	215	301	0.35	0.3	0.4	0.350
spirit	S	341	354	452	152	322	377	387	284	0.35	0.65	0.65	0.550
spoon	O T	108	179	259	109	122	146	171	120	0.35	0.4	0.5	0.417
spring	Q	236	216	308	204	122	127	163	221	0.25	0.5	0.55	0.433
spy	H P	624	557	597	574	623	615	622	616	0.4	0.5	0.65	0.517
squad	C	358	570	636	400	450	488	503	385	0.2	0.5	0.45	0.383
squirrel	A M	663	305	679	631	419	244	351	664	0.4	0.7	0.6	0.567
staff	Q	496	448	487	433	458	543	486	468	0.25	0.35	0.5	0.367
stallion	A M	638	327	619	580	411	218	356	632	0.4	0.6	0.45	0.483
star	F C	300	162	379	204	133	204	169	256	0.2	0.6	0.7	0.500
state	F A	225	346	129	162	157	146	231	195	0.6	0.55	0.9	0.683
station	F B	132	255	148	176	104	143	166	140	0.3	0.45	0.6	0.450
statue	O M	104	170	138	156	100	292	165	103	0.3	0.35	0.45	0.367
steam	O N	116	154	558	137	119	174	158	141	0.25	0.55	0.45	0.417
steeple	F B	117	162	122	132	118	139	161	128	0.5	0.65	0.6	0.583
stem	P	396	191	265	267	143	164	170	330	0.5	0.65	0.65	0.600
stew	O E	150	181	280	144	100	204	157	140	0.25	0.4	0.5	0.383
stewardess	H P	650	515	654	573	592	585	584	630	0.25	0.5	0.7	0.483
stick	P	216	117	276	208	108	156	132	209	0.45	0.55	0.65	0.550
stomach	B	544	241	380	172	142	315	218	363	0.25	0.6	0.4	0.417
stone	O N	108	150	193	173	108	109	139	140	0.3	0.25	0.6	0.383
stool	O F	100	190	248	188	100	132	142	134	0.3	0.55	0.65	0.500
storm	W	136	248	604	231	152	130	184	191	0.4	0.6	0.7	0.567
stove	O M	100	231	156	159	126	141	178	125	0.25	0.3	0.65	0.400
stranger	H D	681	404	589	631	600	624	560	666	0.15	0.35	0.65	0.383
straw	Q	169	192	191	186	109	161	155	168	0.15	0.25	0.5	0.300
strawberry	P E	500	177	254	418	117	181	125	424	0.7	0.7	0.9	0.767
stream	F L	243	215	608	168	133	158	178	224	0.4	0.5	0.65	0.517
street	F B	132	256	157	163	104	136	167	137	0.25	0.3	0.6	0.383
string	O O	100	163	346	136	125	137	163	130	0.35	0.45	0.6	0.467
stud	Q	327	283	304	452	232	365	251	343	0.15	0.35	0.35	0.283
student	H P	680	586	603	615	619	671	626	649	0.5	0.65	0.85	0.667
stump	P	200	130	174	167	130	127	156	193	0.25	0.45	0.5	0.400
submarine	V	132	327	548	132	141	178	218	143	0.35	0.5	0.6	0.483
sugar	O E	165	181	224	174	117	137	157	170	0.35	0.45	0.55	0.450
summer	W	130	188	292	175	118	128	157	154	0.4	0.5	0.65	0.517
sun	F C	344	312	407	208	104	150	175	271	0.35	0.55	0.65	0.517
sunset	F L	188	196	432	200	158	146	186	207	0.3	0.65	0.75	0.567
supervisor	H A	683	578	588	563	663	620	660	653	0.35	0.55	0.7	0.533
supper	O E	121	200	239	168	127	156	172	143	0.2	0.5	0.8	0.500
surgeon	H P	679	617	548	638	681	677	678	668	0.35	0.6	0.6	0.517
swamp	F L	336	158	168	207	119	133	151	274	0.25	0.55	0.55	0.450
sweat	B	181	215	396	196	113	183	163	182	0.3	0.4	0.45	0.383
sweetheart	H D	636	413	519	578	612	500	564	641	0.45	0.6	0.6	0.550
swimmer	H A	674	523	613	638	588	667	584	649	0.25	0.6	0.75	0.533
sword	O W	164	188	429	168	138	122	171	182	0.45	0.5	0.65	0.533
symphony	C	346	446	433	282	308	243	359	333	0.3	0.45	0.7	0.483
synagogue	F B	171	330	176	127	188	212	264	158	0.65	0.65	0.75	0.683
syrup	O E	148	146	319	118	128	136	165	152	0.25	0.45	0.5	0.400
table	O F	119	188	185	115	117	159	171	121	0.5	0.85	0.8	0.717
tail	B	363	196	554	150	126	188	177	278	0.45	0.75	0.55	0.583
tangerine	P E	454	157	177	404	100	133	104	394	0.4	0.6	0.7	0.567
tank	Q	136	238	396	164	119	173	176	149	0.35	0.5	0.6	0.483
tea	P E	204	150	275	200	119	136	147	203	0.35	0.55	0.6	0.500
teacher	H P	677	638	609	652	675	652	672	674	0.4	0.75	0.8	0.650
team	C	550	596	550	535	468	579	516	520	0.2	0.5	0.55	0.417
technician	H P	688	592	554	572	663	669	669	651	0.4	0.75	0.85	0.667
teenager	H D	688	464	636	569	596	688	590	640	0.55	0.8	0.85	0.733
telescope	O T	108	238	229	159	130	150	183	132	0.25	0.5	0.4	0.383
teller	H P	676	521	576	578	588	592	585	640	0.55	0.7	0.75	0.667

temple	F B	129	288	116	150	144	168	211	135	0.25	0.45	0.6	0.433
tenor	H D	426	273	380	458	536	427	484	481	0.2	0.3	0.4	0.300
tent	F B	104	191	261	132	104	137	155	120	0.35	0.6	0.8	0.583
termite	I	608	313	583	661	276	163	230	609	0.35	0.35	0.65	0.450
territory	F A	113	274	174	148	126	200	198	119	0.4	0.75	0.65	0.600
thermometer	O T	100	237	319	104	136	160	197	115	0.35	0.6	0.75	0.567
thief	H A	692	513	627	596	600	600	589	659	0.4	0.7	0.75	0.617
thigh	B	512	192	420	155	137	383	213	334	0.4	0.7	0.65	0.583
thing	Q	207	188	373	220	125	211	165	205	0.35	0.55	0.75	0.550
thorn	P	320	175	243	196	108	148	149	258	0.25	0.45	0.6	0.433
thread	O M	127	155	243	171	104	146	142	145	0.25	0.45	0.65	0.450
throat	B	500	261	373	133	122	296	211	322	0.4	0.6	0.7	0.567
throne	O F	115	207	142	188	132	192	179	139	0.35	0.55	0.55	0.483
thumb	B	480	312	517	187	130	343	224	326	0.35	0.55	0.65	0.517
thunder	W	165	217	435	222	117	136	154	190	0.45	0.7	0.7	0.617
ticket	O M	128	263	211	173	146	137	198	151	0.25	0.45	0.65	0.450
tide	W	175	233	577	218	111	136	153	197	0.2	0.4	0.5	0.367
tiger	A M	657	356	619	600	419	250	370	645	0.35	0.6	0.85	0.600
timber	P	256	185	292	193	124	136	161	230	0.2	0.6	0.75	0.517
toad	A O	659	258	596	668	300	196	239	646	0.25	0.5	0.55	0.433
toast	O E	165	152	220	163	107	107	141	169	0.35	0.45	0.55	0.450
toaster	O M	138	200	246	141	124	142	172	146	0.1	0.45	0.55	0.367
tobacco	P E	308	214	208	277	138	126	165	285	0.5	0.6	0.65	0.583
toe	B	561	261	492	163	119	376	213	358	0.25	0.7	0.65	0.533
toilet	O F	104	204	162	100	100	172	167	100	0.15	0.45	0.45	0.350
tomato	P E	556	221	226	400	129	142	144	454	0.5	0.65	0.65	0.600
tongue	B	413	204	542	216	130	324	190	308	0.2	0.35	0.75	0.433
tool	O T	123	304	362	138	119	133	191	133	0.5	0.5	0.65	0.550
tooth	B	383	196	244	138	138	273	203	266	0.35	0.45	0.6	0.467
tornado	W	181	232	675	152	179	131	214	203	0.35	0.6	0.7	0.550
tortoise	A R	693	336	408	622	376	277	336	649	0.55	0.55	0.65	0.583
tourist	H A	670	525	635	642	588	658	582	650	0.15	0.25	0.55	0.317
towel	O M	108	117	304	127	119	150	151	129	0.15	0.55	0.6	0.433
tower	F B	119	163	116	146	104	128	147	130	0.35	0.55	0.7	0.533
town	F A	283	342	145	304	200	274	256	267	0.3	0.35	0.65	0.433
toy	O M	120	208	471	152	112	152	162	142	0.6	0.6	0.55	0.583
tractor	V	163	288	500	150	114	152	183	161	0.45	0.75	0.8	0.667
trail	F L	146	231	145	133	126	140	184	143	0.35	0.6	0.55	0.500
trailer	Q	140	182	396	150	100	146	147	149	0.35	0.6	0.65	0.533
train	V	100	317	624	144	131	132	198	135	0.3	0.6	0.6	0.500
traitor	H A	633	491	532	592	529	612	533	602	0.15	0.5	0.5	0.383
trash	O M	131	148	280	184	104	152	139	152	0.25	0.4	0.5	0.383
tray	O M	110	184	245	174	129	136	165	143	0.35	0.55	0.6	0.500
tree	P	577	181	224	500	111	148	105	493	0.5	0.7	0.85	0.683
triangle	O O	105	146	219	124	117	112	153	126	0.35	0.6	0.65	0.533
tribe	C	600	533	519	564	558	504	555	594	0.35	0.6	0.7	0.550
trombone	O I	108	221	357	138	127	156	180	130	0.3	0.55	0.55	0.467
trophy	O M	115	200	178	131	100	142	157	121	0.3	0.2	0.6	0.367
trout	A F	679	242	578	639	317	269	263	643	0.6	0.55	0.75	0.633
truck	V	104	308	612	120	115	162	193	122	0.55	0.65	0.75	0.650
trumpet	O I	143	222	292	163	135	146	182	158	0.25	0.4	0.35	0.333
trunk	O M	148	165	204	104	104	150	157	134	0.15	0.4	0.55	0.367
tube	O O	111	156	180	177	112	139	146	139	0.35	0.4	0.65	0.467
tulip	P	665	173	232	548	138	163	119	563	0.35	0.55	0.55	0.483
tumor	Q	480	279	292	454	144	221	168	422	0.3	0.45	0.4	0.383
tuna	A F	646	222	600	600	309	216	251	620	0.4	0.75	0.85	0.667
tunnel	F L	117	204	143	154	118	126	165	134	0.3	0.45	0.45	0.400
turkey	A B	671	300	614	628	373	224	314	655	0.45	0.65	0.65	0.583
turnip	P E	461	135	213	465	113	154	100	420	0.3	0.5	0.7	0.500
turtle	A R	667	269	430	650	328	279	279	635	0.4	0.6	0.75	0.583
twig	P	285	162	254	208	104	143	139	243	0.3	0.85	0.8	0.650
twin	L	642	371	542	581	610	600	565	635	0.3	0.5	0.7	0.500
twister	W	133	300	681	158	146	148	206	163	0.4	0.45	0.6	0.483
typewriter	O M	133	200	319	189	141	142	176	165	0.3	0.5	0.6	0.467
typhoon	W	188	244	612	244	135	177	174	214	0.35	0.5	0.6	0.483
ulcer	B	354	154	229	204	123	244	167	272	0.3	0.4	0.45	0.383
umbrella	O T	104	197	248	164	119	148	164	132	0.5	0.6	0.65	0.583
umpire	H P	654	462	468	595	600	600	578	635	0.3	0.55	0.55	0.467
uncle	H R	685	473	566	629	646	683	620	668	0.5	0.75	0.9	0.717
unicorn	S	383	159	500	319	250	187	233	376	0.4	0.6	0.8	0.600
uniform	O C	117	254	254	152	125	163	186	132	0.4	0.3	0.65	0.450
university	F B	185	535	119	224	181	231	294	176	0.5	0.65	0.7	0.617
utensil	O T	100	290	292	135	129	130	195	122	0.1	0.55	0.75	0.467
vacuum	O O	108	248	386	139	116	135	175	129	0.25	0.55	0.6	0.467
vagrant	H D	546	352	529	509	485	593	477	527	0.35	0.55	0.55	0.483
valley	F L	212	148	177	161	105	139	144	188	0.35	0.4	0.45	0.400

van	V	100	200	638	145	120	111	159	143	0.3	0.5	0.65	0.483
vase	O M	100	145	176	176	131	130	157	140	0.2	0.55	0.75	0.500
vegetable	P E	504	120	220	435	116	173	108	435	0.45	0.6	0.75	0.600
vehicle	V	119	330	650	148	133	181	209	142	0.35	0.55	0.8	0.567
vein	B	484	323	238	144	123	304	227	307	0.45	0.75	0.65	0.617
venom	B	204	196	288	136	125	144	174	182	0.45	0.6	0.7	0.583
vessel	V	163	257	383	173	135	186	193	168	0.35	0.4	0.5	0.417
vest	O C	123	183	233	167	100	167	149	136	0.35	0.7	0.6	0.550
veteran	H D	696	533	570	588	616	674	617	650	0.35	0.65	0.6	0.533
victim	H D	623	441	538	587	578	600	557	613	0.5	0.6	0.7	0.600
village	F A	354	436	176	426	312	296	344	367	0.1	0.2	0.6	0.300
villain	H D	658	542	588	616	544	617	553	625	0.55	0.6	0.85	0.667
vine	P	542	208	276	365	124	165	145	434	0.1	0.4	0.45	0.317
vinegar	O E	138	200	227	158	100	132	150	145	0.2	0.3	0.5	0.333
violin	O I	132	200	322	146	114	132	162	145	0.35	0.5	0.6	0.483
virgin	H D	638	466	563	526	577	592	571	603	0.6	0.75	0.85	0.733
visitor	H A	658	524	587	535	556	574	565	610	0.2	0.5	0.55	0.417
vodka	O E	132	156	312	152	111	154	151	145	0.6	0.65	0.7	0.650
voice	B	296	304	405	184	163	352	246	229	0.2	0.4	0.45	0.350
volcano	F L	283	208	283	195	130	143	171	244	0.2	0.35	0.6	0.383
volunteer	H D	616	583	646	573	564	630	585	593	0.25	0.5	0.45	0.400
wagon	V	108	152	517	138	119	152	156	138	0.25	0.65	0.7	0.533
waist	B	340	158	392	142	157	300	209	253	0.2	0.3	0.4	0.300
waiter	H P	700	600	611	604	588	613	601	655	0.4	0.6	0.6	0.533
waitress	H P	700	548	678	604	564	659	576	648	0.35	0.65	0.75	0.583
wallet	O M	100	209	321	154	123	148	171	130	0.3	0.45	0.55	0.433
walnut	P E	364	150	264	346	111	132	118	334	0.35	0.55	0.75	0.550
walrus	A M	691	261	541	668	365	219	293	676	0.45	0.55	0.75	0.583
warehouse	F B	104	252	128	122	107	127	174	110	0.25	0.45	0.7	0.467
warrior	H P	687	589	643	662	583	637	588	663	0.35	0.65	0.7	0.567
wart	B	407	176	163	292	104	179	136	328	0.4	0.65	0.7	0.583
wasp	I	658	246	669	588	319	221	267	626	0.25	0.5	0.65	0.467
wave	W	171	192	654	243	158	138	173	220	0.4	0.7	0.6	0.567
wax	O N	124	139	208	176	124	152	153	150	0.25	0.6	0.6	0.483
weapon	O W	108	281	315	252	113	156	164	156	0.45	0.5	0.7	0.550
weather	W	241	213	504	183	170	158	203	234	0.35	0.6	0.65	0.533
web	O N	196	231	307	192	160	180	203	199	0.25	0.45	0.85	0.517
weed	P E	500	192	428	508	150	154	133	470	0.45	0.6	0.5	0.517
whale	A M	673	289	573	635	442	264	368	671	0.7	0.8	0.75	0.750
wheat	P E	456	208	337	429	127	132	130	414	0.25	0.5	0.6	0.450
wheel	O T	104	250	596	148	122	174	181	134	0.2	0.5	0.65	0.450
whip	O W	100	185	369	142	119	184	168	124	0.25	0.5	0.6	0.450
whiskey	O E	112	188	248	158	120	117	160	139	0.5	0.55	0.6	0.550
whistle	O M	114	176	311	155	112	148	155	136	0.3	0.35	0.6	0.417
wife	H R	693	565	554	617	617	664	620	657	0.45	0.7	0.8	0.650
wilderness	F A	440	232	254	304	157	142	182	369	0.45	0.75	0.7	0.633
wind	W	119	172	643	179	138	129	163	168	0.4	0.7	0.7	0.600
winter	W	156	233	246	181	100	124	154	161	0.2	0.6	0.6	0.467
witch	H P	480	420	558	426	514	571	525	473	0.55	0.65	0.75	0.650
witness	H A	604	558	508	543	588	617	602	582	0.3	0.55	0.7	0.517
wolf	A M	677	435	633	600	407	227	377	651	0.4	0.6	0.6	0.533
woman	H D	684	523	612	652	681	632	647	690	0.6	0.85	0.9	0.783
wood	P	288	138	171	215	100	117	127	248	0.4	0.7	0.65	0.583
wool	Q	177	135	220	186	135	132	157	188	0.35	0.45	0.7	0.500
worker	H P	681	563	588	620	624	646	621	657	0.35	0.5	0.75	0.533
world	F C	408	452	432	239	269	238	339	344	0.3	0.55	0.8	0.550
worm	I	681	226	485	556	244	215	213	603	0.3	0.55	0.75	0.533
wrist	B	428	186	542	196	125	341	187	308	0.4	0.55	0.65	0.533
writer	H A	680	613	514	604	642	636	648	652	0.25	0.45	0.55	0.417
yacht	V	124	227	538	172	116	144	164	154	0.45	0.7	0.65	0.600
yard	F L	272	145	129	161	104	154	146	217	0.45	0.55	0.65	0.550
zebra	A M	679	356	640	648	396	236	343	668	0.35	0.6	0.7	0.550
zipper	O M	113	196	388	120	100	162	158	121	0.4	0.5	0.65	0.517
zoo	Q	295	377	258	258	173	196	241	264	0.45	0.8	0.7	0.650
zucchini	P E	478	185	254	408	117	196	131	406	0.55	0.65	0.85	0.683

Note. AvRecall is the average recall across trials. Category abbreviations are as follows: Animate words—H A (Human-Actor), H D (Human-Descriptors), H P (Human-Profession), H R (Human-Relative), A B (Animal-Bird), A F (Animal-Fish), A M (Animal-Mammal), A O (Animal-Other), A R (Animal-Reptile), I (Insect), L (Misc. Living). Ambiguous words— B (Body Part), C (Collective Noun), S (Supernatural), P E (Plants-Edible), P I (Plants-Inedible), Q (Misc. Ambiguous), V (Vehicle), W (Weather Phenomenon). Inanimate words—F A (Fixed PlaceArea), F B (Fixed Place-Building), F C (Fixed Place-Celestial Body), F L (Fixed Place-Landscape), O C (Object-Clothing), O E (Object-Food), O F (Object-Furniture), O I (Object-Instrument), O M (Object-Manmade), O N (Object-Natural), O O (Object-Other), O T (Object-Tool), O W (Object-Weapon).

Miscellaneous Norms for 1200 Words

Word	Category	CNC	FAM	IMG	AVAIL	MNG	VAL	ARO	DOM	AoA	LEN	OrthoN	PhonoN	NSyll	$SUBTL_{WF}$	$SUBTL_{CD}$
abdomen	B	586	426	548	0.00	12	5.43	3.68	5.15	8.61	7	0	0	3	3.35	1.45
acrobat	H P	566	431	583	0.30	19	6.00	4.90	5.42	8.05	7	0	0	3	0.59	0.25
actor	H P	545	550	469	1.40	14	6.15	4.35	5.64	7.17	5	1	5	2	26.33	6.84
actress	H P	512	543	562	0.48	11	5.42	5.43	4.65	6.17	7	0	0	2	16.02	4.52
addict	H D	436	509	430	0.90	9	2.86	5.33	2.74	11.17	6	0	3	2	5.35	2.3
adolescent	H D	532	620	400	0.95	8	5.38	4.20	4.00	11.05	10	0	1	4	1.84	1.03
adult	H D	492	590	526	1.23	12	5.90	4.36	6.46	4.68	5	0	1	2	14.29	6.83
adversary	H D	412	588	232	0.48	12	4.55	4.41	5.00	12.67	9	0	0	4	1.51	0.8
agency	C	426	420	366	0.48	19	5.14	3.17	4.89	10.58	6	0	1	3	19.43	7.01
agent	L	520	452	405	0.78	24	5.23	3.43	5.65	9.55	5	1	1	2	102.65	16.68
air	O O	518	608	450	1.79	17	6.71	3.25	5.72	3.94	3	7	20	1	139.02	39.64
aircraft	V	564	648	576	0.00	12	6.30	4.86	5.71	7.61	8	0	0	2	9.45	2.49
airplane	V	683	668	616	1.36	21	5.25	5.62	4.12	3.94	8	0	0	2	10.92	4.22
airport	F B	631	503	650	1.08	6	6.00	5.50	5.79	6.84	7	0	0	2	38.04	11.71
ale	O E	578	454	526	0.30	7	5.95	4.10	5.17	10.16	3	18	30	1	3.96	1.47
alligator	A R	624	442	627	0.60	13	4.23	5.36	4.10	4.78	9	0	0	4	3.49	1.49
almond	P E	608	640	680	0.60	11	6.05	2.89	6.46	7.67	6	1	2	2	1.1	0.49
amateur	H D	388	502	397	0.70	15	4.58	3.55	5.25	10.53	7	0	1	3	6.55	3.25
ambulance	V	595	499	627	0.60	18	3.71	5.33	3.29	6.16	9	0	1	3	22.41	8.67
ancestor	H R	452	640	272	0.30	18	6.37	3.73	4.81	8.61	8	0	0	3	1.69	0.67
anchor	O M	595	458	561	0.00	10	5.16	3.32	5.29	5.72	6	0	2	2	7.41	2.24
angel	S	399	470	554	1.11	14	7.71	4.24	5.90	4.00	5	2	0	2	78.27	13.26
animal	A O	587	620	575	2.19	28	7.06	4.30	5.72	2.89	6	0	1	3	45.49	16.36
ankle	B	608	543	613	0.85	16	5.40	3.11	5.58	4.89	5	1	3	2	8.02	3.41
ant	I	604	511	613	1.04	14	3.90	3.27	5.30	4.32	3	11	11	1	5.35	1.32
antelope	A M	596	560	572	0.48	10	5.68	4.46	5.57	8.39	8	0	0	3	0.98	0.39
apartment	F B	575	491	556	1.28	18	5.72	3.80	5.33	7.80	9	0	0	3	83.04	21.15
ape	A M	654	547	616	1.08	10	5.21	4.25	5.38	5.89	3	14	21	1	9.67	2.06
appendage	B	503	544	312	0.00	11	4.23	4.35	5.32	11.58	9	0	1	3	0.41	0.2
apple	P E	620	598	637	1.67	17	6.62	3.52	6.44	4.15	5	2	4	2	23.67	8.21
appliance	O M	558	493	554	0.60	18	5.15	2.84	5.00	8.78	9	0	0	2	0.8	0.41
architect	H P	528	640	336	0.85	16	6.21	3.25	6.05	10.12	9	0	0	3	6.55	2.01
arm	B	592	608	593	1.63	6	5.44	3.44	6.02	3.26	3	7	5	1	65.41	23.19
armor	O C	509	343	590	0.70	13	6.10	3.29	6.30	7.17	5	2	10	2	7.29	2.35
army	C	543	555	578	1.77	12	4.65	4.49	4.65	7.15	4	2	8	2	85.69	17.95
arrow	O W	595	490	619	1.08	9	5.24	3.91	5.53	6.07	5	0	8	2	7.84	2.35
artery	B	628	580	412	0.00	8	4.29	4.09	4.78	13.06	6	0	0	3	5.31	2.16
artist	H P	554	547	600	1.32	12	6.76	4.10	6.95	6.78	6	0	0	2	28.63	9.24
ass	Q	603	644	600	1.00	13	5.45	5.43	3.61	7.84	3	7	17	1	226.37	40.28
astronaut	H P	540	668	612	0.48	11	6.73	4.40	5.32	6.28	9	0	0	3	3.96	1.18
athlete	H P	545	482	591	1.20	18	6.21	4.75	5.96	7.11	7	0	0	2	4.61	2.25
atmosphere	W	385	540	444	0.85	14	6.05	4.00	4.86	9.79	10	0	0	3	9.67	4.32
attorney	H P	500	676	372	0.70	12	3.67	4.80	5.53	10.95	8	1	2	3	40.39	11.09
audience	C	515	511	555	0.60	19	5.89	4.91	5.14	7.00	8	0	0	2	25.37	9.04
aunt	H R	564	554	567	0.90	3	6.56	2.71	4.28	3.80	4	6	11	1	55.2	11.37
author	H P	502	554	460	0.85	8	6.33	2.73	6.38	7.10	6	0	4	2	7.94	2.99
automobile	V	607	456	628	0.30	8	5.45	3.91	6.00	7.11	10	0	0	4	5.71	2.3
autumn	W	421	533	622	0.60	9	7.12	3.21	5.17	6.00	6	0	4	2	3.78	1.66
avenue	F B	539	529	564	0.60	4	5.74	3.30	5.18	7.00	6	1	1	3	16.88	6.72
baby	H D	589	597	608	1.95	19	6.67	4.97	4.94	3.84	4	2	13	2	509.37	60.66
backbone	B	516	640	496	0.00	14	5.16	4.05	6.40	6.95	8	0	0	2	1.65	0.93
bacon	O E	646	553	650	1.11	10	7.52	4.16	6.11	5.00	5	3	5	2	11.86	4.76
bacteria	L	560	460	505	0.78	19	3.30	4.24	3.44	9.28	8	0	0	3	3.04	1.19
badge	O C	561	473	519	0.78	14	5.24	4.40	5.75	6.11	5	4	16	1	15.25	5.52
ball	O M	615	575	622	1.92	17	6.14	3.48	5.47	2.90	4	20	47	1	104.96	24.68
ballerina	H P	544	632	624	0.78	14	6.79	3.73	5.59	5.26	9	0	0	4	2.31	0.81
balloon	O M	623	520	583	0.85	21	6.84	3.90	5.45	4.37	7	0	4	2	8.67	3.11
banana	P E	633	576	644	1.11	13	6.71	3.21	6.05	3.78	6	0	0	3	10.73	3.87
band	Q	590	555	579	1.57	14	6.44	4.52	5.56	6.16	4	16	20	1	53.41	13.38
bandage	O M	639	546	554	0.78	14	3.63	3.64	4.40	5.94	7	1	2	2	2.86	1.49
bandit	H P	547	388	562	0.60	17	3.88	5.18	4.77	8.15	6	1	2	2	3.75	1.13
bank	F B	573	573	560	1.57	6	6.00	4.19	4.78	6.44	4	18	16	1	84.98	18.96
banker	H P	547	524	565	0.00	9	4.89	3.38	5.32	6.89	6	12	10	2	4.76	1.91
bar	F B	565	592	596	1.66	13	5.00	4.53	5.48	6.90	3	19	45	1	85.98	26.47
barn	F B	614	466	589	1.04	13	6.16	3.57	5.65	4.50	4	16	17	1	13.59	4.71
barrel	O M	590	487	602	0.78	25	4.92	3.43	4.94	7.72	6	4	11	2	10.63	4.45
bartender	H P	504	628	556	0.30	11	5.63	4.95	6.15	8.90	9	0	0	3	9.76	3.8
basement	F B	585	522	571	1.00	19	4.81	3.33	5.26	6.74	8	2	2	2	21.06	8.09

basket	O M	606	485	560	1.18	19	5.66	2.48	5.30	5.67	6	4	4	2	13.18	5.1
bass	Q	547	540	544	1.00	14	5.23	4.87	5.89	8.63	4	18	28	1	7.55	2.67
bat	Q	564	514	586	1.08	17	4.81	4.57	4.29	4.85	3	26	46	1	20.63	6.69
bay	F L	580	474	570	0.85	15	7.23	3.26	4.86	8.67	3	25	54	1	24.24	7.3
beach	F L	612	553	667	1.78	16	7.21	5.10	5.70	4.80	5	7	26	1	56.63	15.39
bean	P E	604	549	538	1.08	19	6.00	2.95	5.60	3.42	4	16	49	1	6.84	2.62
beard	B	580	538	630	0.85	13	5.09	3.18	5.42	4.84	5	4	25	1	12.61	4.76
beast	L	564	456	558	0.78	15	4.42	5.83	4.08	5.74	5	6	18	1	24.55	6.58
beaver	A M	589	470	612	0.78	16	5.00	4.05	5.15	5.21	6	5	8	2	4.82	1.51
bed	O F	635	636	635	1.76	11	7.16	3.00	6.73	2.89	3	20	42	1	187.12	49.03
bedroom	F B	615	646	629	0.78	14	7.00	4.90	6.84	3.90	7	0	1	2	36.71	15.06
bee	I	597	554	623	1.26	7	3.68	5.65	5.32	5.00	3	21	55	1	10.35	2.96
beer	O E	587	604	598	1.83	22	5.67	4.30	5.33	6.11	4	15	50	1	75.49	21.52
beetle	I	619	503	640	0.00	4	4.20	4.45	5.93	5.32	6	0	8	2	2.06	0.68
beggar	H P	533	435	593	0.00	14	2.92	4.29	4.16	7.63	6	0	9	2	2.47	1.04
beginner	H D	428	680	204	0.60	18	5.15	3.50	4.79	6.70	8	0	1	3	1.94	0.98
bell	O I	620	543	610	1.20	11	5.67	4.70	6.16	3.89	4	15	45	1	39.33	12.34
belly	B	630	486	576	0.78	12	4.37	3.75	4.96	4.05	5	12	32	2	15.57	6.94
belt	O C	602	550	494	1.15	11	4.44	3.45	5.75	4.62	4	13	19	1	24.35	9.99
bench	O F	614	488	555	0.90	14	5.50	3.46	5.81	4.21	5	6	10	1	9.67	4.08
beverage	O E	526	566	565	0.30	5	7.17	3.38	6.58	6.63	8	1	0	3	2.33	1.18
bicycle	V	633	652	608	1.26	15	6.71	3.95	6.20	4.26	7	0	0	3	6.61	2.85
biologist	H P	595	608	364	0.30	21	5.85	3.27	5.85	10.90	9	0	0	4	1.25	0.6
bird	A B	602	592	614	1.90	23	6.75	3.83	5.88	3.52	4	5	48	1	45.45	14.26
biscuit	O E	574	521	571	0.60	22	6.45	2.91	6.26	4.63	7	0	1	2	3.75	1.36
bishop	H P	587	467	524	0.48	16	4.53	3.77	4.82	10.50	6	0	0	2	16.76	2.36
blackberry	P E	612	640	552	0.48	16	6.63	3.24	5.45	8.95	10	0	0	3	0.75	0.32
blade	O W	584	517	568	1.11	9	3.90	4.52	4.56	6.72	5	6	16	1	13	4.67
blanket	O M	622	563	582	1.28	9	7.05	2.23	6.75	3.61	7	1	0	2	12.98	5.72
blaze	Q	497	456	481	0.30	6	4.47	5.33	4.20	7.47	5	7	19	1	2.1	0.92
blood	B	613	571	620	1.86	20	3.48	5.76	3.94	4.89	5	4	8	1	186.12	42.04
bloom	P	520	426	524	0.48	7	6.40	4.87	6.05	6.84	5	3	10	1	5.51	2
blossom	P	559	507	618	0.48	13	7.05	4.75	5.64	6.61	7	0	0	2	3.61	1.38
blouse	O C	640	562	595	0.78	11	5.73	3.24	6.59	6.65	6	0	3	1	5.33	2.23
blueberry	P E	632	656	608	0.85	10	7.11	3.23	5.70	6.22	9	1	0	3	2.57	1.05
bluejay	A B	580	600	604	0.48	6	6.64	3.43	5.00	5.84	7	0	0	2	0.35	0.02
boat	V	637	584	631	1.86	16	6.36	4.05	5.59	3.84	4	11	39	1	95.78	17.37
body	B	568	610	614	1.92	31	5.95	4.62	5.76	4.28	4	7	25	2	195.53	47.22
bomb	O W	595	566	606	1.40	17	2.47	5.71	3.14	8.00	4	4	29	1	53.65	11.13
bone	B	588	541	567	1.54	19	5.24	4.75	6.00	5.53	4	20	50	1	26.06	10.19
book	O M	609	643	591	2.17	15	7.05	3.13	6.41	3.68	4	15	25	1	176.98	38.67
boot	O C	595	566	604	0.78	13	5.30	3.95	6.24	3.89	4	18	43	1	11.14	4.46
border	F A	444	489	453	0.85	16	4.68	4.30	4.74	6.85	6	4	8	2	17.18	5.51
boss	H P	552	574	554	1.46	19	4.76	4.43	4.65	6.16	4	22	21	1	124.29	27.81
bottle	O M	591	591	619	1.43	20	5.47	3.32	5.88	3.56	6	4	16	2	50.75	18.61
boundary	F A	411	481	435	0.70	13	4.75	4.17	3.95	8.35	8	0	1	3	1.35	0.7
bouquet	P	566	473	599	0.00	3	6.67	3.33	5.76	8.72	7	0	1	2	3.22	1.39
bowl	O M	575	557	579	1.38	22	5.67	3.21	5.58	4.26	4	10	49	1	21.45	8.13
box	O M	597	599	591	1.74	15	5.33	2.67	4.67	4.30	3	16	40	1	89.75	28.05
boxer	H P	556	664	640	0.85	14	5.21	4.14	5.64	7.95	5	6	2	2	3.84	1.35
boy	H D	609	606	618	1.73	10	5.84	4.11	5.50	3.67	3	20	27	1	529.82	73.12
boyfriend	H D	588	672	392	1.23	12	7.06	4.90	5.17	6.89	9	0	1	2	72.24	21.8
bra	O C	629	575	624	1.00	15	5.90	3.92	5.63	8.21	3	8	8	1	10.92	3.85
bracelet	O C	602	547	606	0.78	13	6.48	3.96	5.00	5.68	8	0	0	2	7.8	2.3
brain	B	556	580	572	1.59	17	6.22	3.35	6.28	5.76	5	7	28	1	77.02	23.77
branch	P	583	529	548	1.00	11	5.15	2.67	4.91	5.11	6	2	4	1	10.08	4.46
brat	H D	501	507	536	1.18	13	2.67	4.67	4.61	6.21	4	11	17	1	6.22	2.72
bread	O E	622	611	619	1.70	15	6.52	3.85	6.05	3.58	5	6	19	1	28.33	10.75
breakfast	O E	576	657	586	1.34	10	7.39	5.00	6.83	3.47	9	0	0	2	66.29	23.44
breast	B	580	555	597	0.85	20	6.64	5.39	5.00	6.60	6	0	6	1	8.96	3.77
breath	B	479	572	480	1.38	13	6.61	2.35	5.78	5.81	6	2	5	1	44.92	19.11
breeze	W	500	511	560	0.90	10	7.61	3.20	4.55	6.22	6	2	26	1	8.04	3.86
brick	O M	610	529	574	1.15	14	4.65	2.53	5.00	6.43	5	8	23	1	10.18	3.04
bride	H A	574	501	668	0.78	4	6.80	4.50	6.08	5.10	5	4	22	1	24.22	7.61
bridge	F B	623	561	608	1.18	10	5.44	3.48	4.78	5.58	6	2	9	1	45.71	12.47
broccoli	P E	596	672	580	0.78	13	6.00	2.48	5.12	5.20	8	0	0	3	2.27	0.81
brook	F L	611	384	597	0.48	6	7.00	3.33	6.08	8.42	5	3	8	1	2.04	0.83
broom	O T	613	547	608	0.70	11	5.50	3.33	5.76	5.50	5	4	15	1	4.76	2.13
brother	H R	585	598	589	1.34	10	6.18	4.48	5.46	3.63	7	1	1	2	283.94	45.24
brunette	H D	544	628	670	0.30	9	6.35	4.15	5.36	8.61	8	0	0	2	3.49	1.61

brush	O T	589	579	570	1.28	6	5.47	3.18	6.18	3.78	5	3	4	1	14.16	6.96
bubble	O N	563	508	604	1.08	8	6.43	4.19	6.12	3.79	6	5	9	2	8	3.48
bucket	O M	594	506	586	0.90	11	4.55	2.96	5.52	5.61	6	2	2	2	10.02	4.66
buddy	H D	545	640	510	0.85	3	7.41	4.57	6.24	5.37	5	3	18	2	102.88	27.67
bug	I	640	680	670	1.72	16	3.45	6.06	4.08	3.79	3	20	32	1	20.94	6.95
builder	H P	532	554	551	1.00	18	5.95	3.32	6.93	5.95	7	1	6	2	0.94	0.51
building	F B	591	674	670	1.83	20	5.47	3.35	6.00	6.16	8	0	6	2	99.57	28.74
bulb	Q	612	510	611	0.95	7	5.86	3.26	4.82	6.56	4	2	2	1	3.92	1.76
bull	A M	640	652	620	1.28	9	3.95	4.90	6.89	4.53	4	17	26	1	27.51	7.93
bullet	O W	595	517	611	0.90	13	3.45	5.89	3.93	6.70	6	6	4	2	38.24	11.99
bully	H D	460	656	600	1.00	20	2.67	5.86	3.18	6.05	5	12	20	2	7.22	3.15
bum	H D	608	616	500	1.28	21	3.64	4.39	4.74	8.11	3	12	29	1	15.43	5.71
bunny	A M	623	471	585	0.95	7	7.30	3.86	5.78	4.50	5	8	21	2	18.55	4.05
bureau	Q	547	395	497	0.60	21	4.70	3.74	5.19	11.95	6	0	0	2	11.14	4.21
burglar	H A	558	486	591	0.90	19	2.67	5.32	3.88	7.00	7	0	0	2	5.53	1.61
bush	P	585	532	549	1.26	15	4.75	2.67	5.00	4.90	4	13	10	1	14.12	4.8
butler	H P	616	425	543	0.30	11	5.62	2.55	6.04	7.50	6	3	1	2	9.96	2.18
butter	O E	618	615	603	1.48	15	6.36	3.37	5.67	5.78	6	11	20	2	20.43	8.01
butterfly	I	593	481	624	0.78	20	7.23	3.20	5.51	3.67	9	0	0	3	5.51	2.22
button	O M	613	573	580	1.28	16	5.48	4.10	6.53	4.78	6	5	9	2	28.25	10.73
buyer	H A	484	487	463	0.48	8	5.90	3.95	5.76	6.94	5	3	19	1	5.18	2.24
cabbage	P E	611	504	573	0.90	15	4.60	2.91	5.93	5.78	7	0	1	2	2.9	1.3
cabin	F B	596	523	582	1.04	9	5.90	3.74	6.30	6.39	5	2	2	2	19.65	5.47
cabinet	O F	593	472	524	0.90	16	5.10	3.75	5.78	6.06	7	0	0	3	8.33	3.72
cake	O E	624	594	624	1.70	19	7.58	5.33	5.88	3.26	4	19	30	1	45.06	14.27
calf	A M	592	511	565	0.78	7	5.44	3.70	5.16	6.63	4	5	24	1	2.96	1.29
camel	A M	597	421	561	0.48	11	5.29	3.10	5.21	5.11	5	1	8	2	5.02	1.65
camera	O T	627	550	576	1.30	8	6.61	3.05	6.39	6.00	6	0	0	2	57	16.54
camp	F B	571	541	588	1.08	19	7.00	4.14	5.89	5.78	4	10	10	1	51.22	13.04
canary	A B	577	411	533	0.00	4	6.37	3.50	5.41	7.32	6	1	0	3	2.92	1.14
cancer	Q	615	556	567	1.30	13	1.90	5.14	2.90	8.39	6	5	9	2	22.33	7.05
candidate	H P	489	488	452	0.85	17	4.50	5.32	5.48	10.39	9	0	0	3	8.51	3.3
candle	O T	565	544	594	1.15	8	6.14	3.81	6.08	5.37	6	2	15	2	8.02	3.47
candy	O E	602	559	601	1.65	14	7.27	5.03	6.46	4.00	5	7	16	2	35.78	10.75
cane	O T	590	442	608	0.85	14	4.64	3.00	4.38	5.74	4	21	60	1	8.33	1.93
cannon	O W	604	498	588	0.00	16	4.74	5.09	4.95	7.90	6	4	7	2	8.71	3.04
canoe	V	623	441	602	0.85	8	5.76	3.70	6.15	6.63	5	1	2	2	3.57	0.91
captain	H P	534	498	497	1.18	13	5.71	3.86	5.00	6.06	7	0	2	2	208.27	21.28
captive	H D	516	415	518	0.60	21	3.27	4.88	3.30	9.44	7	0	0	2	2.27	1.16
car	V	622	634	638	2.41	25	6.63	4.04	6.41	3.37	3	23	43	1	483.06	61.44
cardinal	A B	600	451	531	0.60	12	6.14	4.21	5.20	8.00	8	0	0	3	4.08	1.01
carpenter	H P	540	656	524	0.85	18	5.94	3.05	5.12	7.39	9	0	0	3	6	1.45
carriage	V	576	436	529	0.60	13	6.10	2.52	6.00	5.84	8	1	2	2	7.47	2.87
carrot	P E	622	539	577	1.04	16	5.79	3.91	6.37	2.74	6	1	12	2	3.82	1.47
cart	V	576	454	597	0.85	16	5.37	3.18	5.83	6.16	4	19	20	1	9.04	3.87
cashier	H P	516	514	493	0.60	9	5.10	3.45	5.43	6.74	7	2	2	2	3.27	1.38
cast	Q	502	495	483	0.85	20	5.26	3.55	5.05	7.24	4	19	28	1	23.14	9.5
castle	F B	650	455	670	1.23	16	6.42	4.72	6.35	5.80	6	1	12	2	21.55	4.55
cat	A M	615	582	617	1.83	3	6.95	4.50	5.48	3.68	3	25	43	1	66.33	16.52
catcher	H A	504	640	528	0.00	10	5.39	3.26	4.80	7.63	7	3	3	2	3.75	1.1
caterpillar	I	586	457	626	0.48	10	5.25	3.24	5.04	5.17	11	0	0	4	1.12	0.41
cathedral	F B	553	440	599	0.30	9	6.00	3.45	5.04	10.58	9	0	0	3	3.73	1.18
cattle	C	600	511	619	0.95	14	5.42	2.64	4.74	6.53	6	6	20	2	13.22	3.15
cauliflower	P E	642	462	567	0.00	10	5.35	2.29	5.87	6.18	11	0	0	3	0.55	0.27
cave	F L	592	526	601	1.11	11	5.15	4.39	4.45	6.74	4	19	25	1	13.98	4.35
cavern	F L	534	400	548	0.30	11	5.38	3.63	4.41	8.84	6	1	2	2	1.1	0.38
celery	P E	630	632	620	0.48	12	5.71	2.81	6.28	5.78	6	0	1	3	1.86	0.75
cell	Q	542	520	590	1.38	16	4.09	4.23	4.86	10.00	4	13	40	1	54.35	17.39
cellar	F B	572	467	572	0.60	10	4.70	3.14	4.75	8.94	6	1	13	2	9.37	2.8
cereal	O E	637	543	576	1.32	11	6.45	3.05	5.77	4.44	6	0	3	2	6.35	2.66
chair	O F	606	617	610	1.59	14	5.89	2.86	5.28	3.43	5	3	36	1	49.24	18.51
chalk	O T	634	560	601	0.85	7	5.00	2.90	5.48	4.47	5	0	18	1	3.59	1.7
champion	H D	459	507	508	0.78	14	7.33	4.74	5.88	8.61	8	0	1	2	20.92	6.09
character	H D	365	551	372	0.90	15	6.14	4.35	7.37	6.47	9	0	0	3	38.16	13.94
chauffeur	H P	516	600	530	0.30	5	5.42	4.70	5.33	9.84	9	0	0	2	5.63	1.76
cheek	B	565	533	561	0.48	16	5.90	3.47	5.38	5.06	5	4	33	1	7.16	3.34
cheerleader	H A	556	672	580	0.95	29	5.79	5.50	6.00	6.00	11	0	0	3	6.45	2.19
cheese	O E	614	580	640	1.59	17	6.81	3.80	7.11	4.33	6	1	36	1	39.04	13.47
chef	H P	641	656	620	0.95	6	6.15	3.05	6.67	8.30	4	5	8	1	11.88	3.84
chemist	H P	580	648	436	0.00	13	4.95	3.95	5.40	8.94	7	1	1	2	1.86	0.72

cherry	P E	611	514	582	1.04	16	7.05	4.91	5.63	5.58	6	3	24	2	13.59	4.49
chest	Q	580	543	556	1.23	22	5.18	4.95	6.58	5.05	5	4	18	1	40.98	14.03
chick	L	540	608	590	0.60	12	5.86	4.04	5.32	5.53	5	8	33	1	26.16	8.81
chicken	A B	614	544	619	1.76	29	6.17	3.20	5.22	3.26	7	1	4	2	61.73	18.72
chief	H P	503	482	545	1.15	10	5.83	3.25	4.89	7.53	5	2	14	1	77.9	16.38
child	H D	581	585	619	2.00	15	7.20	5.33	5.20	5.15	5	3	9	1	157.65	36.56
children	C	582	608	597	1.61	17	6.36	5.09	5.95	4.10	8	0	0	2	175.1	39.06
chimney	F B	670	519	670	0.48	14	4.89	2.45	5.19	6.58	7	0	0	2	4.18	1.66
chimpanzee	A M	604	624	608	0.60	7	6.39	3.90	5.28	7.26	10	0	0	3	1.22	0.46
chipmunk	A M	611	529	609	0.30	15	7.33	3.80	4.96	4.70	8	0	0	2	0.82	0.35
chocolate	O E	576	560	611	1.66	17	7.63	5.14	5.88	3.33	9	0	0	2	29.39	10.57
choir	C	567	526	567	0.60	10	6.15	3.29	4.68	6.53	5	1	2	1	5.31	1.98
chorus	C	558	408	509	0.60	10	6.00	4.20	5.26	7.50	6	2	11	2	6.08	2.5
church	F B	587	560	616	1.93	15	5.21	3.63	5.04	5.15	6	0	8	1	69.67	15.98
cigar	O M	580	536	619	0.78	7	4.40	4.27	6.16	7.67	5	0	1	2	12.94	4.61
cinnamon	P E	599	515	571	0.00	12	6.75	3.72	5.91	5.37	8	0	1	3	2.98	1.19
circus	F B	535	489	586	1.08	13	5.85	5.45	4.94	4.53	6	1	3	2	17.06	5.36
citizen	H D	455	535	445	0.70	14	6.43	2.63	5.95	7.74	7	0	0	3	13.33	6.14
city	F A	554	616	605	1.61	18	6.12	5.08	5.04	6.56	4	3	18	2	169.1	39.59
clam	A O	564	486	541	0.85	19	4.70	3.36	5.32	7.37	4	7	14	1	3.92	1.88
clarinet	O I	633	464	593	0.95	9	4.74	3.06	5.06	9.22	8	0	0	3	1.57	0.43
claw	B	587	445	600	0.85	15	4.65	3.65	3.80	4.70	4	9	6	1	4.37	1.63
clay	O N	606	455	575	1.08	24	5.45	3.84	5.64	5.32	4	9	13	1	12	2.56
clerk	H P	605	676	620	0.95	21	4.76	3.85	5.24	6.74	5	1	8	1	12.9	4.83
cloak	O C	543	423	518	0.48	11	5.95	4.10	5.13	6.95	5	2	15	1	3	1.1
clock	O M	591	608	614	1.30	7	5.65	3.35	5.24	4.42	5	8	17	1	58.63	19.54
closet	F B	599	540	525	1.23	14	5.10	3.55	6.63	5.00	6	3	0	2	27.08	10.56
cloud	W	554	553	595	1.43	8	6.20	2.81	4.79	3.63	5	2	15	1	11.75	4.63
clove	P E	565	395	446	0.00	14	5.53	3.32	5.54	10.88	5	5	9	1	0.51	0.23
clown	H P	627	511	589	1.23	11	5.36	4.94	4.38	3.72	5	3	11	1	15.82	5.32
club	Q	509	533	522	1.40	22	6.50	3.76	5.11	5.89	4	2	3	1	98.78	25.7
coach	H P	561	509	560	0.78	13	5.72	3.35	4.11	6.89	5	5	21	1	47.63	7.14
coal	O N	584	513	581	0.70	14	4.56	2.55	4.88	6.65	4	8	50	1	6.57	2
coast	F L	562	541	588	0.85	22	5.90	4.17	5.78	6.43	5	3	20	1	26.69	9.48
coat	O C	601	610	572	1.51	17	5.29	3.10	6.68	3.58	4	11	33	1	42.08	15.16
cobra	A R	623	628	620	0.30	7	4.42	5.71	3.74	7.47	5	1	0	2	3.33	0.73
cocktail	O E	576	511	604	0.30	13	6.95	5.60	5.86	9.53	8	0	0	2	10.88	5.11
coffee	Q	613	625	618	1.45	13	7.00	5.10	6.12	4.94	6	2	6	2	144.53	36.23
coffin	O M	595	531	606	0.78	8	2.63	4.30	3.72	7.79	6	1	6	2	9.04	3.04
coin	O M	581	564	603	1.15	12	6.55	3.13	6.24	4.17	4	13	27	1	9.75	3.42
collar	O C	622	509	582	0.85	14	4.95	3.33	4.63	6.56	6	2	24	2	10.51	4.67
colonel	H P	523	482	552	0.70	15	5.18	3.90	5.72	9.62	7	0	6	2	96.25	7.65
comedian	H P	536	648	440	0.78	9	7.60	5.78	6.48	8.89	8	0	2	3	4.1	1.6
commander	H P	512	409	478	0.48	18	4.73	4.60	6.68	8.19	9	1	1	3	37	5.77
committee	C	498	532	481	0.85	14	5.52	3.56	5.56	9.83	9	1	1	3	22.02	6.29
communist	H D	424	608	256	0.70	24	3.22	5.10	4.12	13.22	9	2	0	3	7.57	1.75
community	C	388	499	416	0.85	21	6.09	3.80	7.11	7.28	9	0	0	4	29.14	10.92
companion	H D	495	640	300	0.95	11	7.25	4.06	6.09	9.58	9	0	0	3	6.33	2.94
company	C	424	573	426	1.36	15	5.64	3.29	5.00	6.84	7	0	0	3	147.2	39.14
compass	O T	615	445	600	0.48	13	5.75	2.85	5.75	8.44	7	0	2	2	4.06	1.48
computer	Q	615	688	616	1.59	33	6.84	4.92	6.58	9.70	8	3	0	3	59.04	14.59
conductor	H P	555	648	468	0.30	13	5.50	4.24	5.47	7.44	9	0	1	3	3.04	1.28
congress	C	384	389	356	0.90	25	3.55	3.61	3.48	9.05	8	0	0	2	8.22	2.81
consumer	H A	492	668	324	0.48	17	5.95	3.82	5.21	11.21	8	3	2	3	2.08	0.95
continent	F A	459	459	478	0.78	16	6.05	3.24	5.16	8.35	9	0	1	3	3.67	1.61
contractor	H P	492	644	332	0.48	16	4.70	4.26	5.48	10.16	10	0	1	3	3.14	1.47
convent	F B	537	458	559	0.30	6	5.05	3.86	4.25	9.57	7	4	0	2	3.33	1.12
convict	H D	452	427	384	1.08	17	2.28	4.95	4.08	11.00	7	0	1	2	6.35	2.49
cop	H P	636	668	640	1.54	16	4.50	4.90	2.83	4.94	3	25	41	1	86.14	17.49
coral	Q	572	425	561	0.30	11	6.42	3.18	5.50	9.06	5	1	10	2	2.37	0.68
cord	O O	564	477	549	1.04	13	5.38	4.20	5.47	6.00	4	16	34	1	7.02	3.15
corn	P E	576	548	601	1.41	14	5.95	3.43	5.65	4.61	4	17	28	1	14.22	4.8
corporal	H P	464	540	340	0.30	16	4.63	3.50	4.90	11.11	8	0	1	3	15.73	3.35
corpse	B	587	406	614	0.60	3	2.45	4.89	3.23	10.00	6	0	6	1	10.1	4.47
corridor	F B	568	579	553	0.70	5	4.76	3.53	5.35	9.11	8	0	1	3	5.57	2.47
costume	O C	544	456	538	0.60	18	6.05	4.78	6.36	4.17	7	0	1	2	14.14	4.71
cottage	F B	593	543	607	0.30	11	6.63	2.95	6.08	8.50	7	1	0	2	5.29	1.96
cotton	P	608	521	562	1.30	19	6.05	2.48	6.24	6.00	6	1	7	2	14.18	4.11
couch	O F	578	521	536	1.04	12	6.52	3.40	6.19	3.74	5	7	12	1	23.47	9.44
cougar	A M	663	580	650	0.00	11	5.67	5.70	4.24	8.11	6	0	4	2	2	0.41

county	F A	540	483	317	0.60	18	5.18	3.40	7.00	8.90	6	2	4	2	33.76	10.97
court	F B	509	549	552	1.69	17	3.52	4.43	3.94	8.39	5	1	27	1	100.73	21.92
cousin	H R	502	515	478	0.85	11	6.11	2.60	5.28	4.95	6	0	2	2	48.84	12.41
cow	A M	621	529	632	1.69	10	5.42	2.95	5.24	3.94	3	28	36	1	25.51	8.68
coward	H D	392	471	251	1.11	13	2.42	4.09	4.09	7.62	6	2	3	1	14.39	6.18
cowboy	H P	568	521	608	1.18	10	5.43	4.43	5.67	4.55	6	0	0	2	18.98	5.75
cowgirl	H P	500	576	560	0.00	15	6.11	5.30	5.63	6.74	7	0	0	2	1.18	0.32
crab	A O	626	433	589	0.90	21	5.81	4.13	4.52	5.28	4	7	9	1	6.9	2.24
cradle	O F	587	478	592	0.30	5	6.10	3.67	4.86	5.22	6	0	2	2	2.84	1.28
crater	F L	555	404	555	0.30	10	5.15	4.84	4.79	8.11	6	4	11	2	2.59	0.74
creator	H A	395	431	409	0.78	8	6.45	4.89	6.12	6.84	7	0	0	3	2.78	1.13
creature	L	541	508	492	0.60	17	6.06	4.77	4.82	7.32	8	0	3	2	21.41	7.83
creek	F L	595	423	378	0.70	13	6.32	2.67	5.00	5.89	5	6	16	1	8.9	2.87
crew	C	523	442	486	0.00	21	5.83	3.38	5.00	7.56	4	6	17	1	47.53	12.35
cricket	I	576	486	603	0.48	14	5.71	3.22	4.88	7.72	7	1	2	2	2.82	1.12
criminal	H D	492	652	376	1.67	18	2.11	4.49	4.09	6.78	8	0	0	3	34.47	12.92
critic	H A	468	485	226	0.00	22	4.10	4.25	4.86	10.21	6	0	0	2	3.76	1.5
crocodile	A R	583	456	601	0.00	14	3.15	6.48	3.47	5.11	9	0	0	3	2.25	0.83
crook	H D	520	467	526	1.30	11	2.86	4.62	3.82	7.84	5	4	9	1	5.67	2.34
cross	Q	514	525	501	1.32	18	5.67	3.05	4.00	4.74	5	6	11	1	55.04	20.27
crow	A B	590	490	578	0.48	10	4.32	3.55	5.40	5.74	4	6	12	1	4.45	1.57
crowd	C	546	523	548	1.38	15	4.48	5.15	5.21	7.14	5	2	11	1	37.37	14.66
crown	O C	586	531	602	0.95	8	6.00	4.52	5.62	7.80	5	8	11	1	13.69	4.33
crumb	O E	541	524	497	0.30	12	5.14	2.95	4.62	5.89	5	1	10	1	1.8	0.75
crutch	O T	570	481	580	0.00	21	3.64	3.67	4.08	7.21	6	4	6	1	1.31	0.63
crystal	O N	587	510	579	0.70	15	6.75	4.10	6.72	7.78	7	0	5	2	16.14	4.46
cub	A M	610	632	580	0.48	7	6.71	3.95	4.24	5.40	3	14	21	1	2.1	0.81
cucumber	P E	653	536	623	0.70	8	6.47	3.17	5.86	5.72	8	0	0	3	1.98	0.86
culture	Q	351	523	339	1.08	29	6.28	4.06	5.71	9.52	7	1	2	2	13.94	5.65
cup	O M	539	595	558	1.52	10	5.94	2.60	5.28	3.57	3	10	19	1	51.65	18.67
customer	H A	505	549	488	0.48	21	5.86	3.40	6.16	7.21	8	0	1	3	15.2	6.89
dad	H R	603	646	626	1.38	5	7.14	4.05	6.12	2.58	3	19	31	1	507.25	51.87
dagger	O W	576	480	581	0.48	10	4.38	5.79	4.83	8.44	6	3	3	2	4.92	1.3
daisy	P	613	519	573	0.60	8	7.48	3.95	5.37	5.55	5	2	11	2	13.51	2.12
dancer	H P	558	535	551	0.95	23	6.64	4.52	5.78	6.00	6	7	5	2	16.29	5.95
dandruff	O N	546	495	554	0.60	13	3.05	4.41	3.57	10.74	8	0	0	2	0.8	0.38
dart	O W	608	496	597	0.00	13	4.76	3.87	5.61	7.38	4	12	12	1	1.92	0.85
date	Q	514	613	501	1.40	20	7.18	4.33	5.11	5.84	4	21	32	1	141.53	35.61
daughter	H R	625	696	680	0.70	13	6.73	5.00	5.06	4.95	8	1	7	2	171.35	35.68
deck	F B	566	507	539	0.85	15	5.68	3.25	5.38	6.45	4	8	34	1	23.76	7.5
decoration	O M	507	517	526	0.30	20	6.71	4.05	6.40	5.94	10	0	0	4	1.84	1.04
deer	A M	631	509	624	1.30	18	6.89	3.95	4.89	5.17	4	14	48	1	8.71	2.92
democrat	H D	472	656	336	0.78	11	5.54	5.65	5.61	11.21	8	0	0	3	1.69	0.75
demon	S	302	399	474	0.48	10	3.00	5.34	3.40	7.16	5	5	9	2	31.24	4.58
dentist	H P	607	563	622	1.00	8	3.84	4.37	4.70	5.22	7	0	1	2	11.2	3.51
deputy	H P	455	462	435	0.00	9	5.30	4.05	5.52	6.45	6	1	0	3	15.65	4.45
desert	F L	590	514	615	1.38	8	5.36	3.50	5.58	8.35	6	0	0	2	27.98	8.7
designer	H A	488	668	324	0.60	17	5.57	5.00	5.44	9.05	8	1	3	3	5.24	2.44
desk	O F	583	583	574	1.28	18	5.56	2.45	5.72	5.56	4	3	3	1	43.9	16.74
detective	H P	505	509	524	0.90	15	5.06	4.55	4.39	6.58	9	1	2	3	61.12	11.78
device	O T	444	500	391	0.00	18	5.79	3.42	5.95	8.06	6	1	3	2	18.16	6.71
devil	S	274	474	546	1.18	11	3.11	5.40	3.84	5.00	5	1	3	2	41.33	13.97
diamond	O N	610	512	623	1.36	17	6.88	5.82	5.64	6.47	7	0	0	2	20.65	5.64
dictator	H P	464	632	412	0.95	18	2.77	5.50	4.19	10.60	8	0	0	3	2.12	0.86
dime	O M	582	586	590	0.85	9	5.58	3.52	5.32	5.74	4	12	28	1	12.06	5.64
diner	Q	515	442	497	0.30	12	6.75	4.04	6.43	6.83	5	8	17	2	12.39	3.83
dinner	O E	542	621	570	1.71	5	6.40	3.85	6.05	3.99	6	5	21	2	202.67	47.19
dinosaur	A R	556	628	616	0.85	20	6.11	5.33	4.41	4.91	8	0	0	3	3.98	1.38
director	H P	492	668	364	0.78	21	4.95	3.75	6.89	8.50	8	0	1	3	35.96	9.64
dirt	O N	564	571	547	1.88	18	4.50	3.44	4.70	3.83	4	7	19	1	25.69	9.7
disease	Q	504	580	487	1.49	12	1.68	5.50	2.80	7.55	7	0	10	2	26.18	9.78
ditch	F L	555	511	558	0.78	14	3.20	3.81	5.42	6.22	5	8	26	1	7.86	3.67
diver	H A	520	448	524	0.48	11	5.66	5.42	5.90	6.89	5	10	8	2	2.43	0.63
doctor	H P	575	573	600	1.79	19	5.93	4.05	4.69	4.60	6	0	0	2	263.94	44.15
dog	A M	610	598	636	2.16	5	7.00	5.43	5.73	2.80	3	19	12	1	192.84	36.35
doll	O M	588	503	565	0.85	13	5.88	3.51	5.66	3.68	4	12	26	1	24.76	7.73
dollar	O M	575	611	611	1.20	9	7.39	5.57	5.07	5.06	6	1	19	2	27.65	10.4
dolphin	A M	608	652	700	1.00	18	6.67	3.00	5.67	6.05	7	0	0	2	2.76	0.86
donkey	A M	667	648	680	0.90	10	6.29	2.90	5.12	6.00	6	1	4	2	5.35	1.93
donor	H A	409	479	406	0.30	10	6.57	3.76	6.79	10.06	5	1	12	2	4.08	1.56

door	O M	606	630	599	1.79	23	5.43	3.19	6.10	3.05	4	10	45	1	292.06	63.02
dope	Q	428	612	490	0.70	15	4.14	4.24	4.95	9.44	4	16	19	1	16.08	6.1
dough	O E	627	474	558	0.90	13	6.00	4.10	5.96	6.63	5	9	59	1	15.88	4.85
dove	A B	588	415	616	1.04	11	6.90	3.27	6.14	6.63	4	16	20	1	5.57	1.59
dragon	S	549	425	670	1.00	23	6.68	5.45	5.17	5.58	6	0	0	2	19.29	3.3
dress	O C	595	588	595	1.74	15	6.42	4.73	6.64	4.05	5	5	7	1	87.2	26.06
dresser	O F	560	526	556	0.48	14	5.28	2.58	4.96	4.28	7	4	5	2	3.57	1.9
drill	O T	516	473	571	0.70	19	4.73	5.11	5.48	7.14	5	6	13	1	13.75	5.56
driver	H A	553	593	567	1.30	16	6.39	3.15	5.56	4.95	6	4	4	2	47.37	16.67
drug	O M	555	539	564	1.66	20	4.11	4.48	3.67	8.11	4	5	6	1	45.22	13.03
drum	O I	602	506	599	1.18	16	6.05	4.67	5.65	4.63	4	4	9	1	8.47	3.22
duck	A B	606	529	632	1.26	16	6.11	4.00	5.30	3.50	4	16	37	1	24.76	8.38
dungeon	F B	562	428	579	0.60	16	3.52	5.13	3.68	7.55	7	1	1	2	2.57	1.19
dust	O N	550	558	549	1.32	16	3.72	3.45	4.56	5.06	4	12	17	1	23.84	9.67
dwarf	H D	516	437	608	0.78	9	4.71	3.43	3.84	7.65	5	1	2	1	3.08	1.11
dynasty	C	406	407	386	0.00	20	5.16	4.45	5.45	10.50	7	1	0	3	2.55	0.99
eagle	A B	616	465	601	0.90	11	6.47	4.57	5.09	5.83	5	1	5	2	11.49	3.33
ear	B	640	560	597	1.34	14	5.86	3.50	6.74	3.63	3	12	24	1	32	13.19
earth	F C	580	580	580	1.61	12	6.83	5.04	5.69	5.37	5	2	10	1	99.49	27.89
egg	Q	613	608	599	1.41	20	5.95	3.28	5.74	3.89	3	6	17	1	26.04	8.66
ego	B	261	497	334	1.11	27	4.38	4.17	6.05	10.89	3	3	5	2	7.49	3.7
elbow	B	607	564	602	0.78	10	5.38	3.20	6.02	4.78	5	0	1	2	6.14	2.97
electrician	H P	520	668	412	0.00	22	5.21	3.19	5.73	8.75	11	0	0	4	1.49	0.7
elephant	A M	628	459	616	1.28	19	6.17	4.23	4.23	4.80	8	0	2	3	11.37	3.74
elevator	V	623	660	596	0.90	14	5.95	3.65	4.92	5.47	8	0	0	4	24.41	8.06
elf	S	437	355	543	0.60	22	6.10	4.30	5.43	4.32	3	7	7	1	3.78	0.91
elk	A M	575	572	600	0.30	9	5.81	3.48	4.67	7.05	3	6	7	1	6	0.73
elm	P	579	456	550	0.00	4	6.32	3.05	5.43	9.06	3	5	6	1	1.43	0.56
emerald	O N	613	457	602	0.60	8	7.30	5.33	6.32	8.26	7	0	0	3	2.57	0.74
emperor	H P	527	379	502	0.30	15	4.68	4.25	5.32	7.44	7	0	0	3	13.53	2.19
empire	C	429	479	470	0.78	25	5.36	4.59	5.95	8.44	6	2	1	2	12.67	4.41
employee	H P	578	672	332	0.95	9	5.29	4.65	4.81	7.84	8	3	3	3	11.57	5.11
employer	H P	604	648	340	0.78	7	5.30	4.06	3.30	10.15	8	3	3	2	5.37	2.46
enemy	H D	434	523	497	1.34	17	2.22	5.30	2.50	7.26	5	1	2	3	48.51	14.65
engine	O M	586	543	595	1.30	16	5.48	3.89	5.36	6.28	6	0	1	2	31.88	9.62
engineer	H P	531	514	495	1.00	24	5.79	4.22	6.53	9.89	8	0	0	3	11.69	3.89
envelope	O M	579	542	554	0.90	10	5.95	2.80	5.50	6.25	8	1	0	3	10.06	3.89
executive	H P	477	458	513	0.90	19	4.95	4.32	4.95	11.65	9	0	0	4	10.61	4.7
expert	H D	387	540	325	0.85	18	6.74	4.05	6.91	9.63	6	2	0	2	22.12	10.04
eye	B	634	611	603	1.66	13	6.18	3.95	5.72	3.75	3	10	15	1	111.78	38.34
face	B	599	612	581	1.83	20	6.36	4.59	5.96	3.75	4	12	28	1	289.16	66.88
factory	F B	586	562	608	1.00	24	4.95	3.00	5.09	6.89	7	1	0	3	16.8	5.76
fairy	S	433	471	536	1.00	13	6.71	5.04	6.38	5.17	5	4	30	2	16.69	5.13
fall	W	409	572	547	1.90	17	3.89	4.24	3.83	4.71	4	13	43	1	118.51	39.6
family	C	525	607	577	1.75	25	7.25	4.35	5.98	3.38	6	0	0	3	354.25	63.66
fan	Q	557	520	582	0.00	17	6.81	3.70	6.05	5.63	3	23	36	1	35.14	13.08
farm	F A	565	564	560	1.58	12	6.22	3.05	6.08	3.85	4	10	6	1	30.04	8.71
farmer	H P	642	668	670	0.90	33	6.14	3.67	6.10	4.74	6	6	7	2	11.84	3.8
fat	B	540	609	574	1.92	16	2.74	3.89	4.00	5.15	3	21	33	1	79.43	24.39
father	H R	594	591	646	1.48	4	6.88	3.68	5.19	4.11	6	5	5	2	554.49	64.93
fawn	A M	581	433	565	0.30	6	6.15	3.92	5.73	8.40	4	7	27	1	0.71	0.23
feast	O E	542	457	610	0.70	15	7.57	5.26	6.21	7.81	5	3	13	1	6.71	2.81
feather	B	663	485	640	1.11	14	6.30	3.29	5.97	4.67	7	3	11	2	6.63	2.75
female	L	617	676	660	1.28	12	7.52	5.90	6.42	5.89	6	0	0	2	31.61	12.36
fence	F B	597	526	611	1.15	20	5.05	2.70	5.20	6.28	5	2	10	1	16.06	6.58
fiddle	O I	582	465	555	0.48	15	5.05	4.05	4.85	8.28	6	6	17	2	3.63	1.54
fighter	H A	567	652	488	0.85	13	5.10	5.30	6.42	6.89	7	2	23	2	12.78	4.38
fin	B	584	576	530	0.70	12	5.27	4.45	5.45	7.30	3	21	42	1	3.41	0.81
finger	B	620	621	648	1.49	12	5.80	4.15	5.32	3.43	6	8	1	2	36.67	15.34
fireman	H P	680	504	592	0.60	14	6.47	4.52	5.00	5.05	7	2	3	2	2.92	1.25
fireplace	F B	592	529	639	0.90	15	5.95	5.20	5.56	7.37	9	0	0	2	5.08	2.25
fish	A F	597	548	615	1.95	24	6.42	3.33	6.08	4.05	4	5	17	1	83.49	20.36
fist	B	640	483	612	0.90	8	2.95	4.85	4.95	4.58	4	10	21	1	7.35	3.49
flag	O M	606	545	607	1.51	12	6.10	3.74	5.56	5.33	4	9	7	1	17.49	5.93
flask	O M	595	401	614	0.30	17	5.50	4.24	5.17	10.78	5	2	1	1	1.12	0.48
flea	I	625	515	606	0.60	11	3.00	3.00	4.42	7.79	4	6	20	1	3.31	1.31
flesh	B	597	483	567	0.00	8	5.20	4.11	5.29	8.30	5	3	9	1	22.06	9.44
flood	W	553	523	598	0.70	12	2.76	5.31	3.16	6.58	5	3	9	1	5.71	2.41
flour	O E	639	501	505	0.85	13	5.25	3.26	5.86	6.89	5	2	6	1	3.16	1.31
flower	P	584	566	618	1.72	21	7.30	3.67	6.43	3.11	6	4	6	1	22.76	7.5

flute	O I	587	496	581	1.08	19	6.29	3.72	5.84	8.47	5	2	12	1	2.12	0.85
foe	H D	424	344	435	0.70	8	3.15	4.71	3.82	9.95	3	18	58	1	1.84	0.91
fog	W	556	546	606	1.11	25	5.77	3.67	4.05	6.21	3	18	15	1	9.45	2.56
follower	H A	424	648	232	0.30	11	4.86	3.40	4.58	7.79	8	2	3	2	0.67	0.36
fool	H D	354	551	436	1.32	14	3.56	4.86	2.94	7.56	4	10	28	1	89.33	28.25
foot	B	558	583	597	1.59	9	4.68	2.77	5.97	3.44	4	12	12	1	64.92	24.49
forehead	B	590	521	596	0.30	19	5.04	3.14	6.50	5.58	8	1	1	2	7.84	4.01
forest	P	609	513	633	1.45	9	6.68	4.44	5.71	6.28	6	1	1	2	18.88	5.96
fork	O T	592	584	598	1.11	8	5.47	3.35	6.02	3.63	4	9	13	1	8.82	3.77
foundation	F B	462	475	429	0.78	19	5.86	2.41	6.41	10.94	10	0	0	3	14.51	4.46
fountain	F B	593	469	602	0.30	7	6.26	3.10	5.90	7.17	8	1	2	2	6.9	2.83
fox	A M	605	501	607	1.11	18	5.52	4.36	5.50	5.02	3	12	32	1	21.61	4.88
fraternity	C	429	510	508	0.90	15	4.89	4.64	5.41	12.95	10	0	0	4	3.35	0.95
fraud	Q	304	447	381	0.70	17	2.05	5.18	3.48	10.11	5	2	10	1	10.04	4.08
freak	L	400	539	435	0.30	17	3.73	6.30	5.11	8.02	5	3	12	1	36.75	14.28
friend	H D	450	603	587	2.06	22	6.79	4.29	6.31	3.57	6	0	4	1	419.29	73.65
frog	A O	619	507	617	1.20	20	5.84	4.07	5.50	4.32	4	3	5	1	11.82	3.23
fruit	P E	612	590	587	1.72	17	7.00	4.09	6.12	3.63	5	0	6	1	21.73	8.52
fugitive	H D	512	632	392	0.30	21	2.74	5.26	4.00	10.55	8	0	0	3	5.18	2.32
fungus	P	610	449	540	0.85	16	2.79	4.67	3.61	8.44	6	1	2	2	2.2	0.92
fur	B	601	530	588	1.26	13	5.65	3.64	6.11	5.22	3	10	24	1	8.27	3.4
furniture	O F	583	580	588	1.23	12	5.79	3.05	5.43	5.89	9	0	0	3	15.08	6.41
gal	H D	536	596	384	0.00	12	5.27	4.43	5.53	6.21	3	15	29	1	14.22	5.11
galaxy	F C	465	423	575	0.30	12	5.95	5.61	4.76	7.67	6	0	0	3	6.65	1.81
gang	C	492	515	535	1.18	18	2.71	6.55	5.37	9.22	4	11	24	1	30.14	9.56
gangster	H P	468	636	660	0.60	12	2.59	6.36	4.16	8.50	8	0	0	2	5.33	2.04
garden	P	602	567	635	1.45	14	7.25	3.71	6.13	5.33	6	2	6	2	26.55	10.03
garlic	P E	636	509	565	0.85	19	5.67	4.12	6.62	6.89	6	2	0	2	6	2.29
gavel	O T	558	383	539	0.00	8	4.30	2.72	4.21	9.22	5	2	3	2	0.76	0.35
gazelle	A M	596	544	570	0.00	15	6.47	4.05	5.20	9.37	7	0	3	2	1.22	0.41
gem	O N	573	457	572	0.85	7	7.35	4.44	6.09	7.68	3	9	16	1	2.47	1.07
gender	Q	408	450	376	0.48	9	5.05	4.05	5.42	7.00	6	7	11	2	2.8	1.43
genius	H D	342	476	456	1.04	10	7.52	6.20	7.37	7.21	6	1	0	2	34.76	14
gentleman	H D	516	537	559	0.70	16	7.50	4.14	6.06	6.89	9	1	0	3	41.86	14.95
germ	Q	464	523	442	0.78	16	2.50	4.10	3.65	5.95	4	3	11	1	1.25	0.61
ghost	S	379	505	552	1.49	24	4.23	5.70	4.47	5.06	5	0	14	1	36.59	9.11
ghoul	S	472	516	500	0.30	7	2.84	4.95	4.30	9.59	5	0	29	1	1.02	0.36
giant	S	515	469	562	0.78	17	5.41	5.10	6.68	4.72	5	1	0	1	27.06	10.26
gift	O M	533	566	553	1.52	16	7.27	4.64	6.32	5.05	4	7	11	1	64.51	22.38
giraffe	A M	600	381	690	0.70	8	6.52	2.91	5.27	5.00	7	0	0	2	1.49	0.68
girl	H D	607	645	634	2.10	8	7.15	5.23	5.27	4.00	4	4	24	1	557.12	73.24
girlfriend	H D	492	660	372	1.04	13	7.56	5.05	5.00	6.26	10	0	0	2	76.1	23.2
glacier	W	590	409	580	0.00	6	5.50	3.88	4.55	8.05	7	1	1	2	0.75	0.39
glass	O O	635	611	585	1.78	21	5.48	3.14	5.42	4.47	5	3	5	1	60.71	21.95
glove	O C	607	575	596	0.95	9	6.11	3.57	6.00	4.30	5	3	2	1	10.1	4.01
goat	A M	636	469	585	0.85	16	5.30	2.94	5.17	5.21	4	9	28	1	10.53	4.03
goddess	S	334	372	515	0.00	19	6.63	4.55	5.75	8.37	7	1	1	2	8.76	2.63
gold	O N	576	550	594	1.69	16	7.28	6.35	5.80	7.10	4	14	29	1	78.94	18.28
goose	A B	663	644	690	1.04	11	5.68	3.29	4.76	5.15	5	4	17	1	13.04	4.48
gorilla	A M	620	554	634	0.85	14	4.26	4.95	4.88	5.74	7	0	0	3	5.55	1.86
government	C	426	594	486	1.65	19	3.78	3.75	3.11	8.50	10	0	0	3	65.24	18.16
governor	H P	520	644	356	0.60	13	5.32	3.65	6.05	8.47	8	0	2	3	26.84	4.78
gown	O C	586	515	578	1.00	11	6.00	3.86	5.50	6.16	4	7	14	1	6.55	3.14
grain	P E	563	463	478	0.95	11	5.83	1.60	5.12	7.44	5	5	28	1	4.76	2.13
grandma	H R	524	680	564	1.04	10	7.50	3.20	5.39	2.58	7	1	0	2	45.59	10.17
grandpa	H R	544	660	568	0.48	11	7.43	3.70	5.05	3.06	7	1	0	2	32.57	6.66
granite	O N	592	404	463	0.48	8	5.05	3.76	4.60	12.24	7	0	0	2	1.59	0.66
grape	P E	611	532	591	1.20	17	6.70	3.50	5.88	3.94	5	10	22	1	4	1.63
grass	P	599	587	602	1.73	14	6.47	3.39	5.67	3.94	5	9	14	1	16.78	6.56
grasshopper	I	660	507	630	0.30	14	6.05	4.43	5.82	5.78	11	0	0	3	0.92	0.43
grave	F B	535	501	619	1.11	22	2.40	4.54	3.73	7.06	5	9	19	1	26.27	10.5
gravel	O N	587	502	569	0.60	12	4.42	2.95	4.80	7.19	6	5	3	2	1.43	0.58
gravy	O E	606	522	594	0.85	13	6.21	3.85	5.87	6.00	5	2	6	2	5.27	2.27
groom	H D	531	640	570	0.30	11	6.84	4.35	5.75	7.78	5	3	9	1	7.82	2.98
group	C	451	553	467	1.81	23	5.78	3.43	4.39	5.94	5	2	13	1	73.76	25
guard	H P	517	504	530	1.30	18	5.89	3.60	4.06	6.25	5	0	18	1	58.2	18.71
guardian	H D	597	652	260	0.30	6	6.50	2.91	5.48	9.44	8	0	0	2	7.02	2.94
guest	H D	519	560	497	0.85	13	6.14	4.15	6.95	6.21	5	2	19	1	39.94	16.46
guide	H P	468	524	482	0.95	14	5.43	3.33	5.75	7.11	5	3	28	1	17.84	7.83
guitar	O I	673	495	645	1.23	16	7.10	4.40	5.89	5.32	6	0	1	2	15.59	4.07

gun	O W	612	519	613	1.90	18	3.66	7.74	4.71	5.58	3	17	28	1	213.2	35.48
guy	H D	565	550	551	1.34	8	6.55	4.71	5.12	4.11	3	7	40	1	762.61	78.61
gymnast	H P	500	620	610	0.00	19	5.22	4.55	5.65	6.74	7	0	0	2	0.59	0.26
hail	W	502	440	477	0.30	11	4.81	3.83	4.44	7.90	4	15	48	1	12.02	3.98
hair	B	583	575	580	2.06	19	6.18	3.71	6.69	3.17	4	5	38	1	153.55	43.3
hallway	F B	554	531	563	0.85	20	4.78	2.89	4.94	5.38	7	1	1	2	9.55	4.73
hammer	O T	605	515	618	1.30	7	5.17	4.56	5.59	5.42	6	3	9	2	12.47	4.71
hand	B	604	601	598	1.64	16	5.90	3.98	5.88	2.74	4	11	17	1	279.65	66.31
handkerchief	O M	618	551	583	0.48	19	5.79	3.05	5.05	7.22	12	0	0	3	4.2	1.8
hare	A M	615	460	577	0.48	6	6.61	2.74	5.04	6.78	4	23	38	1	3.82	0.93
hat	O C	601	580	562	1.51	12	5.69	2.88	6.21	3.33	3	26	42	1	64.18	20.6
hatchet	O W	607	467	527	0.00	13	4.43	5.14	4.48	8.20	7	4	4	2	1.96	0.85
hawk	A B	623	504	591	0.48	8	6.46	4.83	5.50	6.74	4	5	25	1	12.75	2.97
hay	P	623	486	597	0.95	18	5.41	2.43	4.75	5.32	3	24	51	1	6.37	2.38
haze	W	509	484	521	0.78	13	4.83	3.91	4.37	11.62	4	13	53	1	1.51	0.56
head	B	603	611	593	1.89	15	5.86	4.45	5.56	3.42	4	13	39	1	371.51	75.04
heart	B	605	578	617	1.62	16	6.95	5.07	5.43	5.17	5	4	17	1	244.18	54.63
heaven	S	305	536	448	1.40	9	7.50	4.23	5.22	4.22	6	3	5	2	56.61	19.17
hedge	P	615	487	583	0.48	16	5.14	3.39	5.95	8.90	5	3	16	1	1.55	0.69
heel	B	579	524	597	0.90	10	4.63	4.55	5.41	7.85	4	7	43	1	7.39	3.35
hell	S	355	564	519	1.28	13	2.55	6.26	3.47	5.11	4	17	46	1	470.82	69.66
helmet	O C	602	528	620	0.60	11	5.26	3.71	5.52	5.71	6	2	2	2	9.47	3.61
helper	H A	482	652	248	0.85	17	6.71	3.22	6.60	4.80	6	1	2	2	2.02	0.91
hen	A B	631	461	597	0.90	10	6.14	3.39	5.39	6.39	3	28	37	1	3.2	1.28
herb	P E	558	514	502	0.85	17	6.72	3.26	5.05	9.05	4	7	11	1	4.98	1.6
hero	H D	428	510	483	1.38	18	7.44	6.35	5.78	6.47	4	8	8	2	49.84	16.46
heroine	H D	625	604	336	0.00	10	4.86	5.43	4.92	10.68	7	0	0	2	1.45	0.58
highway	F B	575	488	581	1.11	14	5.19	4.28	5.14	6.50	7	0	1	2	17.86	6.87
hill	F L	588	585	607	1.48	14	5.41	3.15	6.95	3.47	4	16	49	1	37.55	10.97
hive	C	583	386	554	0.00	5	4.00	4.28	5.71	6.89	4	12	19	1	0.98	0.41
hobo	H D	567	584	640	0.48	7	3.94	4.50	4.40	8.22	4	4	3	2	1.78	0.74
hoe	O T	537	489	525	0.90	13	4.80	5.40	5.96	8.72	3	22	59	1	0.92	0.33
hog	A M	581	528	527	0.95	9	4.55	2.90	4.68	5.70	3	20	13	1	5.12	2.31
honey	O E	611	533	608	1.00	10	7.27	4.38	6.39	5.44	5	8	15	2	300.49	49.89
hook	O T	525	497	541	1.04	17	4.00	4.00	5.68	6.26	4	14	22	1	38	15.32
horn	Q	618	498	566	1.46	15	5.00	4.22	5.68	4.84	4	9	22	1	21.08	6.99
hornet	I	637	612	600	0.00	8	3.37	5.73	3.83	7.28	6	2	0	2	1.33	0.38
horse	A M	613	560	624	1.90	16	6.05	4.16	5.71	4.15	5	10	16	1	92.88	18.8
hospital	F B	584	548	602	1.64	17	3.52	5.07	3.93	5.55	8	0	0	3	124.2	31.13
host	L	496	640	400	0.48	10	5.70	3.21	5.75	8.05	4	11	16	1	15.02	6.09
hostage	H D	526	448	536	0.70	24	2.74	5.73	2.74	9.89	7	1	0	2	14.57	4.26
hostess	H A	500	471	498	0.30	17	6.70	4.18	6.40	8.47	7	1	1	2	3.71	1.87
hotel	F B	591	565	597	1.26	16	6.60	4.55	5.59	6.05	5	3	2	2	103.22	24.09
hound	A M	583	433	596	0.60	5	5.30	4.27	5.84	5.74	5	7	15	1	5.04	1.99
house	F B	608	600	606	2.27	13	7.19	3.95	6.41	3.16	5	7	20	1	514	72.01
human	H D	583	596	543	1.23	16	6.45	3.62	5.71	4.83	5	0	3	2	124.76	34.94
hurricane	W	576	471	608	1.04	12	3.16	5.75	2.98	7.35	9	0	0	3	8.76	2.12
husband	H R	549	557	537	1.15	4	7.41	4.38	5.72	5.53	7	0	0	2	194.8	40.26
hut	F B	589	486	560	1.11	17	5.10	2.91	5.70	8.10	3	20	30	1	13.22	2.52
ice	W	621	564	635	1.66	18	6.06	3.30	4.89	3.86	3	6	20	1	79.55	23.53
idiot	H D	416	597	423	1.00	10	3.03	4.85	4.20	6.50	5	1	1	2	66.22	25.6
individual	Q	474	586	440	0.85	11	6.17	3.47	6.86	7.70	10	0	0	4	11.69	5.79
infant	H D	579	513	600	0.30	6	6.65	4.10	5.26	6.42	6	1	0	2	4.22	1.72
infection	Q	468	471	487	0.85	18	2.00	4.95	3.80	8.05	9	1	1	3	8.75	3.53
inn	F B	592	440	578	0.95	10	5.71	3.26	5.52	7.52	3	8	21	1	8.39	2.11
insect	I	593	542	586	1.36	8	4.43	4.67	4.79	4.75	6	3	3	2	3.16	1.3
instructor	H P	558	531	551	0.60	6	6.15	5.05	5.81	8.19	10	0	1	3	4.71	1.97
instrument	O I	543	553	521	1.53	14	6.68	3.88	6.35	6.94	10	0	0	3	8.1	3.73
intelligence	Q	275	570	383	1.18	13	7.65	6.32	6.72	8.56	12	0	1	4	19.27	7.73
inventor	H A	480	652	368	0.48	23	6.21	4.62	5.15	8.00	8	1	1	3	2.29	0.99
island	F L	596	507	643	1.48	19	7.18	4.25	5.58	7.41	6	1	1	2	39.57	8.15
item	O O	436	545	369	1.08	11	5.29	2.90	5.50	5.68	4	2	3	2	12.31	5.15
jacket	O C	635	596	611	1.36	15	5.86	3.35	6.89	3.95	6	2	2	2	33.41	11.58
jail	F B	590	539	608	1.74	15	1.91	4.47	3.91	5.74	4	12	36	1	70.63	20.33
jeep	V	622	564	659	0.48	16	5.53	4.05	5.00	6.32	4	7	19	1	10.27	2.85
jelly	O E	560	521	590	1.20	11	5.90	3.63	5.68	4.11	5	7	24	2	7.12	2.86
jet	V	580	583	585	1.00	10	6.74	5.26	5.44	5.39	3	17	23	1	14.14	4.92
jewel	O N	594	519	621	1.04	20	6.68	3.83	5.10	6.22	5	1	5	1	7.24	2.15
journal	O M	563	486	509	0.85	15	5.91	3.23	6.31	8.50	7	0	4	2	8.88	3.23
judge	H P	506	539	558	1.58	17	3.89	4.50	3.78	8.85	5	4	4	1	79.67	19.33

jug	O M	593	538	590	0.60	18	5.45	3.73	5.45	5.83	3	13	16	1	2.63	0.89
juice	O E	599	567	593	1.43	10	6.90	4.60	5.74	4.40	5	1	16	1	26.88	9.9
jungle	F L	628	479	680	1.32	21	5.70	4.06	4.50	5.26	6	5	3	2	22.57	5.79
junior	H D	384	470	391	0.00	14	5.36	4.15	6.26	7.11	6	0	0	2	35.78	9.75
jury	C	540	498	580	1.00	11	4.23	5.20	5.21	11.05	4	6	6	2	42.76	6.97
juvenile	L	472	636	372	0.30	12	3.74	3.85	4.12	11.63	8	0	0	3	5.12	2.4
kangaroo	A M	600	632	644	0.30	11	6.45	4.27	5.37	5.55	8	0	0	3	2.31	0.7
keeper	H A	459	464	421	0.70	25	5.89	3.81	4.83	8.13	6	4	13	2	4.08	1.93
kettle	O M	602	551	594	0.70	14	5.67	3.10	5.68	8.06	6	4	17	2	2.8	1.42
key	O M	612	603	618	1.08	9	6.22	3.90	6.75	3.58	3	11	54	1	86.86	25.81
kid	H D	536	559	525	1.53	12	7.23	4.71	4.83	4.28	3	14	29	1	339.2	55.14
king	H P	559	522	585	1.66	8	6.00	4.45	5.53	5.42	4	13	24	1	129.25	20.12
kingdom	C	392	513	494	0.90	21	6.74	4.20	6.75	6.05	7	0	0	2	15.43	5.28
kite	O M	592	481	624	0.70	8	6.90	4.20	6.24	4.58	4	8	34	1	2.29	0.91
kitten	A M	612	517	639	1.18	6	7.58	3.19	6.67	3.64	6	2	6	2	4.73	1.87
knee	B	593	599	597	1.11	14	4.70	4.25	5.38	4.42	4	2	52	1	14.69	6.35
knife	O W	612	573	633	1.63	13	4.33	4.86	5.29	4.15	5	1	12	1	46.8	14.96
knuckle	B	586	491	520	0.30	15	4.68	4.32	4.95	5.94	7	0	6	2	1.29	0.7
labyrinth	F B	515	313	453	0.00	9	4.84	4.24	3.80	10.53	9	0	0	3	0.8	0.27
ladder	O T	608	547	640	1.00	14	5.32	4.09	5.56	4.40	6	5	30	2	9.25	3.73
lady	H D	564	573	571	1.45	15	6.91	4.05	5.87	3.68	4	5	14	2	217.08	49.23
lake	F L	585	583	616	1.51	15	7.13	2.64	5.36	4.61	4	22	40	1	36	9.56
lamb	A M	633	519	614	0.95	14	6.30	3.32	5.72	4.15	4	7	37	1	10.63	3.84
lamp	O F	615	578	575	1.15	7	5.74	2.71	6.04	4.00	4	12	13	1	12.88	4.58
landscape	F L	542	503	608	0.70	20	7.00	3.75	5.00	9.89	9	0	0	2	2.49	1.14
lap	B	540	505	531	0.30	14	5.89	3.45	5.26	3.15	3	26	35	1	13.47	6.19
lawn	F L	588	534	608	1.08	11	6.05	2.62	6.04	5.45	4	8	36	1	12.35	5.05
lawyer	H P	569	520	557	1.53	13	3.94	3.95	3.56	7.78	6	1	3	2	79.51	20.1
leader	H A	487	559	502	1.49	22	6.24	4.96	6.30	6.90	6	8	27	2	31.16	10.66
leaf	P	593	556	608	1.34	10	6.16	3.05	5.54	4.60	4	9	29	1	5.2	2.59
leg	B	626	589	601	1.60	10	6.22	2.75	5.50	3.00	3	22	17	1	56.51	18.93
lemon	P E	608	518	632	1.00	11	6.37	4.52	5.43	4.74	5	2	9	2	12.02	4.1
lemonade	O E	615	522	606	0.60	18	7.05	4.63	6.00	5.06	8	0	0	3	5.51	2.29
leopard	A M	595	431	635	0.30	11	6.43	6.26	4.29	6.84	7	2	8	2	5.41	1
letter	O M	577	610	595	1.67	15	5.68	3.19	5.97	4.74	6	7	33	2	82.61	20.96
lettuce	P E	579	565	608	1.08	11	5.84	3.64	5.44	4.28	7	0	3	2	3.39	1.47
lever	O T	572	518	515	0.60	15	4.50	2.56	6.29	7.89	5	10	19	2	3.2	1.26
liar	H A	409	534	425	1.28	18	2.41	6.60	4.74	4.89	4	1	21	1	35.14	14.08
library	F B	564	580	587	1.00	4	6.33	2.52	6.35	4.95	7	0	0	3	22.94	8.19
lieutenant	H P	560	436	512	0.60	14	4.91	4.10	5.28	9.50	10	0	0	3	104.04	10.56
life	Q	361	598	482	2.03	11	6.68	5.59	5.89	5.89	4	12	22	1	796.65	90.56
lightning	W	525	465	599	1.04	14	5.34	6.75	4.00	4.76	9	0	1	2	14.14	4.29
limb	B	590	526	580	0.85	8	4.42	2.70	6.37	7.16	4	6	28	1	4.67	2.32
lime	P E	590	447	563	0.00	11	6.10	3.83	6.23	6.61	4	17	26	1	3.29	1.47
limousine	V	624	505	595	0.48	16	6.14	5.65	6.20	8.17	9	0	0	3	2.82	1.19
lion	A M	627	511	626	1.52	15	5.84	5.29	4.86	4.42	4	7	6	1	15.35	3.91
lip	B	590	568	619	0.85	13	6.38	4.60	5.95	3.79	3	19	32	1	10.75	5.17
liquor	O E	630	579	576	1.34	18	4.85	5.85	4.50	8.40	6	0	20	2	17.29	7.02
litter	Q	471	546	620	0.00	13	2.58	3.80	5.70	7.61	6	9	29	2	3.92	1.74
liver	B	617	481	571	0.85	18	4.19	3.27	4.67	8.56	5	12	11	2	14.29	5.1
lizard	A R	588	483	632	0.78	21	5.43	5.50	5.86	5.42	6	2	5	2	4.84	1.37
loaf	O E	568	567	505	0.30	8	5.75	2.45	5.32	6.84	4	4	19	1	4.47	1.93
lobby	F B	532	420	462	0.30	16	4.76	4.65	5.53	7.71	5	3	12	2	12.69	5.4
lobster	A O	590	472	630	0.70	23	6.43	4.67	5.55	7.44	7	1	1	2	7.33	2.4
lock	O T	565	588	532	1.36	14	4.56	3.00	4.11	5.74	4	16	38	1	56.57	22.25
lodge	F B	538	429	464	0.48	21	6.43	3.33	5.80	8.26	5	2	14	1	6.69	2.15
log	P	686	466	630	1.15	9	4.94	4.29	5.70	6.74	3	21	16	1	11.96	4.73
lord	H P	409	518	482	0.90	14	5.59	3.81	5.75	5.95	4	12	32	1	138.16	23.77
loser	H D	372	648	244	1.20	11	2.85	3.94	4.53	6.67	5	7	11	2	27.08	10.92
lover	H D	558	636	620	1.11	16	8.05	7.45	6.37	9.16	5	14	11	2	26.63	10.56
lunch	O E	552	616	602	1.26	17	6.64	3.57	6.44	3.61	5	6	7	1	104.12	31.44
lung	B	569	546	576	0.95	11	4.84	2.64	4.74	7.16	4	10	19	1	8.24	2.85
macaroni	O E	631	498	608	0.48	7	7.75	5.09	6.27	5.15	8	0	0	4	3.25	1.19
machine	O M	578	549	575	1.59	17	5.00	4.39	4.80	6.53	7	0	0	2	70.25	22.41
mafia	C	416	620	428	0.70	24	3.11	7.05	3.65	10.32	5	3	1	2	4.67	1.79
magazine	O M	588	585	588	1.46	13	6.24	4.20	7.05	5.89	8	0	0	3	33.2	10.22
magician	H P	560	528	569	0.78	12	5.68	4.73	4.26	5.37	8	0	0	3	7.65	2.28
magnet	O O	550	526	543	0.48	13	5.65	3.38	4.89	6.10	6	0	1	2	2.75	1.12
maid	H P	625	644	610	1.11	20	5.38	3.19	6.20	6.95	4	8	43	1	22.82	7.32
mailman	H P	520	656	568	0.30	12	5.32	3.32	4.82	4.72	7	1	1	2	2.88	1.28

majority	Q	338	546	390	0.60	13	4.95	4.30	4.76	8.94	8	0	0	4	5.12	2.48
maker	H A	426	487	379	0.90	17	5.74	4.16	6.15	6.94	5	8	14	2	4.92	2.46
male	L	564	588	587	1.30	5	6.91	4.50	5.89	5.63	4	27	59	1	33.94	13.19
mammal	A M	549	458	541	1.00	18	5.95	3.81	6.00	7.39	6	1	4	2	1.22	0.62
man	H D	618	623	567	2.23	9	5.42	4.36	5.44	3.11	3	34	45	1	1845.75	96.02
manager	H P	604	668	312	1.08	17	4.82	4.15	7.16	9.40	7	2	1	3	39.96	12.58
mansion	F B	579	489	628	1.00	12	6.62	4.84	6.50	7.20	7	0	1	2	6.45	2.48
map	O M	565	545	587	1.30	16	5.81	3.95	5.79	5.60	3	29	34	1	31.82	9.6
maple	P	534	518	511	0.60	6	6.09	3.77	5.47	5.94	5	0	1	2	3.24	1.08
marble	O N	611	436	605	0.85	22	5.80	3.57	5.38	7.05	6	2	7	2	5.22	1.84
mare	A M	549	460	529	0.30	5	5.62	3.64	5.00	8.84	4	31	41	1	2.9	1.01
marijuana	P E	624	628	584	0.90	10	3.63	4.36	4.77	10.89	9	0	0	4	5.31	1.79
marine	H P	595	652	532	0.70	17	5.95	3.44	5.14	9.80	6	3	5	2	14.08	3.39
market	F A	551	518	583	1.11	14	6.21	3.55	5.77	7.16	6	3	3	2	36.24	14.18
mask	O M	638	476	555	1.20	12	4.81	3.26	5.10	4.80	4	11	10	1	19.8	5.72
master	H D	498	495	495	0.95	24	5.72	4.40	4.17	6.50	6	10	11	2	87.25	15.76
mate	H D	507	553	506	1.11	19	7.18	5.95	6.79	8.67	4	27	49	1	29.24	7.75
mattress	O M	640	524	601	0.48	10	5.74	3.45	6.17	5.10	8	0	0	2	6.61	2.74
mayor	H P	507	443	523	0.30	20	4.59	4.15	6.21	8.28	5	3	0	1	31.27	6.06
maze	F A	528	434	555	0.70	13	5.84	4.83	4.56	7.11	4	15	52	1	2.55	0.94
meadow	F L	594	478	622	0.60	16	7.30	2.62	6.15	6.89	6	0	2	2	2.27	0.82
meat	B	587	589	618	1.83	17	6.62	4.30	5.58	4.42	4	13	33	1	43.65	15.33
mechanic	H P	580	467	530	0.70	14	5.45	4.45	5.15	7.83	8	0	0	3	5.06	2.21
medicine	O M	517	547	551	1.66	27	5.90	4.00	5.35	4.89	8	1	0	2	34.2	11.92
member	H D	455	573	399	0.95	18	5.95	3.47	6.89	8.20	6	0	0	2	28.78	13.22
mermaid	S	494	391	578	0.00	21	7.05	5.58	4.33	5.68	7	0	1	2	3.16	0.87
microscope	O T	591	493	617	0.90	19	6.33	4.00	5.05	9.16	10	1	0	3	2.53	1.23
midget	H D	544	460	500	0.48	8	4.58	4.00	3.70	9.20	6	2	1	2	4.61	1.82
mildew	P	600	398	360	0.60	22	2.61	4.14	4.19	9.74	6	1	0	2	0.43	0.14
milk	O E	670	588	638	1.61	18	6.74	2.33	6.31	3.37	4	8	10	1	42.53	15.05
mind	B	333	591	373	1.71	10	6.70	5.05	6.09	5.37	4	16	22	1	484.61	81.9
miner	H P	551	521	569	0.30	15	4.81	4.05	4.67	8.05	5	10	19	2	1.45	0.67
minister	H P	563	500	584	0.48	12	5.00	3.85	5.65	7.42	8	1	1	3	18.45	4.71
mink	A M	589	524	604	0.30	7	5.86	3.24	4.86	10.32	4	18	14	1	3.71	0.92
minor	Q	353	536	376	0.90	13	4.81	3.26	4.79	9.11	5	3	19	2	12.82	6.33
mirror	O M	605	593	627	1.28	8	5.90	4.55	5.50	4.89	6	0	20	1	24.18	10.38
missile	O W	597	504	602	0.48	21	2.85	5.67	4.20	7.22	7	2	9	2	13.14	2.47
mist	W	497	499	637	0.90	11	6.47	3.05	4.70	6.95	4	14	25	1	3.55	1.44
mister	H D	349	529	365	0.00	12	5.56	3.20	4.83	6.39	6	6	8	2	45.61	14.64
model	Q	550	664	540	1.28	20	6.38	3.90	6.53	5.83	5	6	16	2	32.06	11.71
molasses	O E	578	309	451	0.30	16	5.90	3.09	5.71	8.95	8	1	0	3	1.02	0.46
mole	A M	590	484	567	0.48	26	4.23	3.81	5.32	7.33	4	22	56	1	8.06	1.93
mom	H R	640	652	532	1.54	5	7.64	4.62	6.29	2.22	3	18	25	1	430.39	48.61
monarch	H P	525	428	572	0.30	10	4.33	3.41	3.78	10.12	7	0	1	2	0.82	0.37
monastery	F B	564	461	550	0.30	7	4.75	2.50	4.59	10.26	9	0	0	4	3.71	0.98
monk	H P	570	401	606	0.70	8	4.90	2.61	5.04	10.29	4	7	11	1	7.37	1.79
monkey	A M	566	531	588	1.36	22	5.82	5.15	5.74	4.21	6	1	5	2	33.51	9.32
monster	L	508	672	680	1.34	22	2.55	5.55	5.00	4.58	7	3	2	2	38.86	11.27
monument	F B	558	455	543	0.60	17	6.24	2.82	5.45	8.45	8	0	0	3	2.29	1.16
moon	F C	581	585	585	1.57	10	7.00	3.43	6.11	4.83	4	13	34	1	49.96	13.91
moose	A M	616	518	604	0.85	18	6.71	4.85	4.97	5.22	5	7	22	1	5.53	1.5
moron	H D	396	600	500	0.30	10	4.30	4.50	4.55	8.67	5	2	3	2	14.78	6.89
mosquito	I	595	512	612	1.00	10	3.12	5.17	3.88	6.10	8	0	0	3	1.82	0.89
moth	I	550	496	577	0.48	14	4.47	2.55	4.60	5.74	4	6	14	1	2.27	0.82
mother	H R	579	632	638	1.68	13	7.53	4.73	6.11	2.63	6	3	4	2	479.92	66.24
motor	O M	565	545	521	0.90	13	5.64	5.42	5.50	7.42	5	1	16	2	13.16	5.6
mountain	F L	616	574	629	1.76	17	6.65	4.12	6.18	6.15	8	1	2	2	35.39	10.55
mouse	A M	624	520	615	1.30	10	4.80	3.38	4.29	4.94	5	10	18	1	19.12	4.77
mouth	B	568	572	613	1.67	19	5.59	4.14	6.00	3.58	5	5	6	1	104.41	36.03
movie	O M	590	523	571	2.01	21	7.24	4.39	5.68	3.56	5	1	5	2	122.96	25.05
mud	O N	605	519	582	1.43	10	5.06	3.19	4.27	4.05	3	12	27	1	14.82	6.03
muffin	O E	653	537	615	0.60	14	7.10	4.05	6.29	5.11	6	1	2	2	5.82	1.84
mug	Q	576	527	574	1.00	9	4.16	3.83	4.82	5.15	3	16	24	1	6.84	3.1
mule	A M	592	455	608	0.60	11	4.26	2.78	4.50	5.65	4	10	6	1	7.02	2.54
mummy	Q	538	606	654	0.30	15	4.81	3.75	4.40	5.47	5	6	15	2	9.8	1.98
murderer	H A	464	664	388	0.60	19	1.92	6.83	2.83	8.26	8	1	3	3	26.57	8.69
muscle	B	573	540	553	1.53	22	6.15	4.55	6.81	8.45	6	0	14	2	13.61	6.29
mustard	P E	595	532	599	0.78	10	4.74	3.39	5.69	4.95	7	2	4	2	6.45	2.71
nag	L	392	492	508	0.60	15	2.30	4.72	3.96	9.21	3	21	23	1	2.18	0.75
nail	O T	598	563	588	1.43	6	4.60	3.05	5.17	5.42	4	13	46	1	18.65	8.46

napkin	O M	585	495	582	0.78	19	5.63	3.09	5.21	4.79	6	0	0	2	3.61	1.63
nation	C	415	508	436	0.60	12	6.00	4.78	4.74	7.74	6	2	3	2	20.49	7.39
navigator	H A	484	616	328	0.30	13	5.47	4.09	6.37	9.84	9	0	0	4	2.69	0.79
navy	C	472	465	562	1.20	10	5.38	3.64	5.07	7.15	4	4	8	2	25.69	5.53
neck	B	587	576	622	1.36	19	5.44	3.65	5.17	3.00	4	5	22	1	59.51	23.38
necklace	O C	633	536	606	1.08	12	6.85	3.52	5.64	5.00	8	0	5	2	9.75	3.33
needle	O T	608	533	589	1.51	8	3.97	4.36	5.12	5.32	6	0	11	2	11.92	5.15
neighbor	H D	552	672	610	0.48	10	5.60	3.72	5.12	5.06	8	0	8	2	16.94	7.43
nephew	H R	541	452	443	0.30	11	6.75	4.33	5.94	6.37	6	0	0	2	16.59	5.66
nerve	B	488	554	486	0.90	24	4.45	5.27	5.42	9.67	5	3	8	1	22.96	9.94
nest	O N	557	521	571	1.08	4	5.65	3.35	5.50	5.11	4	14	21	1	11.1	4.38
net	O T	577	514	540	1.00	14	5.00	3.00	4.61	7.00	3	19	38	1	15.55	6.45
newspaper	O M	576	641	616	1.57	23	5.11	2.67	5.05	5.78	9	0	0	3	23.69	8.97
nickel	O M	597	559	572	0.78	10	5.62	4.22	5.00	5.75	6	2	13	2	8.45	4.03
niece	H R	544	668	540	0.00	9	6.52	3.95	5.36	7.00	5	1	22	1	9.53	3.28
nightgown	O C	644	506	564	0.60	16	5.85	3.35	5.67	5.78	9	0	0	2	1.96	0.93
nomad	H D	512	342	516	0.48	18	4.71	3.17	5.30	11.12	5	0	0	2	0.53	0.13
nose	B	628	584	605	1.69	15	5.50	3.10	4.61	2.95	4	14	45	1	69.75	25.33
nun	H P	583	500	617	1.00	15	5.79	2.43	4.53	8.39	3	16	28	1	6.96	2.09
nurse	H P	588	537	617	1.11	10	5.41	4.64	5.58	5.84	5	3	13	1	44.98	13.1
nursery	F B	528	461	542	0.30	10	6.10	4.29	4.89	6.95	7	0	2	3	4.06	1.66
oak	P	588	515	590	0.85	9	6.47	2.64	5.91	7.35	3	9	17	1	5.61	2.23
oar	O T	572	496	592	0.60	5	5.15	2.72	6.38	5.83	3	15	20	1	0.82	0.36
oatmeal	O E	552	471	558	0.30	24	5.47	3.10	5.65	4.50	7	0	0	2	3.31	1.48
object	O O	487	586	408	1.36	17	5.52	4.08	5.91	7.94	6	1	0	2	25.76	9.81
ocean	F L	593	526	623	1.86	17	7.39	3.50	5.88	4.74	5	0	1	2	30.29	10.28
octopus	A O	669	370	628	0.30	11	6.00	5.10	5.76	6.26	7	0	0	3	1.94	0.76
office	F B	569	566	518	1.52	18	4.54	3.05	5.16	6.68	6	0	1	2	203.9	47.39
officer	H P	550	549	593	1.28	13	4.91	4.38	4.41	6.50	7	1	0	3	103.24	24.15
onion	P E	632	550	617	0.95	15	5.37	4.95	4.78	6.05	5	2	0	2	4.24	1.81
operator	H A	452	620	296	0.30	13	4.85	2.67	4.74	7.95	8	0	0	4	16.39	5.66
opponent	H D	440	495	408	0.60	19	4.42	5.50	5.80	8.63	8	0	0	3	4.71	2.17
orange	P E	601	567	626	1.59	14	6.81	4.04	5.58	3.26	6	1	2	2	22.31	8.15
orchard	C	578	427	545	0.00	10	6.15	3.86	5.50	7.67	7	0	1	2	1.92	0.6
orchestra	C	578	533	619	0.90	7	6.50	4.07	5.76	9.44	9	1	0	3	5.51	2.25
oregano	P E	539	608	436	0.48	13	6.11	3.70	5.16	10.88	7	0	0	4	0.82	0.41
organ	Q	596	510	576	1.18	12	4.95	3.41	5.55	8.72	5	0	0	2	7.25	2.93
ornament	O M	615	460	594	0.30	9	6.63	3.32	5.39	6.10	8	0	0	3	1.14	0.61
orthodontist	H P	657	580	420	0.00	6	4.38	4.90	4.22	10.26	12	0	0	4	0.49	0.24
otter	A M	631	391	572	0.48	14	6.95	4.42	5.19	5.47	5	3	13	2	1.35	0.32
outfit	O C	515	489	487	0.48	12	6.05	4.19	6.64	7.00	6	1	3	2	25.1	9.99
outlaw	H D	429	612	400	0.60	20	4.10	6.00	4.10	6.33	6	1	1	2	2.92	0.98
oven	O M	593	577	599	1.18	9	6.16	2.95	6.04	5.67	4	6	3	2	8.88	3.95
owl	A B	614	477	595	0.60	9	6.30	3.57	5.02	6.21	3	4	19	1	5.61	1.63
owner	H A	468	564	425	1.00	23	6.38	4.71	6.59	7.50	5	1	13	2	23.24	10.13
ox	A M	633	364	548	0.48	14	4.95	3.82	5.81	4.72	2	14	10	1	7.78	2.13
oyster	A O	573	453	521	0.95	14	4.81	3.11	5.18	8.00	6	1	6	2	3.06	1.23
package	O M	580	497	529	0.85	19	5.17	4.73	5.17	6.61	7	0	2	2	22.78	8.4
page	Q	571	555	603	1.04	10	6.09	3.45	6.37	5.16	4	12	20	1	37.49	13.66
painter	H P	568	575	565	0.70	23	6.60	3.29	5.71	5.60	7	4	5	2	6.75	2.29
pal	H D	543	608	460	0.70	4	6.67	3.25	5.11	5.74	3	17	36	1	57.59	19.1
palace	F B	579	462	612	0.48	14	6.10	4.67	5.40	6.89	6	1	10	2	19.2	5.22
palm	Q	596	515	555	0.78	8	6.05	2.67	5.83	6.00	4	6	3	1	13.24	5.19
pan	O T	586	566	532	1.18	13	5.15	3.05	6.00	4.72	3	29	41	1	12.29	4.36
panther	A M	683	616	650	0.60	14	6.10	5.45	4.40	6.67	7	0	3	2	2.57	0.55
pants	O C	619	575	630	1.49	22	5.62	3.80	6.29	3.23	5	11	10	1	58.75	21.1
paper	O M	599	635	590	2.21	15	5.42	3.52	5.64	4.00	5	8	14	2	103.35	31.31
parade	C	523	526	578	0.48	25	6.37	4.80	5.78	6.53	6	0	3	2	12.88	5.02
parcel	O M	525	503	509	0.00	14	5.45	4.18	5.83	10.67	6	1	3	2	1.39	0.67
parent	H R	618	684	650	1.51	10	6.73	4.14	5.00	4.22	6	1	1	2	13.14	5.66
park	F L	579	571	573	1.46	21	7.00	2.70	5.56	4.47	4	15	16	1	72.12	22.35
parrot	A B	628	664	650	0.48	9	6.79	4.65	4.25	5.58	6	1	12	2	3.27	1.13
parsley	P E	588	632	580	0.30	29	6.26	2.77	4.26	8.95	7	1	1	2	0.84	0.39
partner	H D	500	555	513	0.85	17	7.11	3.70	6.00	5.85	7	1	1	2	75.22	21.13
passenger	H D	562	543	529	0.30	10	4.55	3.82	4.00	6.65	9	0	0	3	10.76	3.41
paste	O M	559	504	529	0.60	4	4.95	2.62	5.84	4.84	5	8	24	1	1.71	0.85
pasture	F L	562	414	562	0.60	8	6.15	3.14	5.75	6.33	7	1	2	2	1.53	0.79
path	F L	493	565	580	1.11	12	5.71	3.74	4.62	6.11	4	9	18	1	24.55	10.37
patriot	H D	440	616	356	0.30	20	5.80	4.86	6.09	10.14	7	0	1	2	2.61	1.13
peach	P E	617	536	613	1.00	10	6.83	4.70	5.74	4.21	5	7	29	1	6.35	2.53

peak	F L	475	490	493	1.04	12	6.10	3.90	6.48	7.11	4	11	38	1	5.94	2.56
peanut	P E	632	688	690	1.04	15	6.38	3.48	5.74	5.00	6	0	0	2	12.35	4.32
pear	P E	634	567	590	0.78	9	6.70	3.76	5.71	4.00	4	17	39	1	1.33	0.52
pearl	O N	585	447	602	0.90	14	6.05	3.50	5.94	6.28	5	1	32	1	15.67	3.62
pebble	O N	602	498	625	0.48	4	5.72	2.85	4.67	5.68	6	1	6	2	1.27	0.58
pedal	O M	602	512	556	0.60	11	5.16	3.89	6.06	6.50	5	3	18	2	2.04	1.01
pedestrian	H D	540	652	428	0.60	9	5.21	3.71	5.65	9.75	10	0	0	3	1.39	0.67
peer	H D	406	460	376	0.60	12	5.64	4.05	6.05	10.21	4	13	49	1	1.53	0.75
pen	O T	571	554	576	1.63	4	5.63	2.75	6.17	5.11	3	24	37	1	24.73	9.73
pencil	O T	617	598	607	1.48	9	5.65	3.11	6.03	4.06	6	0	1	2	9.86	4.66
pendulum	O M	583	407	605	0.00	11	5.17	2.77	4.13	11.75	8	0	1	3	0.53	0.2
penguin	A B	647	360	670	0.48	17	6.65	4.00	4.86	5.68	7	0	0	2	2.88	0.72
people	C	540	628	548	2.19	18	5.70	3.77	5.40	3.52	6	0	7	2	1102.98	94.05
pepper	P E	591	554	587	1.00	6	5.63	4.30	5.75	5.47	6	2	8	2	8.8	3.18
person	H D	562	620	562	2.13	14	6.10	3.71	6.00	4.67	6	1	8	2	212.88	56.18
pest	L	479	482	445	1.15	15	2.67	5.14	4.36	7.35	4	15	26	1	2.86	1.34
pet	L	557	541	589	0.85	11	7.05	3.76	5.61	4.05	3	22	34	1	20.18	7.43
phantom	S	364	387	499	0.30	10	4.26	5.23	4.46	8.35	7	0	3	2	4.08	1.42
philosopher	H P	500	616	312	0.30	20	6.63	3.71	6.58	11.63	11	0	1	4	3.04	1.36
phone	O T	624	550	587	1.48	10	6.09	3.43	4.44	4.11	5	3	37	1	269.73	53.67
photo	O M	588	594	640	0.85	15	6.58	4.60	6.05	5.16	5	0	2	2	22.84	9.23
physician	H P	573	472	572	0.00	4	5.24	3.96	5.23	8.68	9	0	0	3	6.14	2.8
piano	O I	615	545	630	1.20	14	6.40	3.61	5.42	5.50	5	0	0	3	24.86	7.12
pickle	O E	606	562	641	0.30	15	6.52	3.48	5.84	6.05	6	4	11	2	4.61	1.69
picture	O M	579	597	581	1.73	11	6.73	3.29	6.12	4.05	7	0	1	2	138.45	37.89
pier	F B	588	436	545	0.30	11	5.86	3.75	6.14	9.56	4	5	49	1	6.55	2.54
pig	A M	614	509	635	1.43	22	4.83	3.68	5.04	3.84	3	16	25	1	39.14	12.59
pigeon	A B	609	499	610	0.30	7	5.58	2.95	5.04	6.21	6	0	2	2	5.9	2.16
pillow	O M	613	602	624	1.26	14	7.00	2.90	6.34	3.47	6	2	7	2	11.39	5.4
pilot	H P	595	672	640	1.00	8	6.00	5.60	6.16	6.32	5	2	5	2	26.67	6.76
pimple	B	579	557	617	0.60	13	2.11	3.90	4.09	9.57	6	4	5	2	1.67	0.75
pine	P	592	557	617	0.60	7	6.58	3.25	4.95	5.53	4	22	34	1	6.2	2.52
pipe	O M	602	535	598	1.18	15	4.75	4.11	5.92	8.17	4	7	19	1	19.39	7.67
pirate	H P	496	632	690	0.95	20	4.19	5.26	3.81	6.50	6	1	3	2	7.35	1.94
pistol	O W	659	442	640	0.70	10	3.92	5.79	4.53	7.28	6	2	2	2	10.06	3.86
piston	O M	586	409	526	0.48	9	4.57	4.85	5.55	10.37	6	2	1	2	1.18	0.29
pitcher	Q	650	636	650	0.60	12	5.70	4.09	6.08	6.42	7	3	6	2	3.24	1.28
plane	V	535	558	556	1.59	12	5.72	4.91	5.07	4.95	5	6	13	1	95.53	20.16
planet	F C	523	457	578	1.23	9	6.27	4.35	6.11	6.67	6	3	1	2	38.73	10.23
plant	P	594	592	605	1.74	14	7.05	3.94	6.45	3.95	5	5	7	1	27.61	9.91
plasma	Q	508	472	329	0.00	4	6.05	5.30	5.19	13.05	6	0	0	2	4.98	1.8
plate	O M	595	556	527	1.30	12	4.80	3.18	5.79	3.84	5	7	14	1	25.65	11.03
platform	F B	547	498	529	0.00	12	5.00	4.18	6.42	7.83	8	0	0	2	6.14	2.66
player	H A	580	660	530	1.43	20	5.55	5.95	5.68	6.89	6	5	11	1	37.76	12.29
pledge	Q	360	442	408	0.60	16	5.09	3.95	6.00	7.17	6	2	5	1	6.88	2.75
pliers	O T	645	499	588	0.30	16	4.48	3.55	5.76	7.00	6	1	5	1	1.16	0.58
plum	P E	632	547	611	0.60	13	6.15	2.76	5.26	5.50	4	6	7	1	3.41	1.34
plumber	H P	520	644	640	0.70	14	5.40	3.18	5.59	8.56	7	4	8	2	4.49	1.79
pocket	O M	578	590	558	1.00	18	5.67	4.50	6.37	4.74	6	7	10	2	35.71	15.28
poet	H P	552	544	518	0.60	17	6.85	2.91	5.84	8.61	4	5	4	1	9.22	3.27
poison	O O	527	504	513	1.15	18	2.16	6.01	3.38	5.58	6	1	1	2	24.55	8.3
pole	O M	559	468	482	1.15	14	5.60	3.05	4.59	5.63	4	20	48	1	12.59	4.7
policeman	H P	574	570	629	0.00	25	4.21	4.06	5.76	4.44	9	1	0	3	11.73	4.6
politician	H P	494	556	507	1.15	17	3.25	4.70	4.10	9.11	10	0	0	4	3.27	1.65
pony	A M	611	524	642	0.48	5	6.71	4.29	5.90	5.39	4	13	14	2	8.1	3.11
pool	F B	573	541	577	1.49	13	6.78	3.65	6.39	5.15	4	10	32	1	46.98	14.31
pope	H P	593	489	576	0.60	17	5.18	4.21	4.24	8.83	4	15	26	1	10.71	2.93
population	C	406	543	391	0.30	18	4.81	3.96	4.24	8.11	10	1	1	4	9.1	4.34
porcupine	A M	625	588	612	0.48	17	6.38	4.95	4.89	6.89	9	0	0	3	0.65	0.26
pork	B	585	538	522	1.08	10	5.00	3.80	5.85	5.63	4	11	12	1	10.53	3.77
portrait	O M	570	427	565	0.30	9	6.05	3.20	7.00	7.61	8	0	0	2	5.43	2.29
potato	P E	629	612	617	1.36	23	6.40	2.38	5.46	4.84	6	0	0	3	11.29	4.59
prairie	F L	575	416	569	0.60	14	5.33	2.41	5.38	6.50	7	0	1	2	2.8	1
preacher	H P	532	632	524	0.95	19	5.09	4.55	4.85	6.11	8	2	3	2	6.71	1.73
predator	L	448	632	360	0.00	20	3.24	4.72	3.86	8.45	8	0	1	3	2.63	1.22
president	H P	526	538	572	1.49	19	5.23	4.71	4.38	6.89	9	0	0	3	140.67	18.49
prey	L	464	443	500	0.70	20	3.74	4.56	3.24	9.42	4	3	13	1	5.51	2.52
priest	H P	561	484	568	1.38	13	4.50	3.76	5.82	7.10	6	2	6	1	26.2	6.22
primate	A M	524	580	620	0.30	13	5.84	2.95	4.18	9.32	7	1	0	2	0.69	0.32
prince	H P	542	506	606	0.78	13	5.44	5.15	4.39	5.26	6	2	3	1	45.08	8.21

princess	H P	568	502	547	1.00	10	7.64	5.42	5.74	3.95	8	1	2	2	39.59	8.06
principal	H P	381	491	402	0.30	18	5.30	4.30	5.26	5.58	9	0	0	3	13.75	4.36
prison	F B	570	462	593	1.38	17	1.94	5.10	3.54	7.50	6	2	3	2	66.04	18.2
prisoner	H D	548	485	565	1.15	16	2.67	5.00	2.41	8.00	8	1	1	3	23.14	7.52
prize	O O	474	508	517	0.85	14	8.00	5.50	6.16	5.11	5	3	17	1	22.39	8.76
producer	H P	492	656	272	0.60	13	6.15	3.89	5.81	10.89	8	2	2	3	12.47	4.18
professor	H P	549	583	587	1.30	11	5.72	3.85	4.44	10.89	9	1	1	3	69.57	9.69
property	F A	460	531	466	1.28	12	6.00	4.75	6.68	8.16	8	1	1	3	33.29	13.16
proprietor	H P	518	423	475	0.00	13	5.48	4.00	5.50	12.21	10	1	1	3	1.18	0.44
pudding	O E	593	510	588	0.95	13	6.72	3.80	5.46	4.79	7	4	10	2	6.16	2.38
puddle	F L	604	521	562	0.30	8	4.30	4.33	4.73	5.37	6	8	17	2	1.94	1.06
pupil	Q	570	547	572	0.60	4	5.53	3.76	5.17	8.06	5	1	1	2	3.14	1.38
puppy	A M	623	522	635	1.08	7	7.85	5.84	6.24	3.28	5	4	8	2	11.45	4.57
purse	O M	572	533	567	1.20	12	5.95	3.21	5.68	5.53	5	8	24	1	19.76	8.01
puzzle	O O	449	486	510	1.18	13	6.53	4.42	5.86	5.11	6	3	4	2	7.33	2.96
pyramid	F B	615	386	613	0.85	10	5.68	3.48	5.71	7.61	7	0	0	3	4	1.18
quarter	O M	509	569	531	0.90	15	5.61	3.85	6.04	5.79	7	1	1	2	26.02	10.93
queen	H P	537	527	612	1.38	7	6.52	5.05	6.04	4.42	5	3	3	1	54.69	14.16
quilt	O M	613	490	554	0.48	16	5.91	3.11	5.62	6.55	5	6	3	1	0.76	0.41
rabbi	H P	572	515	557	0.48	10	4.79	4.00	4.32	8.88	5	0	1	2	6.71	1.56
rabbit	A M	635	523	611	1.36	27	7.21	3.98	5.95	3.94	6	1	3	2	20.94	5.33
raccoon	A M	660	636	670	0.60	22	5.85	5.16	5.19	6.79	7	0	0	2	1.43	0.6
racket	O T	562	486	530	0.60	3	3.95	4.33	4.45	8.20	6	4	3	2	7.43	3.58
radio	O M	615	644	613	1.38	13	6.00	3.84	6.27	5.17	5	3	2	3	77.18	19.36
raft	V	598	523	483	0.48	17	5.70	4.55	5.76	7.35	4	8	20	1	4.71	1.56
rail	O M	540	505	556	0.70	14	5.10	2.62	5.50	7.89	4	15	54	1	4.57	2.1
railroad	F B	579	493	596	0.78	7	5.68	3.95	5.29	6.06	8	0	0	2	12.43	3.49
rain	W	600	604	618	1.79	18	6.58	3.29	4.25	3.60	4	12	51	1	48.9	17.24
rainbow	W	531	469	662	0.70	9	7.30	3.94	6.11	4.26	7	0	0	2	7.98	2.77
ram	A M	541	468	546	0.00	12	4.37	4.50	5.27	8.32	3	23	41	1	6.43	2.35
raspberry	P E	594	513	636	0.70	15	7.30	3.71	6.33	5.33	9	0	0	3	1.88	0.85
rat	A M	624	548	588	1.32	19	3.21	5.90	3.35	5.11	3	28	44	1	32.61	11.22
razor	O T	632	491	575	0.78	5	4.90	4.23	5.93	7.11	5	1	12	2	6.88	3
reader	H A	530	652	308	0.60	16	6.52	4.45	6.95	5.37	6	7	28	2	5.45	2.44
rebel	H D	439	448	497	0.95	26	4.37	5.29	5.20	9.95	5	2	6	2	5.35	1.98
receipt	O M	474	498	432	0.30	23	5.41	4.50	5.38	8.53	7	0	5	2	7.43	3.35
receptionist	H P	528	660	472	0.30	13	5.37	3.09	5.58	9.95	12	0	0	4	1.9	0.92
reef	C	641	499	485	0.48	8	5.63	3.67	5.29	9.72	4	5	30	1	4	0.94
referee	H P	554	534	564	0.30	19	5.10	3.65	5.09	7.61	7	0	0	3	3.59	1.26
refrigerator	O M	574	545	612	0.78	9	5.76	3.25	5.82	4.11	12	0	0	5	8.37	3.74
region	F A	435	488	287	0.00	10	5.21	3.24	6.04	9.14	6	1	2	2	5.02	2.59
reindeer	A M	576	620	630	0.60	11	6.62	3.59	5.50	3.58	8	0	0	2	3.37	1.03
relation	L	383	585	451	0.60	16	5.84	4.36	5.75	8.11	8	0	0	3	4.12	1.97
reptile	A R	578	490	579	0.78	8	4.58	5.89	4.55	6.05	7	0	0	2	1.41	0.63
republic	C	376	458	356	0.48	17	4.80	3.48	5.16	10.83	8	0	0	3	5.61	1.97
republican	H D	444	648	304	0.78	9	4.26	3.11	5.40	11.28	10	0	0	4	4.04	1.69
resort	F B	499	523	523	0.30	11	7.76	4.16	6.09	9.28	6	2	2	2	6.9	3.15
restaurant	F B	683	668	552	1.36	12	6.95	4.19	5.82	5.95	10	0	0	3	46.53	14.83
rib	B	599	536	586	0.00	22	6.10	2.29	5.00	6.30	3	15	26	1	5.9	2.55
ribbon	O M	600	480	563	0.95	14	6.70	3.63	5.31	5.25	6	1	3	2	5.06	1.86
rice	P E	608	548	506	1.04	19	5.70	3.00	5.50	3.72	4	17	34	1	15.08	5.33
rider	H A	555	640	530	0.60	12	5.36	4.41	5.37	6.37	5	9	21	2	7.71	2.49
rifle	O W	606	477	581	0.78	10	4.30	6.14	5.28	7.85	5	0	6	2	14.57	4.59
ring	O M	593	589	601	1.75	13	7.09	4.43	5.44	4.53	4	13	28	1	92.75	24.74
river	F L	585	565	633	1.48	20	6.72	4.22	4.89	4.90	5	13	12	2	55.47	14.44
roach	I	642	385	365	0.95	17	2.19	5.26	3.33	7.15	5	3	25	1	2.65	0.87
robber	H A	545	493	549	1.08	16	2.90	6.20	3.92	5.74	6	4	12	2	4.69	1.79
robe	O C	574	491	566	0.95	18	5.53	3.10	5.70	6.38	4	11	25	1	8.49	3.31
robin	A B	637	487	615	0.78	6	6.63	2.64	4.35	6.69	5	2	3	2	24.94	3.34
robot	Q	572	672	660	0.30	15	6.18	4.43	5.14	5.35	5	0	2	2	12.18	2.58
rock	O N	600	583	612	1.81	13	5.72	3.14	5.26	3.22	4	14	41	1	86.16	22.71
rocket	V	645	525	612	0.85	18	5.80	5.04	5.57	5.63	6	7	5	2	11.84	3.43
rodent	A M	576	624	630	0.90	5	3.56	3.83	4.06	6.95	6	0	0	2	1.8	0.87
roof	F B	586	552	604	1.18	9	4.48	3.40	7.05	5.00	4	9	27	1	35.65	13.69
roommate	H D	532	660	300	0.78	19	5.29	4.13	4.52	9.21	8	0	0	2	11.39	4.3
rooster	A B	620	385	680	0.70	7	5.53	4.57	5.09	6.41	7	3	4	2	3.86	1.22
root	P	558	554	565	0.90	10	5.33	3.62	6.05	5.94	4	15	44	1	10.47	4.55
ruby	O N	594	445	562	0.78	10	6.79	4.05	6.00	6.83	4	3	8	2	11.9	1.8
ruler	Q	555	571	543	1.40	16	5.00	4.47	6.62	5.94	5	4	11	2	3.18	1.65
runner	H A	528	531	546	0.95	27	5.68	5.05	5.90	5.00	6	3	9	2	4.96	1.85

rye	P E	600	388	459	0.30	2	5.45	3.78	5.45	9.26	3	11	45	1	4.16	1.67
sack	O M	582	539	548	0.70	9	5.11	4.24	5.00	5.83	4	15	38	1	12.92	6.01
saddle	O M	603	436	578	0.60	4	4.95	3.10	5.25	6.42	6	2	11	2	7.82	3.16
sage	Q	462	424	434	0.30	14	5.79	3.33	5.25	11.39	4	16	20	1	1.75	0.75
sailor	H P	613	640	630	0.90	14	6.10	3.87	6.09	6.44	6	2	23	2	12.39	3.37
saint	H D	458	463	394	1.04	24	6.40	3.48	5.82	7.49	5	6	10	1	17.92	6.01
salad	P E	595	554	623	1.52	15	6.35	3.78	6.11	5.61	5	0	4	2	17.02	6.99
salesman	H P	500	660	472	0.78	28	4.10	3.00	5.05	8.29	8	2	1	2	10.43	4.46
salmon	A F	624	644	660	0.48	6	6.48	3.87	4.81	8.00	6	2	8	2	6.55	2.19
salt	O N	594	612	570	1.56	7	6.05	4.53	6.04	5.05	4	9	11	1	19.51	7.3
sap	Q	540	377	451	0.30	5	4.19	3.92	4.77	7.53	3	24	31	1	3.49	1.57
sapphire	O N	572	380	560	0.00	12	6.92	4.88	6.00	9.22	8	0	1	2	1.2	0.3
savior	H D	412	624	530	0.70	13	6.59	4.37	5.23	6.68	6	0	0	2	3.39	1.6
saxophone	O I	624	453	602	0.95	17	6.32	4.67	5.74	9.10	9	0	0	3	1.69	0.52
scale	Q	475	523	463	0.85	14	5.06	3.80	5.17	8.85	5	7	10	1	9.51	4.66
scapegoat	H D	408	604	244	0.00	21	3.00	4.80	3.65	11.75	9	0	0	2	1.1	0.58
scar	B	552	529	565	0.78	26	3.71	6.55	4.10	5.68	4	7	9	1	8.47	3.66
scarf	O C	407	591	610	0.60	17	6.00	2.39	6.39	5.68	5	6	3	1	4.69	1.97
school	F B	573	582	599	2.26	22	5.41	4.57	5.88	3.89	6	0	10	1	333.12	54.02
scientist	H P	648	672	484	1.18	17	5.83	4.14	6.68	6.89	9	0	0	2	12.18	4.73
scissors	O T	596	559	609	0.85	4	5.03	4.02	6.89	4.50	8	0	8	2	6.69	2.47
scout	H P	562	452	578	0.78	10	6.00	4.52	5.32	6.94	5	7	15	1	12.88	4.9
screw	O T	642	520	517	0.85	14	5.24	5.40	5.16	6.65	5	3	5	1	37.49	15.98
seagull	A B	643	636	600	0.78	10	5.27	2.90	4.41	5.42	7	0	0	2	1.22	0.41
seal	Q	587	482	563	1.08	25	5.00	2.50	5.63	5.42	4	17	56	1	14.75	5.63
seat	O F	568	597	574	1.30	10	5.22	3.00	6.05	4.58	4	22	48	1	78.78	29.12
secretary	H P	576	528	563	1.04	21	5.18	3.80	6.68	7.75	9	0	0	4	33.22	9.32
seed	P	611	514	542	1.00	13	6.38	3.68	5.19	4.72	4	20	55	1	7.57	3.31
self	H D	459	604	466	1.36	13	6.86	4.78	7.74	5.00	4	4	9	1	14.16	6.37
seller	H P	444	459	427	0.60	12	4.82	4.09	4.68	6.84	6	5	13	2	2.2	1.01
senate	C	540	433	248	0.48	14	3.38	3.63	3.52	10.79	6	1	6	2	6.49	1.56
senator	H P	504	648	352	0.60	18	4.32	3.75	5.84	9.58	7	0	0	3	33.16	3.64
sergeant	H P	511	480	549	1.04	16	3.89	5.10	3.83	9.00	8	0	0	2	62.94	9.51
serpent	A R	564	604	590	0.00	8	3.45	4.83	3.59	8.00	7	0	0	2	1.94	0.79
servant	H P	515	437	508	0.78	15	4.00	3.77	4.71	7.89	7	0	1	2	12.14	4.59
shadow	O N	457	536	565	0.48	18	5.07	3.10	4.41	5.00	6	0	4	2	21.18	7.44
shark	A F	611	516	602	1.04	20	4.02	5.27	4.87	5.47	5	9	13	1	14.98	3.08
sheep	A M	622	507	596	1.11	17	5.32	2.95	4.42	4.25	5	7	32	1	13.43	4.67
sheet	O M	608	616	594	1.04	8	5.57	2.64	5.00	5.33	5	6	38	1	11.61	5.53
shell	Q	597	524	581	1.32	17	6.05	3.23	5.62	5.22	5	6	33	1	13.22	4.8
shelter	F B	560	549	590	1.04	15	6.50	3.25	6.11	9.21	7	1	1	2	11.67	4.47
shepherd	H P	598	435	600	0.00	13	5.75	3.05	5.72	6.67	8	0	2	2	7.43	2.16
sheriff	H P	634	652	660	0.78	8	4.44	4.30	3.67	6.00	7	0	2	2	61.08	7.89
shield	O M	576	464	556	0.85	15	5.91	3.65	6.41	6.50	6	0	16	1	8.2	3.05
ship	V	615	553	612	1.70	9	6.14	3.94	5.84	5.33	4	11	25	1	98.88	13.87
shirt	O C	616	612	612	1.69	17	5.56	2.30	5.67	3.53	5	7	24	1	46.37	16.69
shoe	O C	600	569	601	1.48	14	5.78	2.40	5.44	2.60	4	7	53	1	30.39	10.65
shorts	O C	618	594	580	1.04	16	5.95	4.23	6.57	3.95	6	7	8	1	9.41	4.24
shoulder	B	589	553	577	0.95	21	5.10	2.96	4.81	4.50	8	1	7	2	26.2	11.64
shovel	O T	581	528	538	1.11	13	4.80	3.50	6.42	6.28	6	2	5	2	6.84	3
shrimp	A O	629	546	618	0.95	15	6.95	3.78	5.23	7.11	6	1	2	1	8.71	2.93
sibling	H R	536	644	610	0.48	12	7.27	5.16	4.81	7.58	7	1	0	2	0.96	0.48
singer	H A	553	548	575	1.28	20	6.90	4.86	5.79	5.06	6	10	13	2	15.69	4.72
siren	Q	538	431	578	0.00	17	3.80	6.10	4.88	7.06	5	2	4	2	6.55	2.73
sister	H R	575	588	613	1.34	16	7.00	3.86	5.59	3.68	6	4	5	2	180.53	36.31
site	F A	408	507	406	0.60	20	5.22	3.55	6.09	8.63	4	12	35	1	19.22	7.16
skeleton	B	643	636	620	0.60	11	4.37	4.55	4.64	6.68	8	0	0	3	5.12	1.73
skillet	O T	572	555	670	0.00	7	5.85	3.24	5.33	8.20	7	1	0	2	1.22	0.38
skin	B	614	591	638	1.62	23	5.78	3.25	5.00	4.48	4	8	12	1	44.04	18.26
skirt	O C	614	551	573	1.23	15	6.14	4.88	5.86	5.67	5	3	13	1	9.96	4.59
skull	B	570	503	609	0.48	9	3.63	4.98	4.19	6.33	5	3	9	1	14.71	6
skunk	A M	648	519	652	0.60	5	3.78	5.81	4.04	5.32	5	4	4	1	3.25	1.28
sky	W	542	607	618	1.68	12	7.32	2.74	5.61	4.17	3	7	5	1	44.8	14.7
skyscraper	F B	618	489	577	0.48	8	5.84	5.33	5.25	8.26	10	0	0	3	0.78	0.39
slave	H D	539	418	564	1.04	18	2.06	4.53	2.61	7.84	5	7	11	1	18.43	5.94
sleeve	O C	587	560	550	0.48	10	5.95	3.26	6.05	4.94	6	0	7	1	5.61	2.87
sleigh	V	613	531	608	0.00	9	6.11	3.42	5.85	6.00	6	0	16	1	3.27	0.85
slug	Q	584	596	570	0.00	15	3.16	4.90	4.56	6.00	4	8	11	1	4.96	2.25
slum	F A	450	434	408	0.30	20	2.55	4.20	3.83	11.90	4	11	14	1	1.27	0.61
snail	A O	579	489	577	0.78	8	4.52	3.05	5.58	5.79	5	1	3	1	1.76	0.64

snake	A R	621	501	627	1.41	21	4.03	7.24	3.65	5.10	5	6	10	1	22.35	6.27
snob	H D	375	616	450	1.45	18	2.53	4.68	4.81	9.32	4	6	5	1	2.18	1.03
snow	W	618	615	597	1.63	14	6.78	4.57	5.62	4.11	4	8	4	1	31.35	9.22
soap	O M	598	594	600	1.62	22	7.10	2.62	5.32	3.17	4	6	28	1	15.2	6.14
society	C	335	601	440	0.90	18	5.24	4.55	6.32	8.70	7	1	2	3	32.92	12.22
sock	O C	581	578	553	0.78	8	4.43	3.09	5.14	2.94	4	13	42	1	8.98	3.6
soda	O E	600	536	544	1.48	12	5.47	4.77	6.04	4.42	4	6	6	2	19.84	7.95
sofa	O F	629	564	597	0.90	10	6.26	2.90	5.84	4.50	4	5	3	2	5.86	2.69
soil	O N	581	516	566	1.04	6	5.21	2.76	5.18	6.48	4	7	24	1	7.78	3.47
soldier	H P	578	517	578	1.45	13	5.45	5.90	5.84	6.94	7	0	1	2	38.92	9.9
son	H R	638	607	560	0.90	6	6.91	4.43	5.00	3.78	3	29	40	1	410.76	61.34
soul	S	289	544	366	0.90	20	6.61	4.30	6.56	6.17	4	5	50	1	76.96	24.33
spade	O T	565	513	578	0.30	13	5.48	3.74	4.88	8.11	5	7	16	1	2.31	0.68
sparrow	A B	629	523	583	0.00	5	6.58	3.78	4.68	7.49	7	0	0	2	2.61	0.69
spatula	O T	586	407	517	0.00	16	5.14	2.86	6.41	7.32	7	0	0	3	1.1	0.37
speaker	H A	537	554	549	0.95	21	5.32	4.35	5.47	6.11	7	1	3	2	6.9	3.17
sphere	O O	489	457	562	0.48	9	6.21	4.00	5.60	8.26	6	0	4	1	2.47	0.56
sphinx	S	508	516	540	0.30	11	6.05	4.90	5.27	10.22	6	0	2	1	1.02	0.37
spice	P E	590	518	592	1.30	17	6.55	4.06	6.00	6.78	5	7	9	1	5.29	1.92
spider	I	607	526	597	0.85	12	3.35	6.91	3.74	3.43	6	0	6	2	10.1	2.75
spinach	P E	589	452	606	0.48	14	5.81	3.43	5.46	4.94	7	0	1	2	2.55	1.07
spine	B	622	492	543	0.78	10	5.33	3.14	5.52	7.35	5	10	17	1	5.75	2.87
spirit	S	296	518	450	0.90	17	7.00	5.03	6.38	7.11	6	0	1	2	49.35	17.48
spoon	O T	614	612	584	1.20	12	5.90	3.79	5.18	2.50	5	5	12	1	7.61	3.22
spring	Q	524	588	585	1.23	14	7.64	5.50	5.90	5.50	6	6	12	1	31.31	12.24
spy	H P	452	644	430	0.95	26	4.68	4.74	3.84	8.00	3	7	7	1	20.06	6.14
squad	C	522	488	432	0.30	10	5.35	4.33	5.82	9.55	5	4	4	1	21.49	6.71
squirrel	A M	612	511	642	0.90	11	5.71	4.48	5.62	4.44	8	0	0	2	5.47	1.97
staff	Q	515	577	478	0.78	23	5.18	4.30	6.26	10.00	5	2	9	1	32	11.77
stallion	A M	588	608	616	0.30	8	6.35	4.77	6.56	9.42	8	1	2	2	3.2	1.13
star	F C	574	574	623	1.71	16	7.47	5.50	5.82	3.89	4	10	9	1	81.35	21.71
state	F A	440	560	511	1.52	15	5.73	3.29	5.65	6.39	5	9	17	1	107.84	31.82
station	F B	572	548	554	1.15	10	5.50	3.00	4.61	7.11	7	0	0	2	79.08	25.02
statue	O M	600	444	562	1.18	17	5.95	2.82	4.95	7.55	6	1	1	2	10.59	3.78
steam	O N	552	545	591	0.90	18	5.40	4.00	4.84	6.26	5	4	8	1	13.45	4.86
steeple	F B	561	405	559	0.48	6	5.62	3.04	4.89	7.21	7	1	5	2	0.41	0.19
stem	P	556	513	533	0.70	9	5.10	3.47	6.19	7.26	4	5	8	1	2.24	1.13
stew	O E	603	522	587	0.70	10	5.86	2.95	5.36	6.95	4	8	6	1	6.43	2.53
stewardess	H P	657	616	512	0.00	13	5.90	4.14	4.97	9.35	10	0	0	2	3.16	1.24
stick	P	604	528	517	1.74	24	5.27	3.81	5.82	3.89	5	6	15	1	97.12	35.71
stomach	B	617	547	551	1.34	17	4.53	3.76	5.40	5.26	7	1	0	2	33.82	14.53
stone	O N	632	513	615	1.54	10	4.81	3.25	7.26	4.44	5	9	16	1	40.63	11.18
stool	O F	592	531	584	0.60	16	4.47	2.39	5.20	6.21	5	4	17	1	3.51	1.86
storm	W	527	555	587	1.38	12	5.74	5.86	3.72	4.94	5	3	6	1	30.86	9.85
stove	O M	591	525	592	1.20	11	5.63	3.82	6.08	4.32	5	8	9	1	7.59	3.36
stranger	H D	441	522	454	0.78	20	4.09	5.80	4.84	4.53	8	1	0	2	27	11.75
straw	Q	603	508	568	1.00	16	5.89	2.35	5.24	4.22	5	5	2	1	6.24	2.93
strawberry	P E	610	539	631	1.20	21	7.25	4.05	5.54	4.21	10	0	0	3	5.53	1.98
stream	F L	624	495	580	1.18	10	6.90	4.35	5.09	6.47	6	2	6	1	8.04	3.51
street	F B	584	674	630	1.60	15	5.07	3.45	5.41	4.58	6	0	5	1	148.18	40.67
string	O O	570	566	556	1.43	17	5.25	3.80	5.62	4.94	6	5	14	1	12.67	6.02
stud	Q	620	628	490	0.00	21	4.89	5.14	5.05	10.78	4	5	15	1	6.94	3.21
student	H P	549	632	603	1.41	22	6.41	4.25	6.79	5.94	7	0	0	2	43.04	13.59
stump	P	540	447	490	0.00	11	4.62	3.85	4.54	7.58	5	3	3	1	2.45	0.95
submarine	V	583	450	588	0.78	13	6.00	4.24	4.61	7.94	9	0	0	3	7.1	1.67
sugar	O E	620	608	595	1.53	12	6.56	5.29	6.32	3.95	5	0	1	2	37.76	13.66
summer	W	439	612	618	1.30	10	7.50	5.48	6.61	4.33	6	7	15	2	78.67	19.42
sun	F C	617	635	639	1.91	14	6.92	4.64	4.98	3.40	3	21	40	1	69.67	23.33
sunset	F L	525	539	633	0.95	14	7.46	4.68	5.32	6.06	6	0	0	2	10.31	4.47
supervisor	H A	488	660	328	0.60	11	4.28	4.05	5.55	9.17	10	0	1	4	5.96	2.86
supper	O E	563	593	590	0.60	11	6.72	3.60	5.64	6.32	6	2	10	2	19.37	7.05
surgeon	H P	600	660	690	0.78	8	5.05	5.78	5.00	8.58	7	1	3	2	16.43	5.96
swamp	F L	570	438	600	0.95	24	4.42	3.33	4.12	7.95	5	3	2	1	8.98	2.43
sweat	B	569	545	560	1.56	16	4.38	5.10	4.69	7.26	5	3	8	1	21.86	10.29
sweetheart	H D	428	656	320	0.48	13	7.84	5.39	6.76	6.26	10	0	0	2	64.16	21.82
swimmer	H A	528	672	576	0.30	19	6.26	4.26	6.48	5.11	7	3	4	2	3.73	1.05
sword	O W	577	444	597	1.04	18	5.27	5.95	6.00	5.45	5	3	26	1	26.18	5.51
symphony	C	535	616	528	0.60	7	7.15	4.19	5.62	8.33	8	0	0	3	3.55	1.62
synagogue	F B	545	431	498	0.60	5	4.85	2.56	4.64	11.73	9	0	0	3	0.96	0.37
syrup	O E	600	471	535	0.85	12	6.44	3.11	5.25	5.42	5	0	5	2	5.1	1.87

table	O F	604	599	582	1.65	10	5.49	3.00	5.84	4.39	5	5	8	2	105.63	34.44
tail	B	613	533	551	1.36	17	5.30	3.27	5.32	3.70	4	14	42	1	23.9	9.79
tangerine	P E	645	495	625	0.00	7	6.81	3.90	6.00	8.15	9	0	0	3	0.75	0.29
tank	Q	581	511	563	1.00	14	4.71	4.32	4.92	7.17	4	13	16	1	25.61	8.04
tea	P E	609	572	599	1.28	11	6.56	2.05	6.00	5.47	3	15	52	1	58.63	16.77
teacher	H P	569	599	575	1.81	12	7.37	2.90	5.95	4.55	7	1	6	2	55.73	15.56
team	C	492	538	565	1.46	17	5.91	3.38	6.53	6.00	4	11	27	1	147.61	31.27
technician	H P	472	628	372	0.48	22	5.65	3.33	4.81	8.82	10	0	0	3	2.59	1.2
teenager	H D	560	676	484	1.04	22	4.58	4.23	4.30	7.22	8	1	1	3	6.88	3.43
telescope	O T	592	461	596	0.48	17	6.75	3.38	6.07	6.95	9	0	0	3	2.94	1.04
teller	H P	555	628	380	0.70	4	5.33	3.00	4.32	9.90	6	6	18	2	2.57	1.07
temple	F B	565	450	547	1.11	12	5.30	3.36	5.84	8.79	6	0	5	2	17.55	4.88
tenor	H D	448	496	310	0.30	13	5.48	4.00	5.69	12.56	5	2	14	2	1.55	0.57
tent	F B	608	521	593	1.15	15	6.23	3.38	5.91	5.16	4	17	25	1	17.49	5.31
termite	I	596	624	590	0.00	11	3.08	4.24	3.53	7.94	7	0	0	2	0.75	0.29
territory	F A	459	465	445	0.60	19	5.30	4.32	6.23	8.94	9	0	0	4	14.67	6.22
thermometer	O T	612	481	581	0.48	11	5.22	3.36	5.32	6.63	11	0	0	4	2.2	0.93
thief	H A	519	529	529	1.51	11	2.32	6.05	3.14	7.22	5	1	10	1	24.27	8.39
thigh	B	674	537	543	0.60	11	5.22	5.32	5.73	6.42	5	0	34	1	3.75	1.81
thing	Q	350	587	358	1.43	20	5.55	3.43	5.41	4.58	5	6	17	1	1088.67	96.07
thorn	P	586	454	600	0.90	16	3.62	4.20	4.10	5.97	5	2	18	1	5.1	0.85
thread	O M	607	522	568	1.28	6	5.50	3.87	5.50	7.06	6	1	9	1	5.16	2.5
throat	B	578	548	561	1.04	15	4.76	4.20	5.84	5.09	6	1	8	1	36.02	14.77
throne	O F	580	415	583	0.00	7	5.45	5.22	6.19	7.28	6	2	10	1	8.65	2.77
thumb	B	638	601	599	0.95	8	5.62	3.84	5.79	4.42	5	1	16	1	11.82	4.82
thunder	W	547	547	554	0.60	6	5.74	5.75	3.90	4.89	7	0	5	2	13.31	4.17
ticket	O M	590	586	574	1.30	19	5.28	3.95	5.00	5.32	6	4	1	2	45.57	15.76
tide	W	516	504	530	0.48	16	6.55	5.47	4.76	6.68	4	15	37	1	7.35	3.33
tiger	A M	611	513	606	1.32	15	6.00	5.55	4.40	4.00	5	5	8	2	18.53	5.26
timber	P	578	440	553	0.00	8	4.90	3.73	5.37	6.47	6	1	2	2	2.49	0.89
toad	A O	568	516	591	0.60	4	6.00	3.62	4.84	6.11	4	7	36	1	5.69	1.55
toast	O E	582	571	594	1.28	14	6.73	3.65	6.39	4.67	5	3	13	1	33.47	13.16
toaster	O M	579	520	580	0.70	5	5.80	3.85	6.23	6.72	7	4	7	2	3.88	1.41
tobacco	P E	609	558	601	0.85	14	3.37	5.00	4.13	7.39	7	0	0	3	6.98	2.55
toe	B	607	578	620	1.04	7	5.24	3.10	5.10	3.00	3	22	59	1	12.69	4.6
toilet	O F	586	567	603	1.20	15	3.71	4.50	6.37	3.54	6	2	0	2	28.9	11.37
tomato	P E	662	574	610	1.20	17	5.80	2.68	5.46	4.61	6	0	0	3	5.9	2.42
tongue	B	634	531	621	1.08	13	6.29	4.25	6.32	4.47	6	1	23	1	31.16	13.32
tool	O T	570	532	538	1.53	12	5.07	3.91	5.98	5.37	4	8	29	1	10.75	4.4
tooth	B	619	578	624	1.23	14	5.06	3.52	4.89	3.61	5	3	13	1	13.57	4.78
tornado	W	644	484	591	1.00	13	3.63	7.45	2.87	6.21	7	0	0	3	2.55	0.91
tortoise	A R	602	415	539	0.48	7	5.58	3.32	5.54	5.88	8	0	0	2	1.12	0.32
tourist	H A	533	536	577	0.48	25	5.71	3.57	5.05	8.76	7	1	4	2	4.65	2.23
towel	O M	683	610	680	1.15	19	6.14	2.90	5.86	3.22	5	6	6	1	14.16	6.26
tower	F B	585	463	596	0.85	20	5.24	3.86	5.45	6.33	5	12	24	1	22.84	6.44
town	F A	556	589	553	1.15	10	5.59	3.81	5.47	5.11	4	7	20	1	247.92	49.07
toy	O M	567	550	569	1.32	19	7.29	4.29	5.61	3.00	3	18	24	1	16.84	6.7
tractor	V	590	518	585	0.85	10	5.05	3.73	5.75	5.50	7	1	1	2	3.73	1.26
trail	F L	511	508	525	1.08	21	6.15	4.00	5.42	5.61	5	5	11	1	19.2	7.44
trailer	Q	597	528	587	0.70	14	4.44	2.85	5.16	6.37	7	4	9	2	11.35	3.47
train	V	592	548	593	1.56	19	6.36	4.05	5.72	4.00	5	7	12	1	95.06	20.98
traitor	H A	467	467	447	0.70	26	2.39	4.27	4.73	9.44	7	1	11	2	10.59	3.71
trash	O M	588	541	599	1.28	11	2.74	3.66	4.24	4.47	5	3	9	1	22.47	9.59
tray	O M	590	558	550	0.85	19	5.14	3.57	6.05	6.05	4	10	13	1	8.04	3.35
tree	P	604	613	622	2.03	21	7.59	2.67	5.62	3.57	4	5	16	1	65	19.34
triangle	O O	523	512	597	1.00	14	5.21	3.50	5.06	4.90	8	0	0	3	4.27	1.49
tribe	C	504	503	515	0.48	6	5.63	4.29	5.50	8.17	5	5	8	1	6.37	2.29
trombone	O I	606	481	579	0.60	16	5.00	3.43	6.11	7.83	8	0	0	2	1.27	0.56
trophy	O M	629	447	617	0.48	9	6.55	4.35	6.73	5.55	6	0	1	2	7.55	2.68
trout	A F	617	479	617	0.48	2	5.62	3.85	5.67	8.56	5	2	6	1	4.02	1.34
truck	V	595	620	621	1.48	17	5.16	3.76	5.43	3.79	5	4	6	1	72.86	18.54
trumpet	O I	608	490	628	1.08	16	6.03	4.17	6.02	6.28	7	2	1	2	4.12	1.18
trunk	O M	596	485	529	0.70	13	5.02	3.51	5.46	8.30	5	3	2	1	19.8	6.69
tube	O O	581	539	564	1.08	25	5.53	3.14	4.68	5.50	4	5	14	1	16.43	5.42
tulip	P	619	546	641	0.48	7	7.25	3.40	5.36	7.15	5	0	0	2	0.78	0.31
tumor	Q	552	656	570	0.48	17	2.05	5.33	2.50	10.32	5	4	11	2	5.16	1.56
tuna	A F	653	628	670	0.78	5	5.26	4.14	5.70	5.73	4	5	4	2	8	2.91
tunnel	F L	555	541	578	0.95	18	4.48	4.09	4.31	5.89	6	2	9	2	17.88	5.31
turkey	A B	663	664	650	1.08	14	5.90	3.45	5.59	3.95	6	0	7	2	22.61	6.82
turnip	P E	616	620	620	0.00	14	4.63	3.32	6.08	7.00	6	0	0	2	1.73	0.54

turtle	A R	644	509	564	0.85	18	6.16	2.52	5.82	4.17	6	2	14	2	17.04	3.09
twig	P	559	493	555	0.60	6	5.47	3.18	5.23	6.28	4	4	8	1	1.35	0.74
twin	L	558	490	543	0.85	15	5.81	3.95	4.09	6.06	4	3	10	1	10.43	4.04
twister	W	564	624	660	0.30	10	4.25	6.00	4.89	7.53	7	2	2	2	1.55	0.69
typewriter	O M	611	524	615	1.08	17	5.44	2.40	5.96	6.74	10	1	0	3	3.16	1.1
typhoon	W	542	331	536	0.30	13	3.62	5.82	3.38	9.78	7	0	1	2	1.47	0.41
ulcer	B	558	423	516	0.30	14	2.70	4.76	3.35	12.68	5	0	0	2	2.57	1.03
umbrella	O T	606	511	592	0.70	8	5.84	3.50	5.75	5.68	8	0	0	3	7.49	2.49
umpire	H P	581	542	572	0.48	13	4.19	4.57	4.43	7.56	6	1	1	2	1.06	0.36
uncle	H R	580	557	574	0.78	6	6.50	4.05	5.24	4.47	5	0	1	2	124.06	22.23
unicorn	S	400	632	652	0.30	16	6.86	5.14	5.14	4.83	7	0	0	3	2.47	0.44
uniform	O C	550	484	591	1.00	20	4.37	3.55	4.67	5.60	7	0	0	3	24.82	9.63
university	F B	533	622	615	0.90	14	6.95	4.24	5.70	10.72	10	0	0	5	23.59	8.26
utensil	O T	567	494	534	0.78	11	5.36	2.95	6.62	7.67	7	0	0	3	0.24	0.11
vacuum	O O	389	487	479	0.90	13	5.38	4.63	6.52	6.74	6	0	1	2	5.76	2.48
vagrant	H D	436	500	260	0.60	13	2.63	3.82	3.92	13.21	7	0	0	2	0.63	0.35
valley	F L	575	515	600	0.90	13	6.22	2.70	5.12	7.94	6	3	14	2	25	7.15
van	V	606	542	572	0.48	13	4.43	4.35	5.35	5.20	3	18	29	1	51.78	10.91
vase	O M	595	452	563	1.23	14	5.77	3.57	6.11	7.89	4	9	24	1	3.84	1.44
vegetable	P E	602	591	598	1.30	14	6.79	3.75	5.17	4.17	9	0	0	3	5.71	2.84
vehicle	V	558	534	593	1.20	9	6.00	4.68	5.80	6.58	7	1	0	3	22.61	7.96
vein	B	553	496	546	0.60	10	5.11	3.70	4.57	8.53	4	6	44	1	3.59	1.65
venom	B	476	375	456	0.48	2	2.93	5.81	3.92	7.95	5	0	2	2	2.33	0.76
vessel	V	571	461	525	0.48	11	5.20	3.62	4.28	9.94	6	0	5	2	9.35	2.96
vest	O C	575	472	581	0.00	9	5.74	4.10	6.25	5.83	4	11	22	1	5.57	2.42
veteran	H D	508	443	439	0.48	8	6.86	4.16	5.41	9.90	7	0	0	3	3.75	1.88
victim	H D	467	511	521	1.00	20	2.05	5.37	2.77	9.39	6	0	0	2	47.73	14.02
village	F A	576	524	578	0.48	15	5.95	3.40	5.60	7.84	7	2	3	2	33.57	9.23
villain	H D	444	624	570	0.60	11	3.00	4.91	3.46	8.28	7	1	3	2	4.16	1.61
vine	P	601	411	564	0.60	12	6.39	2.70	5.08	6.95	4	19	34	1	2.1	0.95
vinegar	O E	645	468	562	0.48	12	5.33	3.55	4.75	7.11	7	0	0	3	1.69	0.83
violin	O I	626	468	606	1.04	12	6.56	3.41	5.58	7.45	6	0	1	2	4.75	1.45
virgin	H D	476	648	540	0.85	22	5.56	4.58	5.87	10.63	6	1	0	2	18.84	6.51
visitor	H A	482	560	499	0.48	13	5.27	4.00	5.29	6.37	7	0	0	3	8.75	4.43
vodka	O E	576	573	613	1.00	17	5.68	5.23	3.91	11.11	5	0	0	2	10.1	3.97
voice	B	485	596	489	1.28	16	6.50	3.25	6.22	4.83	5	1	13	1	86.16	28.56
volcano	F L	591	461	627	1.00	10	4.59	6.70	3.62	6.74	7	0	0	3	3.33	1.29
volunteer	H D	460	672	324	0.60	13	7.35	3.95	6.68	6.89	9	0	0	3	9.31	4.28
wagon	V	618	443	576	1.15	13	5.21	3.10	5.45	5.22	5	0	0	2	17.76	5.58
waist	B	563	540	530	0.60	14	5.32	4.00	6.05	6.42	5	2	18	1	5.14	2.62
waiter	H P	665	652	680	1.00	12	5.05	3.05	4.68	8.28	6	7	17	2	13.2	5.16
waitress	H P	516	664	670	0.95	14	5.10	3.50	4.95	7.22	8	0	1	2	11.53	4.74
wallet	O M	584	558	617	0.78	10	6.00	4.25	6.08	5.89	6	5	3	2	22.8	8.21
walnut	P E	642	538	590	0.00	15	6.39	2.81	4.80	6.16	6	0	0	2	1.96	0.69
walrus	A M	629	506	590	0.00	16	5.79	3.95	5.23	5.06	6	0	0	2	1.12	0.48
warehouse	F B	578	449	502	0.30	12	4.43	3.57	5.06	8.58	9	0	0	2	9.98	3.74
warrior	H P	525	368	553	0.70	13	5.50	5.94	5.86	8.25	7	0	8	2	10.12	3.18
wart	B	556	592	540	0.78	22	2.67	2.79	4.50	7.25	4	22	18	1	1.24	0.63
wasp	I	633	608	650	0.48	10	2.71	5.33	3.80	5.58	4	7	2	1	1.43	0.51
wave	W	492	518	542	1.30	13	6.32	4.19	5.48	4.26	4	18	30	1	21.25	8.11
wax	O N	569	494	547	1.00	13	4.68	3.64	6.20	6.00	3	12	30	1	9.04	3.3
weapon	O W	560	517	546	1.15	7	3.95	6.27	4.88	6.95	6	0	0	2	46.65	14.69
weather	W	439	623	537	1.46	13	6.05	4.21	4.37	5.94	7	4	11	2	34.24	12.29
web	O N	561	457	602	0.30	4	5.68	4.14	3.96	5.37	3	10	11	1	9.22	3.43
weed	P E	600	542	596	1.20	14	4.65	4.78	5.44	6.79	4	15	42	1	11.76	3.41
whale	A M	610	500	623	0.95	17	5.81	4.20	5.57	5.47	5	3	5	1	11.25	2.75
wheat	P E	594	510	577	1.34	17	4.95	3.94	5.75	6.53	5	1	9	1	5.75	2.42
wheel	O T	573	566	576	1.32	14	5.90	4.00	6.16	4.40	5	0	6	1	27.06	10.15
whip	O W	570	476	579	1.08	14	3.60	5.10	4.43	7.00	4	9	10	1	13.16	5.64
whiskey	O E	604	574	592	1.04	15	5.55	5.62	4.41	9.38	7	2	3	2	16.12	5.23
whistle	O M	579	505	574	0.85	16	5.70	3.94	5.78	5.42	7	2	4	2	15.45	5.64
wife	H R	562	585	575	1.18	8	6.70	4.21	5.50	5.67	4	9	16	1	348.92	57.36
wilderness	F A	512	405	564	0.90	12	6.68	4.85	4.48	8.95	10	0	0	3	3.94	1.73
wind	W	552	592	535	1.56	19	5.67	3.70	4.50	3.89	4	14	23	1	59.37	21.67
winter	W	499	615	621	1.28	4	5.50	2.77	4.41	4.38	6	7	12	2	26.22	10
witch	H P	522	474	589	1.18	22	3.14	5.30	4.79	4.78	5	9	27	1	27.65	5.66
witness	H A	459	496	467	0.70	22	5.61	3.67	4.44	8.74	7	3	3	2	51.39	14.57
wolf	A M	595	537	610	0.95	20	6.26	5.25	4.59	4.50	4	3	2	1	20.27	4.48
woman	H D	580	623	626	1.85	7	7.09	3.80	5.93	4.95	5	3	3	2	434.63	70.64
wood	P	606	574	577	1.92	26	5.82	3.50	6.37	4.58	4	12	18	1	27	8.99

wool	Q	608	540	586	1.18	16	5.38	2.58	6.05	8.06	4	7	16	1	3.16	1.56
worker	H P	532	587	486	1.45	23	5.95	3.60	6.29	6.67	6	4	10	2	10.94	4.98
world	F C	532	607	560	1.57	12	6.46	4.55	5.12	5.32	5	1	16	1	455.22	73.84
worm	I	611	498	578	1.23	23	4.86	3.50	5.22	3.89	4	10	12	1	10.12	3.23
wrist	B	645	539	553	0.78	7	5.06	3.27	5.26	5.94	5	6	21	1	10.33	4.41
writer	H A	563	672	480	1.15	19	6.74	4.74	6.00	7.32	6	4	21	2	23.53	6.83
yacht	V	606	464	624	0.30	11	5.88	3.98	5.56	10.06	5	1	24	1	8.22	2.35
yard	F L	553	522	568	1.54	15	5.70	3.68	5.84	3.94	4	7	15	1	25.06	9.25
zebra	A M	652	333	660	0.60	9	6.47	3.90	5.26	4.79	5	0	1	2	2.51	0.69
zipper	O M	599	556	632	0.60	12	5.11	3.73	5.18	5.00	6	5	10	2	2.82	1.41
zoo	Q	583	565	613	1.11	8	7.00	5.63	6.33	3.75	3	9	44	1	13.65	4.6
zucchini	P E	592	576	572	0.30	13	6.30	4.18	6.19	6.79	8	0	0	3	0.96	0.25

Note. Table 2 in the main text lists each variable and its corresponding abbreviation. The text from the above note here describes the category abbreviations.

VITA

VITA

Joshua E. VanArsdall was born on October 7th, 1988 to James and Cathy VanArsdall in Indianapolis, Indiana. He attended Purdue University from August, 2006 through May, 2010, in that time attaining a bachelor's of science in genetics, ecology, and evolution, and a bachelor's of arts in psychology. From May 2010 through August 2016 he worked with Distinguished Professor James S. Nairne, also at Purdue University, while pursuing a graduate education in cognitive psychology. He completed his master's degree in August 2013, with the thesis title of "Adaptive memory: Source memory for mates is primarily determined by emotional evaluation", and completed this dissertation in August 2016 with the help of a Bilsland Dissertation Fellowship.

Joshua's research interests as of the time of this dissertation were related to how the courses of human biological and cultural evolution have influenced the development of cognition, with a particular focus on memory. Topics under this umbrella include of course animacy, the topic of this dissertation, contagion and contaminability, the role of sexual selection in cognition, as well as educational and mnemonic applications of functional/evolutionary discoveries in psychology. The following page lists Joshua's publications as of the writing of this dissertation.

Peer-Reviewed Publications

Nairne, J. S., **VanArsdall, J. E.**, & Cogdill, M. (in press). Remembering the living: Episodic memory is tuned to animacy. *Current Directions in Psychological Science*.

VanArsdall, J. E., Nairne, J. S., Pandeirada, J. N. S., & Cogdill, M. (2016). A categorical recall strategy does not explain animacy effects in episodic memory. *Quarterly Journal of Experimental Psychology*. Advance online publication. doi: 10.1080/17470218.2016.1159707

Nairne, J. S., Pandeirada, J. N. S., **VanArsdall, J. E.**, & Blunt, J. R. (2015). Source-constrained retrieval and survival processing. *Memory & Cognition*, *43*, 1-13. doi:10.3758/s13421-014-0456-4

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