TIMED ACTION AND OBJECT NAMING

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Abstract

Factors affecting object and action naming were compared in a timed picture-naming paradigm, for drawings of 520 objects and 275 actions, named by adult native speakers of English. Massive differences between object and action naming were observed for all dependent variables, and theoretically relevant differences emerged in the variables that predict retrieval of nouns vs. verbs in this task. Matching object and action items for variables like frequency, age of acquisition, or picture complexity does not result in a match for measures of naming difficulty (name agreement or latency). Conversely, object and action items matched for naming difficulty invariably differ in their other lexical and pictorial properties. A reaction time disadvantage for action naming remains even after controlling for picture properties, target word properties, name agreement itself (reflecting the differential ambiguity of nouns and verbs) as well as a measure of conceptual or psychological complexity based on the number of relevant objects in the scene. Implications for method and theory in the study of lexical access are discussed, including relevance to a growing literature on the neurobiology and development of nouns and verbs.

Comparisons of noun and verb processing have taken on increased importance in the last few years, in behavioral studies of lexical access in brain-injured patients (Chen & Bates, 1998; Damasio & Tranel, 1993; Daniele, Giustolisi, Silveri, Colosimo, & Gainotti, 1994; Goodglass, 1993; Shapiro, Pascual-Leone, Mottaghy, Gangitano, & Caramazza, in press; Zingeser & Berndt, 1990), in neural imaging studies of normal adults (Damasio et al., 2001; Perani et al., 1999; Tyler, Russell, Fadili, & Moss, 2001), in studies of early lexical development (Caselli et al., 1995), as well as developmental studies of children with language difficulties (Dockrell, Messer, & George, 2001; Nation, Marshall, & Snowling, 2001). In the present study, we compare results for production of nouns (specifically, object names) and verbs (specifically, action names) in a timed picture-naming paradigm with English-speaking adults, using an unusually large sample of items in both categories (520 black-and-white drawings of common objects; 275 black-and-white drawings of common transitive and intransitive actions). This large database permits us to take a multivariate approach, exploring similarities and differences between nouns and verbs in naming behavior, and in the lexical and pictorial variables that predict this behavior.

Timed picture naming is among the first paradigms ever used to study real-time language processing (see Johnson, Paivio, & Clark, 1996 for a review), from early studies by Cattell (1886), through the pioneering work of Snodgrass and colleagues (Cycowicz, Friedman, Rothstein, & Snodgrass, 1997; Sanfeliu & Fernandez, 1996; Snodgrass & Vanderwart, 1980; Snodgrass & Yuditsky, 1996), to recent studies investigating covert or overt picture naming using functional magnetic resonance imaging (Fiez & Tranel, 1997; Hernandez, Martinez, & Kohnert, 2000; Murtha, Chertkow, Beauregard, & Evans, 1999), and event-related brain potentials (Schmitt, Muente, & Kutas, 2000; Schmitt, Schiltz, Zaake, Kutas, & Muente, 2001; van Turennout, Hagoort, & Brown, 1997, 1999). Whether they have focused on object naming alone, or on comparisons of action and object naming, most of these studies have used black-and-white drawings to elicit picture names, including many of the same stimuli that we will employ in the present study.

Evidence for potential differences in brain organization for nouns (object names) and verbs (action names) comes from both timed and untimed studies of picture naming. Results in favor of differential brain organization include an apparent double dissociation between noun and verb production in brain-injured patients. Many nonfluent Broca's aphasics display specific deficits in the production of main verbs, compared with their production of object names, in confrontation naming (naming pictures outside of a phrase or sentence context) and in their spontaneous speech. A complementary profile has been reported for some fluent patients, including Wernicke's aphasics and some anomics, who display fewer problems with verbs and more severe problems in the production of names for common objects.

Although this double dissociation has been replicated in several languages, its interpretation is still controversial (for reviews, see Chen & Bates, 1998; Druks, 2002). Some investigators have proposed that form class distinctions are a “hard-wired” property of the mental lexicon, with nouns in one region, verbs in another. Indeed, Caramazza and colleagues (Caramazza & Hillis, 1991; Shapiro et al., 2001) have suggested that this form class

principle may be replicated in several different brain regions, with the noun-verb distinction represented separately for each modality (e.g., separate phonemic and/or graphemic input buffers for nouns vs. verbs, contrasted with separate phonemic and/or graphemic output buffers for nouns vs. verbs). Other investigators have suggested instead that the noun-verb contrast is secondary to a deeper contrast in the way that noun and verb meanings are represented and/or processed (Chen & Bates, 1998; Tyler et al., 2001). These processing accounts come in two varieties: accounts based on differences in the sensorimotor representations that underlie nouns and verbs (e.g., greater involvement of visual cortex in the representation of object names; greater involvement of motor cortex in the representation of action names), and accounts based on differences in the retrieval characteristics of nouns and verbs (e.g., variations in frequency and age of acquisition; variations in the lexical neighborhoods occupied by nouns vs. verbs, including the number of semantic associates and potential lexical competitors for a given target word). Behavioral studies comparing the factors that predict object vs. action naming would shed light on this controversy.

Support for a fundamental processing contrast between nouns and verbs can also be found in research on the early acquisition of nouns and verbs in children. In most of the studies conducted to date, in many different languages, nouns (names for common objects) appear early in the one-word stage, while main verbs (names for common actions) are exceedingly rare until vocabulary expands to approximately 200 words (Bates, Bretherton, & Snyder, 1988; Bates et al., 1994; Caselli, Casadio, & Bates, 1999; Caselli et al., 1995; Tomasello, Akhtar, Dodson, & Rekau, 1997; Tomasello & Merriman, 1995; but see Gopnik & Choi, 1995; Tardif, 1996; Tardif, Gelman, & Xu, 1999, for evidence that the relative timing of noun vs. verb production can vary over languages). A theoretical rationale for the late appearance of verbs was first outlined by Gentner (1982), who claimed that the semantic structures underlying verbs are inherently more complex and open-ended than the structures which define noun meaning (see also Clark & Gerrig, 1983). O'Grady (1987) also pointed out that acquisition of verbs and adjectives cannot proceed until the child has mastered enough nouns to support predication, since nouns are typically used as arguments, whereas verbs are most often used as segments of the predicates expressed by verbs and adjectives. Because it is known that age-of-acquisition is an important predictor of lexical retrieval in normal adults, this differential timing in the early acquisition of nouns vs. verbs could contribute to differences in the way these words are processed, by normal adults and by brain-injured patients.

Our understanding of lexical retrieval for nouns vs. verbs is complicated by the fact that names for common objects are relatively easy to depict (in drawings or photographs). In contrast, action names are relatively difficult to depict in static drawings and/or photographs, requiring the speaker to make inferences about the action that the artist had in mind. Some investigators have tried to get around this problem by presenting short films for action naming (e.g., Berndt, Mitchum, Haendiges, & Sandson, 1997; Davidoff & Masterson, 1996; Decety et al., 1997). Whether or not this is a good solution for studies of naming accuracy, it presents major problems for the study of naming latency, since the depicted events unfold in time while the depicted objects are typically present in their entirety from stimulus onset. Although static drawings do have their limitations (discussed in more detail below), they are widely used in neuropsychological, psycholinguistic and developmental studies. Hence any results that we obtain with stimuli of this type are relevant to the large and growing literatures that inspired this work.

The timed naming paradigm adopted in the present study permits us to assess reaction times as well as name agreement (and the variety of names produced). Like other investigators who have tried to develop comparative object- and action-naming stimuli (e.g., Masterson & Druks, 1998; Tranel, Damasio, & Damasio, 1998), we hoped to obtain a large enough range of items to permit matching of object and action names on various parameters of item difficulty, including standard variables like visual complexity (for pictures) as well as length, frequency, familiarity and age of acquisition (for the target names elicited by those pictures). As we shall see, this kind of stimulus matching for nouns and verbs proved very difficult. Aside from the problems inherent in the development of action and object pictures, the verbs and nouns produced in response to these pictures differ along many parameters. It may be the case that natural languages have simply not evolved to permit a full orthogonalization of object and action names along all the parameters of interest, at least not for the set of nouns and verbs that can be depicted in photographs or drawings. Implications of this result for future studies of noun vs. verb processing will be discussed later.

METHOD

Participants

A total of 100 right-handed college students participated in the picture-naming studies. Fifty subjects (35 female and 15 male, age ranging from 18 to 25) named the 520 objects, and another 50 subjects (22 female and 28 male, age ranging from 17 to 23) participated in the action-naming experiment. They were all native speakers of English, reported normal or corrected-to-normal visual activity, and had no other language exposure before age 12. They received course credit for their participation.

Materials

Picture stimuli were black-and-white line drawings of 520 common objects, and 275 transitive and intransitive actions (Table 1). They were scanned and stored digitally for presentation within the PsyScope Experimental Control Shell (Cohen, MacWhinney, Flatt, & Provost, 1993). Pilot studies were carried out for the selection of these pictures. Ten different (partly overlapping) sources of picture material were used resulting in more than a thousand pictures in the pretest set. Item selection was subject to several constraints including picture quality, visual complexity, and cross-cultural validity of the depicted item. The pilot naming studies indicated that normal adult participants were able to complete 520 items in a single 45-60-minute session, including occasional breaks.

Appendices 1 and 2 present lists of our picture stimuli, with their empirically determined dominant and alternative names, and main dependent and independent variables. The dependent variables of timed picture naming (overall accuracy and errors, name agreement, and reaction times) are presented in Appendix 1a for action pictures and 1b for object pictures. Independent variables for the pictures (objective visual complexity) and their dominant response (objective AoA, word frequency) are included in Appendix 2 a and b, for actions and objects respectively. With regard to word attributes, all variables are characteristics of the dominant response, i.e., the name given by the largest number of participants in the study.

Procedure

Participants were tested individually in a dimly lit, quiet room. Before starting the picture-naming task, voice sensitivity was calibrated for each participant, with the help of a reading list of words featuring various initial phoneme patterns (none of these words were appropriate as names for the pictures in the main experiment). They were instructed to name the pictures that would appear on the screen as quickly as they could without making a mistake, and to avoid coughs, false starts, hesitations (e.g., 'uhmm'), articles or any other extraneous material (e.g., 'a dog' or 'That's a dog') other than the best and shortest name they could think of for the depicted object or action. To familiarize participants with the experiment, a practice set of pictures depicting geometric forms such as a triangle, a circle, and a square were given as examples in object naming. For action naming, there was no equivalent to geometric shapes for practice items; instead, six of the action-naming pictures (picture numbers 1-6: dive, drink, paint, ski, cut, blow) were used as practice items. Three of them were administered to half of the subjects as practice (and excluded from the main experiment), the other three were used (and also excluded from the main experiment) for the remaining 25 participants. This resulted in collecting nonpractice action-naming data from only 25 subjects for the six items above.

During testing, participants wore headphones with a sensitive built-in microphone (adjusted to optimal distance from the participant's mouth) that were connected to the Carnegie Mellon button box, a response-time-measuring device with 1-ms resolution design for use with Macintosh computers. The pictures were displayed on a standard VGA computer screen set to 640 × 480 bit-depth resolution (pictures are 300 × 300 pixels). Participants viewed the items centered, from a distance of approximately 80 cm. On each trial a fixation crosshatch "+" appeared centered on screen for 200 ms followed by a 500-ms blank interval. The target picture remained on the screen for a maximum of 3 seconds (3000 ms). The picture disappeared from the screen as soon as a vocal response was registered by the voice key (at the same time a dot "." signaled voice detection—a clue for the error-coding procedure). If there was no response, the picture disappeared after 3000 ms but another 1000 ms was added to the total response window just in case speakers initiated a response right before the picture disappeared. Hence the total window within which a response could be made was 4000 ms. The period between offset of one trial and onset of the next was set to vary randomly between 1000 and 2000 ms. This kind of intertrial "jitter" served to prevent subjects from settling into a response rhythm that is independent of item difficulty.

Reaction times associated with each response were recorded, and served as the outcome measures used for statistical analysis. Ten different randomized versions of the experiment were used, each with a printout that could serve as a score sheet for coding purposes during the experiment.

The experimenter took notes on the score sheet according to an error-coding protocol (see details below). Alternative namings were also recorded manually on the score sheet. No pictures were pre-exposed or repeated during the test, hence no training of the actual targets occurred. A short rest period was included automatically after 104 trials, but subjects could ask for a pause in the experiment at any time. Experimental sessions lasted 45 minutes on average and were tape-recorded for subsequent off-line checking of the records.

An objective measure of age of acquisition (AoA) was derived from published norms for the American version of the MacArthur Communicative Development Inventories, or CDI (Fenson et al., 1994). The CDI is based (inter alia) on concurrent parent report of vocabulary development in very large samples of children, collected in a recognition-memory format with a large checklist of words that are likely to be acquired between 8-30 months. For our purposes here, the CDI yields a simple 3-point scale: 1 = words acquired (on average) between 8-16 months; 2 = words acquired (on average) between 17-30 months; 3 = words that are not acquired in infancy (> 30 months). Unlike the subjective AoA ratings for object naming (which we include for comparison with other object-naming studies in Part I), this objective measure of AoA was available for both object and action-naming items.

In addition to predictor variables associated with the target names, estimates of objective visual complexity were obtained for the picture itself, based on the size of the digitized stimuli picture files (for further details, see Szekely & Bates, 2000).

Scoring of the picture-naming study. Our scoring criteria were modeled closely on procedures adopted by Snodgrass and Vanderwart (1980), with a few exceptions. The target name for each picture was determined empirically, in two steps.

First, the data were subjected to error coding to determine which responses could be retained for both naming and RT analyses. Three error codes were possible:

1. "Valid response" refers to all the responses with a valid (codable) name and usable, interpretable response times (no coughs, hesitations, false starts, or prenominal verbalization like "that's a ball"). Any word articulated completely and correctly is kept for the evaluation, except for expressions that are not intended namings of the presented object, like "I don't know".

2. "Invalid response" refers to all the responses with an invalid RT (i.e., coughs, hesitations, false starts, prenominal verbalizations) or a missing RT (the participant did produce a name, but it failed to register with the voice key).

3. "No response" refers to any trial in which the participant made no verbal response of any kind.

Only the valid responses were used for determining the target name, and for further analyses. Once the set of valid responses had been determined, the target name was defined as the "dominant response", i.e., the name that was used by the largest number of subjects. In the case of ties (two responses uttered by exactly the same number of subjects) three criteria were used to choose one of the two or more tied responses as the target. (1) the response closest to the intended target (i.e., the hypothesized target name used to select stimuli prior to the experiment), (2) the singular form if singular and plural forms were tied, (3) the form that had the largest number of phonological variants in common.

Second, all valid responses were coded into different lexical categories in relation to the target name, using the same criteria:

Lexical Code 1: The target name (dominant response, empirically derived).

Lexical Code 2: Any morphological or morphophonological alteration of the target name, defined as a variation that shares the word root or a key portion of the word without changing the word's core meaning. Examples would include diminutives (e.g., 'bike' for 'bicycle'; 'doggie' for 'dog'), plural/singular alternations (e.g., 'cookies' when the target word was 'cookie'), reductions (e.g., 'thread' if the target word was 'spool of thread') or expansions (e.g., 'truck for firemen' if the target word was 'firetruck').

Lexical Code 3: Synonyms for the target name (which differ from Code 2 because they do not share the word root or key portion of the target word). With this constraint, a synonym was defined as a word that shared the same truth value conditions as the target name (e.g., 'couch' for 'sofa' or 'chicken' for 'hen').

Lexical Code 4: This category was used for all names that could not be classified in codes 1-3, including hyponyms (e.g., 'animal' for 'dog'), semantic associates that share the same class but do not have the target word's core meaning (e.g., 'cat' for 'dog'), part-whole relations at the visual-semantic level (e.g., 'finger' for 'hand'), and all frank visual errors or completely unrelated responses.

Name agreement. Percent name agreement "Lex1dom" was defined as the proportion of all valid trials (a codeable response, with a usable RT)

on which participants produced the target name. The number of alternative names for each picture was determined by "Number of types" (i.e., number of different names provided on valid trials, including the target name). In addition, following Snodgrass and Vanderwart (1980), we also calculated the "H statistic" or H Stat (also called U statistic), a measure of response agreement that takes into consideration the proportion of subjects producing each alternative. An increasing H value indicates decreasing name agreement, and 0 refers to perfect name agreement (see Snodgrass for details).

Percent name agreement measures for each item were based on the 4-point lexical coding scheme. For each item, "Lex1dom" refers to the percent of all codable responses with a valid RT on which participants produced the dominant name. "Lex2phon" is the percent of all codable responses with a valid RT that were classified as a morphological variant of the dominant name. "Lex3syn" is based on the same denominator, and refers to the ratio of codeable responses on which a synonym was produced. Finally, "Lex4err" refers to the percent of all codable responses with a valid RT on which participants produced a response that failed to meet criteria for Lexical Codes 1-3. This "error/other" category included frank visual errors, and vague superordinate names like 'animal' or 'food'.

Reaction time. RT measures were calculated two alternative ways. "RT total" refers to mean reaction times across all valid trials, regardless of the content of that response. "RT target" refers to mean latency for dominant responses only. In order to compare items in the variability associated with naming times, the standard deviations were also calculated for both RT total and RT target.

For dominant or target names only, a database was created containing a list of picture and/or word characteristics that are known or suspected to affect name agreement and/or naming latency. These predictors and their sources are listed in Table 2, and were used for correlational analyses (including multiple regression) described under Results.

RESULTS

We begin by describing similarities and differences between the actions and objects in our database on the main independent variables (objective visual complexity of the pictures, and several attributes of the dominant response, including objective age of acquisition). Second, action and object naming are then compared on the major dependent variables (e.g., name agreement and reaction time measures), including comparisons of the respective object- and action-naming categories for those items that do or do not share their target name with other items in the stimulus set (see below for details). Third, we take up the problem of matching action- and object-naming items for relative difficulty, showing that a match on dependent variables (name agreement or reaction time) results in a serious mismatch on independent variables like frequency or visual complexity. Fourth, we examine correlations among the dependent and independent variables, for action and object naming respectively. Finally, we explore the factors that predict naming behavior for action vs. object naming with regression analyses that evaluate the contribution of each measure (including the object-action distinction itself) when other variables are controlled.

Descriptive Statistics for the Independent Variables

Table 2 compares summary statistics for key independent variables, for Object vs. Action items. With one exception, all differences were significant by a two-tailed *t*-test ($p < .01$). With regard to the pictures, our objective measure of visual complexity (based on digital file size) was significantly larger for action pictures, testifying to the inherent difficulty of representing actions with a static image. With regard to word attributes, all variables are characteristics of the dominant response, i.e., the name given by the largest number of participants in the study. Presence/absence of a fricative or affricate in the initial consonant is a variable that has been reported to influence the time required for a response to register on the voice key; this was the *only* measure that did not differ significantly for actions vs. objects. On average, action names were significantly shorter than object names (measured in syllables, or in characters). Frequency counts were taken from the CELEX Lexical database (Baayen, Piepenbrock, & Gulikers, 1995). In accordance with Snodgrass and Yuditsky (1996), log natural transformation ln (1 + raw frequency count) was applied to normalize the frequency measure for use in correlational analyses. Dominant names for actions proved to be significantly *more frequent* than dominant names for objects. However, based on the objective age-of-acquisition measure (detailed above), dominant action names were *acquired later*, on average, than dominant object names.

The "shared name" variable reflects the fact that some dominant names were used for more than one picture. The most extreme example is the single word 'cut,' which was used as the dominant name for five different action pictures (originally selected to elicit 'peel', 'slice', 'dissect', 'clip', and 'cutting a paper with scissors'). Items that share the

same dominant name with at least one other picture were specified by a dichotomous variable (1 = shared name; 0 = no shared name), which yielded a substantial difference between Object and Action items. Whereas only 4.6% of object pictures shared their dominant names, 23.3% of action pictures were described with overlapping dominant names. The list of dominant names that were shared by two or more pictures are listed in Table 3.

Another dichotomous variable is word complexity, which was assigned to any item on which the dominant response was a plural, a compound word or a periphrastic (multiword) construction. Of object pictures, 16.4% were complex, in contrast with only the 1.1% of action pictures.

To summarize, descriptive statistics for all but one of the independent variables (initial frication) yielded significant differences between object and action naming. Two of these differences (visual complexity, age of acquisition) ought to make object naming easier than action naming. The remaining variables (length, frequency, word complexity) ought to make action naming easier than object naming. Later on we will provide evidence indicating just how difficult it is to match action and object stimuli along all of these key dimensions. Finally, there was a marked tendency for speakers to produce the same dominant name on more than one item in the action-naming task, an event that was relatively rare in object naming. The effects of this tendency toward "sharing" will be examined in more detail below.

Descriptive Statistics for the Dependent Variables

Table 4 presents summary statistics for our key dependent variables: nameability, number of alternative names, name agreement measures, and reaction time measures. All differences were significant at $p < .01$. The measures of nameability (or correctness) are based on our 3-point error-coding scheme, described above. They represent the percent of subjects responding with a "Valid response," an "Invalid response," or failing to give any name, i.e., "No response." The overall percent of valid responses was 96.1% for object and 93.5% for action pictures, indicating that subjects had more problems in the naming task when searching for an adequate verb to describe an action picture. On average, 3.9% of all participants failed to come up with any name for the action pictures, and another 2.6% produced a response that was not classifiable as a name. These error ratios were much lower for the object-naming task. All subsequent analyses are based on valid responses only.

The number of alternative names varied from 1 to 18 for objects, and from 1 to 17 for actions. The pictures with the most alternative names were 'watering can' (an object name) and 'sort' (an action name) in the respective object- and action-naming corpora. Examples of items that yielded perfect name agreement are 'volcano' and 'unicorn' in object naming, 'bark' and 'cut' for action naming. Speakers produced significantly more naming errors and more synonyms for action names, as well as a higher number of alternative types (in terms both of the absolute number of word types produced, and the H-statistic weighted for frequency of each alternative). However, action names were less likely to elicit a morphophonological variant of the dominant response; this fact may be related, at least in part, to the greater complexity of some dominant object names (which were shortened by some of the participants).

Reaction time analyses were based on all valid responses, and on latency to produce the dominant response only. In both cases, mean RTs for actions were significantly and substantially longer than RTs for objects.

To summarize so far, across a large set of pictures of the type traditionally used to examine action and object naming, virtually all comparisons lead to the conclusion that action naming is much harder (slower, less consistent, more errors) than object naming. This is true despite the fact that action names tend to be shorter, less complex, and higher in frequency. The variables that could explain the relative difficulty of action items include their greater visual complexity, later age of acquisition, and the fact that action names are more often shared by two or more pictures in the stimulus set. This last possibility is pursued in more detail below.

Sharing: Repetition of the Same Dominant Name for More than One Item

Tables 5a and 5b outline the differences between naming attributes of pictures with shared and non-shared dominant names for objects and actions. As noted above, shared target names were more frequent in action naming. Tables 5a-b show that items with and without shared names differ significantly along a number of dimensions that are associated with naming difficulty, but the direction of these differences is surprising. Shared words tend to be shorter, and more frequent, they are also acquired earlier. Shared words are also less likely to begin with an initial fricative. These facts, together with inspection of the shared vs. non-shared items themselves, indicate that speakers tend to produce a number of relatively easy or

"light" names across the picture-naming session. Some examples of shared nouns are 'gun', 'hat', and 'bird'; examples of shared verbs are 'run,' 'look,' 'cry,' and 'cook'.

Turning to the dependent variables for shared vs. nonshared names, Table 5b shows that participants tend to use shared names on items that have fewer valid responses, lower name agreement, and slower reaction times. These differences did not reach significance within object naming (probably because there were very few object pictures that shared their dominant names with others), but they were significant for action naming. These results present a partial solution to the paradox reported above: naming actions is generally more difficult than naming objects, even though action names tend to be shorter and more frequent. We suggest that speakers sometimes deal with difficult action items by resorting to "light verbs", describing the action in a less specific way, with a general-purpose verb (often hypernyms that apply equally well to several different actions) that may be used more than once across the session. This difference does not derive from picture complexity, since there were no significant differences in complexity for action pictures that did or did not elicit shared names. As we will see below (in regression analyses), the overall difference in difficulty between object and action naming is not due solely to the items that elicit shared names.

The Problem of Creating Matched Sets of Action and Object Items

Is the difference in difficulty for action vs. object naming due only to the more difficult action-naming items, or is it distributed across all levels of difficulty? If especially easy or difficult items are eliminated, can we derive a fully matched set?

Figure 1 explores this issue using ranges of name agreement as an index of item difficulty, illustrating the percents of noun and verb items that fall within each name agreement range or "bin" (from a low of 20-39% agreement to a high of 90-100% agreement, along the horizontal axis). Although some noun and verb items can be found within each bin, the distribution for action and object items is markedly different. For object items, there is a marked increase in representation across the horizontal axis, with most object items bunched up toward the high-agreement end of the distribution. Indeed, more than half of the object items fall in the 90-100% range. For actions, the distribution is relatively flat, and each agreement bin contains between 10-28% of the action items.

Figure 2 explores the same issue using naming latencies (for all codable responses) as an index of item difficulty, illustrating the percents of noun and verb items that fall within each RT range. For example, the 700-ms category in Figure 2 represents those items that have a mean RT between 650-750 ms. Although there is some overlap between object and action items, the two distributions are (again) markedly different. Response times for object items are skewed to the fast end of the distribution, ranging between 700-800 ms. In contrast, RTs for the action items have a broader and flatter distribution, with many of the items falling above 1500 ms.

Suppose that we were able to locate object and action items in these two distributions that overlap in RT. Would they match in name agreement? Conversely, if we were to match items based on name agreement, would they match in RT? These questions are addressed in Figure 3, which displays the mean reaction times for the nouns and verbs (dominant names) produced in each of the name agreement ranges used above. It should be clear from Figure 3 that action-naming RTs are (on average) slower than object-naming RTs within every name agreement range. It therefore seems likely that we will have to choose one of these dependent variables (agreement or RT) if we want to attempt a match based on item difficulty.

Figures 4a through 4c illustrate some additional problems that are encountered if we match items for relative difficulty using RT as our index, and try to identify items that are matched for other lexical and pictorial properties. The horizontal axis in all three figures represents different ranges of mean reaction time (taking all codable answers into consideration). Figure 4a displays mean log word frequency within each RT range, and shows that (on average) dominant action names are more frequent than dominant object names all across the RT spectrum. Figure 4b presents comparable information using mean objective Age-of-Acquisition values on the vertical access. In contrast with our findings for word frequency, Figure 4b indicates that object and action pictures are fairly close together in their mean Age-of-Acquisition across the RT range in which the two item types overlap. Hence we could obtain a better lexical match if we used AoA rather than frequency within and across RT bins. Unfortunately, the same thing is not true for visual complexity, one of the most important factors differentiating our noun and verb pictures. Figure 4c illustrates the levels of visual complexity that are obtained when action and object items are sorted by RT ranges. On average, action items are higher in visual complexity within every RT window, although the disparity is smaller at the fast end of the spectrum.

Taken together, these results demonstrate that action and object differ markedly not only in overall difficulty, but in relative difficulty (RT within each agreement window). Even if we are able to identify items that match in RT, the resulting action and object items are likely to differ in visual complexity (a property of the pictures) and word frequency (a property of the dominant names for those pictures). With this result in hand, we turn now to the assessment of relationships among dependent variables and predictor variables, for objects and actions considered separately.

Correlations Among Dependent Variables for Object vs. Action Naming

In Table 6, correlations among dependent measures are summarized separately for object and action items. Results indicate that general naming difficulty (% valid response) and RT measures are inversely correlated, and to the same degree *(r* = –0.70) for both actions and objects. On the other hand, the relationship of name agreement (% Lex 1) and the mean latency of eliciting the target response (RTtarg.) is lower for objects ($r = -0.55$) than it is for action pictures ($r = -0.71$) (both values are significant at $p < .01$). In other words, the time needed for naming both object and action pictures decreases with nameability (as measured by percent valid responses), but the link between reaction time and coming up with the "right" (dominant) name is stronger for actions than objects. This last finding may reflect at least two facts about action naming: (a) actions elicit a greater range of both name agreement and reaction times, a fact that may enhance the correlation between these two measures, and (b) speakers often deal with difficult action pictures by resorting to a high-frequency "light" verb (perhaps after abandoning the search for a more specific name), a kind of retrieval event that may also enhance the correlation between reaction time and percent dominant response.

Correlations Among Independent Variables for Object vs. Action Naming

Table 7 compares correlations among target name attributes for object vs. action names, respectively. The general tendency for high-frequency words to be shorter (i.e., Zipf's law—Zipf, 1965) is greater for objects than it is for actions. At the same time, the relatively high frequency of early-acquired words is more typical among the verbs produced in the experiment than it is for nouns. Initial frication holds for around 27% of the items both the noun and verb set. However, verbs with initial frication tend to be less frequent, and occur less often as the dominant action-naming response; these frication effects do not hold for object names. Finally, as noted earlier, items with shared names are higher in frequency, but this tendency holds primarily for actions.

Predicting Naming Behavior from Word and Picture Attributes: Correlations

Tables 8a and 8b summarize the raw correlations between our dependent and independent variables in the object and action-naming corpora, respectively. Many of these correlations are in the direction that we would predict, based on the picture-naming literature to date (although their extension to action naming in the present study has few precedents). Many of these trends are in the same direction for actions and objects (e.g., slower RTs and lower agreement for later-acquired words), but there are some interesting differences. First, objective visual complexity is associated with faster RTs for object naming (a significant effect) and slower RTs for action naming (an effect that fails to reach significance—but see regression analyses, below). Second, frequency is associated with greater consistency and faster RTs for object naming, but is unrelated to naming behavior for action naming. Because there is so much collinearity in the relationships among the independent and dependent variables, we refer the reader to Tables 8a-b for details on the raw correlations, and proceed directly to regression analyses that will help us to disentangle these effects.

Factors Predicting Naming Behavior: Regression Analyses

In order to control for confounds among the various predictor variables, seven stepwise regression analyses were conducted on name agreement and naming latencies, respectively, assessing the contribution of each variable on the final step after the other six predictors were entered into the equation. These analyses were conducted separately for nouns and verbs. Table 9 summarizes the total variance accounted for by all predictors together, as well as the unique variance contributed by each predictor after the other variables are controlled.

In object naming, the seven predictors together accounted for approximately 19.6% of the variance in reaction time. Significant unique contributions on the last step were only observed for word frequency (–3.7%) and age of acquisition (+7.4%). In other words, object names that are high in frequency and acquired relatively early take less time to retrieve. Neither of these results are new, but it is interesting that frequency and AoA each make independent contributions when the other is

controlled, suggesting that these two measures reflect partially separable sources of variation.

In action naming, the total reaction time variance accounted for by all predictors was 13.3%, with significant unique contributions on the last step from age of acquisition (+4.6%) and from the dichotomous variable of shared words (+4.4%). These results are not surprising. What is surprising is the further finding that word frequency makes a unique and significant *positive* contribution of +1.6%, which means that higher-frequency action names actually take somewhat *longer* to produce! This positive correlation between frequency and reaction time is in the opposite direction from the negative (facilitating) frequency effect for object names noted above, and runs counter to hundreds of studies indicating easier recognition and retrieval for high-frequency words. As we suggested earlier, this paradoxical result is probably caused by the fact that speakers tend to resort to low-frequency "light words" for difficult action pictures. Finally, small but significant positive contributions to action-naming times were observed for length in characters (+1.8%) and visual complexity (+2.4%), indicating that longer action names take longer to produce when other factors are controlled, and that more complex pictures take longer to name. These last two results were not observed in object naming.

Similar regression analyses were carried out for name agreement. For object naming, the seven independent measures accounted jointly for 10.2% of the variance; for action naming, the corresponding variables accounted for 15.4% of the variance. Small but significant unique contributions to object-name agreement were observed for initial frication (+0.8%), word frequency (+1.2%), age of acquisition (–1.1%) and shared names (–3.1%) and complexity of words (–0.8%). All of these unique contributions were in the expected direction, except for the surprising (but very small) result suggesting that dominant names with an initial fricative are associated with higher name agreement. We have no explanation for this odd result, and will not attempt to provide one. For action naming, significant unique contributions to name agreement were obtained for age of acquisition (–3.6%), visual complexity (–1.5%), and for shared names (–9.4%). The latter finding indicates once again that shared names are used for action items that are particularly difficult. The other results are all in the expected direction, although (to the best of our knowledge) these effects have not been demonstrated before for action naming.

In our search for an explanation for the observed reaction time differences between action and object naming, we conducted another set of regression analyses to determine whether our results for reaction time were influenced by the "shared name" strategy, which was used infrequently for object names (less than 5% of all items) but occurred often for action names (more than 20% of all items). Table 10 shows the unique contributions of the original seven independent variables for object and action names, respectively, calculated only for those items that did not share names with other items in the data set. Briefly summarized, we still observed robust and significant unique contributions from age of acquisition, in the expected direction (+8% for objects, +8.1% for actions). We also continued to observe a unique effect of visual complexity on reaction times for action naming (+4.1%) but not for object naming, suggesting that the complexity of our action pictures slows down action naming even after other factors are controlled. The most interesting result from this analysis lies in the fact that word frequency continues to make a significant unique contribution in the *opposite* direction for object naming (–3.3%) vs. action naming (+2.7%). We suggest again that speakers are using a "light verb" strategy for action pictures, falling back on high-frequency multipurpose verbs for difficult items. This difference in strategies for picture naming persists even after we have removed items that share names with other pictures in the data set.

Because we observed such large differences in the relative difficulty of action vs. object naming (i.e., dependent variables), we were interested in determining whether these object-action differences would remain as a main effect when the various picture and word dimensions on which they also differ were controlled (i.e., independent variables). Towards this end, we collapsed across our action and object items, and performed a series of stepwise regression analyses, similar to the ones outlined above. In these analyses, form class (verbs vs. nouns) was treated as a dichotomous independent variable, with a score of 1 for action-naming items and a score of 2 for object-naming items. Table 11 displays the total variance accounted for and the unique variance contributed by each predictor on the last step, including the verb-noun dummy variable.

For naming latencies, the total variance accounted for by these eight predictors together was 31.4%. The dichotomous object-action variable contributed a large and significant –13.4% to the equation when all the other measures were controlled. *This result means that action naming is still much harder than object naming even after all the other differences between these noun and verb*

items are factored out. The corresponding analysis for name agreement yielded similar results, although they were somewhat weaker. In this case, the total variance accounted for was 20.3%. The verb-noun variable made a significant contribution of +5.2% after all other predictors were entered into the equation, indicating once again that action pictures are harder to name (i.e., lower name agreement) even after we have controlled for other dimensions on which action and object items differ.

Where does this persistent noun-verb difference come from? One possibility is that action naming takes more time because, as Gentner (1982) has proposed, the same scene can be named so many ways. To investigate this possibility, we carried out another set of regressions combining name agreement with the other predictor variables, treating RT to produce the target name as the dependent variable. Results are summarized in Table 12. The total amount of variance accounted for did increase markedly (from 31.4% to 56.1%) when name agreement was added as a predictor, and the unique contribution of name agreement to naming times was –24.7% after all the other variables were controlled. However, several other variables continued to make small but significant unique contributions: length (+0.3%), objective age of acquisition (+1.9%) and word complexity (–0.2%). Most important for our purposes here, the dichotomous verb-noun variable still made a significant contribution of –5.3% after all the other factors were controlled, reflecting a reaction disadvantage for verbs. *Hence differences in name agreement ("nameability") are not sufficient to explain the temporal disadvantage in action naming.*

In one final attempt to explain the empirical difference between object and action naming, we returned to the issue of stimulus complexity. We have already shown that differences in objective visual complexity are not sufficient to explain the large reaction time disadvantage for action-naming stimuli. But our object and action stimuli also differ in their psychological or conceptual complexity. Most of our object stimuli depict a single object against a minimal background. In contrast, the action pictures all involve at least one person, animal or object, and many of them involve two or more protagonists. This was not an accidental confound that escaped our attention. Rather, it is a necessary by-product of the relational meanings that underlie most action verbs. For many of these verbs, the intended meaning would be difficult if not impossible to depict without including the requisite objects in the picture. This is true for many intransitive as well as transitive verbs (e.g., the verb 'to dive', which would be hard to convey without an appropriately dressed human figure and some minimal representation of water and a diving board).

While acknowledging that this confound is inevitable, we decided that it would be useful at this point to attempt a crude quantification of conceptual complexity, to determine whether this factor is responsible for the robust differences in reaction time for action and object naming. For this purpose, we computed our own subjective rating of the number of objects, animals or persons depicted in each stimulus. These counts applied at the level of the whole object. For example, body parts were not counted separately in pictures of a whole person, nor were separate counts given to the multiple elements in a mass noun (e.g., individual grapes in a cluster of grapes). Surrounding props or substrates for an action were counted separately only if they were critical to the interpretation of the action (e.g., a schematic line indicating the floor or the base of a wall was not counted as a separate object). Table 13 lists the percent of action vs. object stimuli that fall within each level of conceptual complexity ('number of objects'), ranging from 1 to 6. Table 13 also presents the mean naming times observed within each complexity level, for action vs. object stimuli, respectively. It is clear from this table that action pictures are vastly more complex. In fact, 84.4% of the object pictures contain only one object, compared with only 3.3% of the action stimuli. Nevertheless, within each level of complexity there is still a serious disadvantage for action pictures, a noun-verb difference that ranges from 154 ms to 410 ms.

To quantify this difference further, we conducted a final set of stepwise regressions on reaction times. On the first step, we entered name agreement plus the seven word and picture variables (as in Table 12). On the second step, we entered the new conceptual complexity variable to determine how much variance this factor could explain when the other measures were controlled. At this point, the new complexity measure contributed a significant +4% ($p < .0001$) to the total variance in naming latencies, indicating that our crude measure of conceptual complexity is indeed associated with slower reaction times. Finally, the dichotomous verb-noun dummy variable was entered into the equation, to see whether we had finally accounted for all of the variance that separates object and action naming. Despite the huge overlap between form class and conceptual complexity, the dichotomous verb-noun variable added a significant –1.9% to the total variance accounted for on the final step, a persistent negative con-

tribution indicating faster reaction times for object naming. Furthermore, the contribution of conceptual complexity was now reduced from 4% (on Step 2) to 0.5% (on Step 3), indicating that much of the conceptual complexity variance was contained within the verb-noun measure (although it is apparently not sufficient to explain the verb-noun difference). Table 14 summarizes the percent variation accounted for on the final step by all of the predictors (after the verb-noun variable was entered). This table shows that three other variables also continue to explain some of the reaction time variance after name agreement, form class and conceptual complexity are controlled. Specifically, small but theoretically coherent effects of word length, word complexity, and objective age of acquisition are still observed. Finally, it is interesting to note that frequency effects disappeared here and in all of the analyses in which form class is included as a variable. Apparently the contradictory effects of frequency on object- vs. action-naming times cancel each other out when the data for action and object stimuli are pooled.

We conclude that the challenges posed by action naming are only partially explained by the number of entities that have to be depicted to convey an action meaning. A lot of other things are still going on, with similarities and differences between object and action naming along multiple dimensions.

SUMMARY AND CONCLUSIONS

Two main conclusions follow from the work we have described here:

(1) Attempting to match actions and objects on either picture properties (e.g., visual complexity) and/or properties of the target names (e.g., word frequency), leads to unavoidable differences in naming difficulty as indexed by either RT or name agreement. Conversely, items matched for naming difficulty will vary on these same parameters. Thus, it may be impossible (at least with stimuli of the sort that are typically used in naming studies) to match action- and object-naming stimuli in fully orthogonalized experimental designs.

(2) Even when picture- and target-name-related differences have been factored out, significant differences between action and object naming remain. Furthermore, in some cases independent variables (such as word frequency) are associated with different patterns of effects on naming difficulty for actions versus objects. Thus, the *process* of mapping between the picture and the name itself seems to differ for action and object naming.

Both of these conclusions have practical and theoretical implications for a growing literature on the role of grammatical categories (especially the noun-verb distinction) in lexical access.

At the outset, taking a large sample of the pictures of common objects and actions typically used in behavioral and neuropsychological studies, we found significant differences between the picture stimuli (i.e., action pictures are higher in objective visual complexity). The target names that speakers chose to describe these pictures also differed along a number of parameters that are known to affect lexical access. For example, target nouns tended to be acquired earlier (which should make nouns easier to produce), but target verbs tended to be shorter, less complex, and more frequent (which should make verbs easier to produce). However, our regression analyses showed that such differences are not sufficient to account for the pattern of results. Even after these and other word and picture differences are controlled, action naming still takes substantially longer, and name agreement for actions is still significantly lower.

In fact, several different analyses suggest to us that the differences between action- and object-naming stimuli cannot be resolved by "hand-matching" stimuli along typical stimulus- or target-based parameters in a factorial design. When action- and object-naming items are equated for name agreement, huge differences in reaction time remain. When items are sorted by level of difficulty (using RT as an index), we find action-object differences in word frequency and picture complexity at every level, from the easiest (fastest, highest agreement) to the hardest items (slowest, lowest agreement). Although the issue is by no means settled, our results suggest that it may not be possible (at least within the picture-naming paradigm) to create large numbers of noun and verb stimuli that are matched along all the dimensions known to affect lexical access.

Even more striking is the fact that the size and direction of lexical and pictorial effects on action and object naming are different, which means that we may be looking at different processes even if we were able to match action and object stimuli for relative difficulty. Among the more interesting processing differences that emerged for action and object naming, we found a surprising and paradoxical effect of word frequency: when other independent variables are controlled, higher-frequency object names are associated with *faster* RTs, but higher-frequency action names are associated with *slower* RTs—a novel finding with few precedents in the lexical processing literature. A partial answer to this paradox may lie in the tendency for speakers

to produce high-frequency, general-purpose "light verbs" for particularly difficult action names. This was evident in the fact that speakers rarely produced the same noun for more than one object picture (averaging around 4.6%), but frequently produced the same verb for more than one action picture (averaging 23.3% of all items). However, the contradictory frequency effects for action and object naming remain when items with shared names are removed from the data set, and/or when "name sharing" is included as a variable in regression analyses. Furthermore, fre-quency effects are wiped out when data for object and action naming are pooled, suggesting that the differential effects of frequency for these two stimulus types have cancelled each other out. It therefore seems that frequency is not always a "good thing" in lexical access. In studies of word production, the tendency to fall back on high-frequency words can be a sign of trouble. This result is interesting, in view of the fact that some brain-injured patients also rely disproportionately on high-frequency "light" content words in their everyday speech (for a detailed discussion, see Bates & Goodman, 1997). The patients who show this profile also tend to be relatively spared in production of verbs. It remains to be seen whether the verbs that are "spared" in some of these patients are the higher-frequency, general-purpose forms that emerged for difficult action pictures in the present study.

We also examined noun-verb differences by treating form class as a dichotomous variable, entered into the regression equation after all other picture and word characteristics were controlled. Substantial form class effects were found despite these controls, reflecting slower RTs and lower name agreement for verbs/actions. To determine whether the slower RTs for verbs are in some sense caused by greater ambiguity (indexed by greater variation in name agreement), this regression was repeated with name agreement entered into the equation with the other word and picture characteristics, prior to form class. Despite these controls, there was still a robust effect of form class on reaction times (with verbs slower than nouns). Hence the difficulties posed by action naming are not simply a reflection of greater uncertainty about the specific name that should be used. Finally, we added a post hoc measure to our list of predictors, a count of the number of relevant objects or protagonists in each stimulus. This measure was intended to pick up effects of conceptual complexity that are not reflected in our objective visual-complexity measure. Although this complexity metric was strongly related to form class (i.e., more complexity for action pictures), and did siphon off some of the noun-verb variance, there was still a significant reaction time disadvantage for verbs after conceptual complexity was controlled. We conclude that the difference between action and object naming is profound, and does not disappear despite our attempts to control for many of the dimensions that separate these two classes of stimuli.

These results are thus consistent with the proposal that action and object naming are fundamentally different processes, as Gentner argued in her classic paper on noun-verb differences (Gentner, 1982). What remains to be determined is whether and to what extent these "fundamental" differences in the present study are by-products of our picture-naming methodology.

The first methodological concern lies in the fact that action naming requires speakers to draw inferences about motion from a static display. However, studies by other investigators have obtained similar results when comparing action naming for static pictures vs. film clips (e.g., Davidoff & Masterson, 1996). Hence it is unlikely that the inference from static display to action verb is responsible for all of the differences that we have noted here.

A second, related concern revolves around the differential complexity of action and object stimuli. We have already seen that visual complexity cannot account for these results, measured objectively (by digitized file size). However, these stimuli also differ in their psychological complexity. Almost all of the object pictures involve a single simple or complex object (although a few of them have background objects, e.g., a cake on a plate, and the human figures typically have articles of clothing to indicate their identity and roles, e.g., a nurse in uniform). In contrast, there is no way to depict an action without simultaneously depicting the person, animal or object who performs the action or undergoes the experience that the artist is trying to convey. For transitive actions, accurate depiction typically requires the presence of both the agent/actor and the patient/object involved in the intended event. Indeed, some of the stimuli that we adopted here involve complex scenes (e.g., a birthday party to elicit the verb 'celebrate'). Hence action naming to still pictures may require a greater degree of "scene parsing" than is typically required for object naming. We acknowledge that this is a limitation of action naming, and may well be one of the major reasons why action naming is a relatively slow process. In a first attempt to quantify this dimension of psychological complexity, we developed a rough post hoc metric of

the number of objects, actors or other entities that were depicted in each of our action and object stimuli. This measure did strongly differentiate between our action and object stimuli, but it was not sufficient to account for the persistent "verb disadvantage" in our reaction time data. It seems to us that this limitation is unavoidable if we want to elicit a large and ecologically valid range of action names. Better metrics of conceptual complexity could be developed to assess the magnitude of these effects. But complexity alone (at least as we have been able to measure it so far) does not seem to be the deciding factor.

A third methodological issue lies in the fact that object naming has been under investigation for more than 100 years, resulting in continual improvements in the quality of object-naming stimuli. Far fewer studies have focused on action naming, and as a result, action-naming stimuli have undergone less "evolution". Results of the present study and others like it may eventually lead to the development of better action-naming stimuli, reducing some of the differences that we have reported here. For example, it might be useful to investigate object and action naming using the relative abstract, schematic drawings or symbols for objects and actions that are available as "clip art" in many computer programs (J.G. Snodgrass, personal communication, January 2002). But because such stimuli are relatively limited in scope and number (and may be recognizable to only a subset of computer-literate subjects), they probably will not prove as useful in cross-linguistic, developmental and/or neuropsychological studies as the standard black-and-white drawings that we have employed here. While we acknowledge the limitations of our materials, they are similar to those that have been used in many other studies. Hence, at the very least, our conclusions are relevant to much of the current literature on action and object naming.

Another potential objection to our methodology lies in the use of a between-subjects, blocked design. In the real world, action and object names are retrieved within the same sentence, close together in time. If we had used a mixed design, would name agreement and reaction times for nouns and verbs converge? In fact, we and our collaborators have conducted a number of studies in which action and object names were elicited from the same participants, in a mixed design, in English (Federmeier & Bates, 1997), in Chinese (Lu et al., in press) and in Spanish-English bilinguals (Hernandez & Salahuddin, 2001). Two conclusions emerge from these studies: (1) compared with blocked designs, mixed designs tend to elicit longer reaction times and lower name agreement, and (2) in mixed designs, participants need cues to help them decide whether the same picture should be described with a noun or a verb. In fact, many of our pictures could be named with either a noun or a verb, a fact that we have exploited in several studies looking at "syntactic priming" of noun and verb production, in picture naming (Federmeier & Bates, 1997; Hernandez & Salahuddin, 2001; Lu et al., in press) and in other tasks including cued shadowing (also called auditory word repetition or auditory naming—Liu, 1996; Lu et al., in press) and word reading (Liu, 1996). In the absence of form class cues (e.g., lead-in phrases like 'Here is the____' vs. 'He likes to____', participants are often uncertain about the way that the picture stimuli should be interpreted. This is an important issue, but it is a separate one that requires a different kind of inquiry. The blocked method that we have used here takes care of the cueing problem, and is much closer to the methods that are typically used in neuropsychological and developmental studies. Hence our present results are more relevant to those literatures.

Although we stand by the materials and procedures that we have used here to assess action and object naming, we do not want to imply that noun-verb differences in word production will generalize to word comprehension. In fact, we have compared picture naming with other modalities for the same target words, with very different results. Lu et al. (in press) compared syntactic priming of Chinese nouns and verbs in picture naming with syntactic priming of the same words in an auditory word repetition (cued shadowing) task. The picture-naming method yielded large form class differences of the sort reported here, with very large effects of syntactic context. In contrast, there were no noun-verb differences in the word repetition task, and the effects of syntactic priming (though significant) were very small. We are currently collecting word reading and word repetition norms for all of the target words that emerged in the present study of picture naming in English, and will soon be in a position to conduct comparisons of form class effects across all these modalities.

Pending evidence to the contrary, we suggest that action and object naming differ in some fundamental ways that are not artifacts of any single method. In her influential paper, Gentner (1982) proposed that the process of mapping from dynamic events to verbs is more variable than the process of mapping from objects to nouns, over speakers and over languages. Matters are likely to become even more complicated when one starts to factor in the many syntactic and semantic differences between nouns and verbs that were not

considered in the present study. Although other views are possible (and the search for a perfectly matched set of noun-verb stimuli may reveal other results), we suspect that natural languages have not evolved to satisfy the psycholinguist's need for orthogonal designs. The many differences that we find in comparing production of nouns and verbs may be there for a reason. These differences are especially important for neural imaging studies of action and object naming, because variations in task, modality and stimulus characteristics of the sort that we have demonstrated here can result in widely different conclusions about the neural bases of language. They will also prove important in comparative studies of timed picture naming across different languages, a project that is now underway (Bates et al., 2000; Bates et al., 2002; Bates, Devescovi, & Wulfeck, 2001; D'Amico, Devescovi, & Bates, 2001).

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APPENDIX 1a

Empirically determined dominant names and main dependent variables for the action picture stimuli

No. and **Dominant name** specify the identity of the stimuli pictures. Measures of nameability (or **Correctness**) are based on the 3-point error coding scheme: representing the percent of subjects responding with a "Valid response", an "Invalid response" or failing to give any name, i.e., "No response". Besides the raw number of **alternatives**, the "H statistic" is presented: increasing H value indicates decreasing name agreement. **Name Agreement** measures specify the percent of all codable responses with a valid RT on which participants produced the dominant name (Lex 1), a morphophonological variant (Lex 2), a synonym (Lex 3) of the dominant name, or a response that failed to meet criteria for the Lexical Codes 1-3 (Lex 4). "**RT total**" refers to mean reaction time and STD values across all valid trials, "**RT target**" refers to reactions for dominant responses only.

ACTION PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Dominant name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
1.	**dive**	100%	0%	0%	1	0.50	100%	0%	0%	0%	938	401	938	401
2.	**drink**	96%	0%	4%	2	0.77	88%	0%	13%	0%	888	204	848	132
3.	**paint**	96%	0%	4%	1	0.51	100%	0%	0%	0%	994	245	994	245
4.	**ski**	60%	4%	36%	2	0.63	93%	7%	0%	0%	1050	271	1053	281
5.	**cut**	100%	0%	0%	1	0.50	100%	0%	0%	0%	1065	278	1065	278
6.	**blow**	96%	0%	4%	1	0.51	100%	0%	0%	0%	974	253	974	253
7.	**argue**	94%	4%	2%	7	1.82	57%	0%	4%	38%	1501	518	1415	479
8.	**walk**	76%	14%	10%	7	2.00	45%	0%	0%	55%	1826	647	1799	591
9.	**fly**	94%	6%	0%	12	2.66	43%	0%	0%	57%	1517	514	1282	442
10.	**wake up**	88%	8%	4%	8	2.22	36%	50%	9%	5%	1711	585	1533	498
11.	**win**	82%	8%	10%	10	2.33	37%	2%	0%	61%	1623	491	1579	386
12.	**bake**	92%	4%	4%	6	1.68	48%	0%	0%	52%	1487	487	1360	301
13.	**balance**	76%	18%	6%	10	2.25	42%	0%	0%	58%	1912	667	1816	762
14.	**bark**	96%	2%	2%	1	0.06	100%	0%	0%	0%	949	275	949	275
15.	**beg**	98%	2%	0%	4	0.55	92%	0%	0%	8%	1348	379	1292	299
16.	**bite**	100%	0%	0%	3	0.28	96%	0%	2%	2%	1015	307	993	285
17.	**sniff**	78%	22%	0%	12	2.67	23%	0%	15%	62%	1863	645	1490	537
18.	**boil**	96%	0%	4%	4	1.19	69%	0%	0%	31%	1272	339	1209	242
19.	**bounce**	98%	0%	2%	3	0.87	82%	0%	12%	6%	917	261	880	218
20.	**bow**	96%	2%	2%	4	0.57	92%	0%	0%	8%	1169	360	1105	298
21.	**bowl**	98%	2%	0%	2	0.35	94%	0%	0%	6%	891	262	856	208
22.	**box**	98%	0%	2%	3	0.87	82%	0%	0%	18%	967	249	963	254
23.	**break**	98%	2%	0%	5	0.88	86%	0%	0%	14%	1484	634	1399	615
24.	**brush**	100%	0%	0%	2	0.14	98%	0%	0%	2%	903	221	888	194
25.	**buckle**	94%	0%	6%	8	1.47	74%	0%	4%	21%	1453	523	1351	394
26.	**burn**	92%	4%	4%	3	0.90	78%	2%	0%	20%	1142	409	1101	374
27.	**bury**	90%	10%	0%	9	1.32	80%	0%	0%	20%	1644	517	1563	471
28.	**pay**	98%	2%	0%	5	1.33	69%	2%	4%	24%	1413	435	1338	388
29.	**yell**	100%	0%	0%	6	1.79	48%	0%	34%	18%	1139	259	1112	200
30.	**camp**	94%	4%	2%	8	2.09	47%	0%	0%	53%	1601	565	1595	691
31.	**carry**	92%	6%	2%	4	0.84	85%	0%	0%	15%	1253	425	1180	354
32.	**carve**	94%	4%	2%	8	1.94	45%	0%	6%	49%	1632	533	1531	541
33.	**catch**	98%	0%	2%	2	0.27	96%	0%	0%	4%	1160	329	1154	324
34.	**celebrate**	80%	16%	4%	12	2.87	25%	0%	5%	70%	1916	542	2214	539
35.	**chase**	100%	0%	0%	4	0.52	92%	0%	0%	8%	1145	322	1143	329
36.	**cheer**	96%	2%	2%	11	2.22	52%	2%	0%	46%	1431	410	1330	387
37.	**chew**	96%	0%	4%	8	2.40	35%	0%	25%	40%	1559	553	1445	420

ACTION PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Dominant name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
38.	**clap**	98%	2%	0%	5	0.69	90%	0%	0%	10%	1174	469	1078	383
39.	**climb**	100%	0%	0%	2	0.24	96%	0%	4%	0%	1001	247	989	245
40.	**cut**	100%	0%	0%	8	2.16	40%	0%	54%	6%	1339	406	1203	406
41.	**slam**	94%	2%	4%	9	2.38	30%	0%	4%	66%	1480	482	1658	667
42.	**sort**	66%	26%	8%	17	2.78	24%	0%	12%	64%	1921	533	1575	394
43.	**comb**	98%	0%	2%	2	0.27	96%	0%	4%	0%	861	159	867	159
44.	**play**	92%	6%	2%	9	2.17	46%	2%	0%	52%	1599	588	1589	686
45.	**conduct**	82%	8%	10%	6	1.33	76%	0%	15%	10%	1426	586	1373	571
46.	**cook**	100%	0%	0%	5	0.94	82%	0%	0%	18%	1152	302	1115	301
47.	**cough**	92%	0%	8%	3	1.25	67%	0%	0%	33%	1334	373	1255	346
48.	**count**	96%	4%	0%	3	0.89	81%	0%	0%	19%	1220	377	1187	330
49.	**crash**	90%	6%	4%	5	0.86	87%	0%	0%	13%	1648	557	1576	537
50.	**crawl**	100%	0%	0%	1	0.00	100%	0%	0%	0%	1045	264	1045	264
51.	**cross**	92%	6%	2%	3	1.14	54%	0%	0%	46%	1457	487	1424	369
52.	**cry**	100%	0%	0%	2	0.14	98%	0%	0%	2%	962	310	934	243
53.	**curl**	98%	0%	2%	6	1.19	78%	2%	2%	18%	1346	359	1326	346
54.	**curtsey**	94%	6%	0%	4	1.30	64%	0%	28%	9%	1306	410	1203	366
55.	**dance**	100%	0%	0%	2	0.33	94%	0%	0%	6%	993	278	979	272
56.	**decorate**	86%	10%	4%	9	1.94	58%	0%	0%	42%	1673	523	1562	394
57.	**deliver**	96%	4%	0%	6	0.93	85%	0%	0%	15%	1452	464	1408	420
58.	**tornado**	78%	18%	4%	12	2.23	38%	0%	0%	62%	1713	534	1390	563
59.	**dig**	88%	10%	2%	4	1.25	57%	0%	39%	5%	1462	366	1437	391
60.	**dip**	98%	2%	0%	3	0.49	92%	0%	0%	8%	1317	410	1294	420
61.	**cut**	74%	18%	8%	9	2.18	38%	0%	5%	57%	1906	466	1858	388
62.	**drip**	92%	6%	2%	12	2.19	61%	0%	0%	39%	1768	571	1577	489
63.	**drag**	100%	0%	0%	8	1.83	62%	0%	2%	36%	1353	388	1315	315
64.	**write**	96%	2%	2%	5	1.37	52%	0%	0%	48%	1502	550	1378	538
65.	**drill**	96%	4%	0%	6	1.17	79%	0%	0%	21%	1370	441	1315	360
66.	**drip**	100%	0%	0%	3	0.28	96%	0%	0%	4%	980	335	947	274
67.	**drive**	100%	0%	0%	2	0.14	98%	0%	0%	2%	999	205	989	195
68.	**break**	86%	14%	0%	9	2.05	51%	2%	0%	47%	1706	564	1422	378
69.	**drown**	96%	2%	2%	2	0.30	96%	4%	0%	0%	1067	434	1001	180
70.	**dry**	100%	0%	0%	4	1.69	34%	32%	0%	34%	1194	327	1271	236
71.	**dust**	96%	4%	0%	5	1.23	75%	0%	0%	25%	1215	383	1209	383
72.	**eat**	64%	0%	36%	2	0.54	97%	0%	0%	3%	1118	240	1105	232
73.	**dump**	96%	4%	0%	12	2.36	50%	0%	29%	21%	1506	440	1421	405
74.	**erase**	98%	0%	2%	5	0.98	84%	0%	0%	16%	1319	422	1244	334
75.	**erupt**	98%	0%	2%	6	1.64	61%	0%	22%	16%	1409	369	1404	388
76.	**look**	88%	12%	0%	8	1.90	55%	0%	18%	27%	1699	641	1527	530
77.	**stretch**	94%	2%	4%	8	2.26	36%	0%	0%	64%	1334	388	1232	237
78.	**explode**	94%	4%	2%	5	1.50	64%	0%	26%	11%	1586	525	1547	492
79.	**scared**	82%	8%	10%	12	2.84	22%	17%	5%	56%	1940	569	2101	411
80.	**fall**	100%	0%	0%	2	0.68	82%	0%	0%	18%	1134	300	1159	290
81.	**feed**	90%	2%	8%	4	0.80	87%	0%	0%	13%	1241	390	1208	279
82.	**fence**	96%	4%	0%	8	1.71	63%	0%	0%	38%	1206	351	1126	276
83.	**fight**	92%	4%	4%	6	1.43	72%	0%	0%	28%	1235	316	1199	273
84.	**file**	90%	8%	2%	11	2.32	53%	0%	13%	33%	1481	502	1252	283
85.	**fill**	88%	6%	6%	8	1.76	64%	5%	0%	32%	1777	513	1716	505

ACTION PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Dominant name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
86.	**drip**	86%	14%	0%	12	2.56	30%	0%	0%	70%	1983	588	1996	594
87.	**fish**	100%	0%	0%	1	0.00	100%	0%	0%	0%	1080	162	1080	162
88.	**float**	96%	4%	0%	6	1.10	81%	0%	0%	19%	1413	471	1390	416
89.	**run**	68%	24%	8%	12	2.32	35%	0%	9%	56%	1838	614	2075	550
90.	**fly**	100%	0%	0%	1	0.00	100%	0%	0%	0%	914	275	914	275
91.	**fold**	90%	6%	4%	8	1.09	84%	0%	0%	16%	1356	549	1275	549
92.	**follow**	98%	0%	2%	6	1.29	73%	0%	0%	27%	1318	445	1321	449
93.	**scare**	96%	2%	2%	5	0.79	88%	0%	6%	6%	1322	395	1246	284
94.	**arrest**	86%	14%	0%	4	1.54	51%	0%	0%	49%	1458	356	1502	390
95.	**cry**	94%	4%	2%	4	1.76	43%	0%	0%	57%	1336	419	1411	498
96.	**cook**	100%	0%	0%	6	1.48	50%	0%	0%	50%	1282	411	1245	469
97.	**give**	96%	2%	2%	6	0.85	88%	2%	0%	10%	1330	275	1343	280
98.	**glue**	98%	2%	0%	5	1.35	63%	0%	29%	8%	1364	385	1375	349
99.	**golf**	98%	0%	2%	8	1.37	78%	0%	0%	22%	1471	529	1438	553
100.	**whisper**	94%	2%	4%	5	1.65	51%	0%	0%	49%	1333	534	1221	343
101.	**shake**	92%	6%	2%	6	1.62	61%	2%	0%	37%	1216	321	1174	315
102.	**cook**	100%	0%	0%	5	1.68	48%	0%	0%	52%	1398	478	1217	315
103.	**grind**	62%	36%	2%	13	2.27	35%	3%	0%	61%	2228	628	2024	593
104.	**hammer**	98%	0%	2%	4	1.29	69%	0%	14%	16%	1114	371	1008	244
105.	**arrest**	82%	16%	2%	9	1.77	66%	0%	0%	34%	1508	549	1341	398
106.	**hang**	98%	2%	0%	7	1.68	45%	0%	0%	55%	1304	381	1147	282
107.	**hatch**	92%	4%	4%	5	0.91	85%	0%	0%	15%	1237	400	1142	305
108.	**hide**	96%	2%	2%	6	1.03	83%	0%	0%	17%	1430	475	1408	413
109.	**hit**	100%	0%	0%	3	0.97	78%	0%	0%	22%	1002	243	984	243
110.	**hitchhike**	98%	0%	2%	3	0.49	92%	6%	0%	2%	1340	479	1360	488
111.	**howl**	100%	0%	0%	2	0.83	74%	0%	0%	26%	1161	289	1205	297
112.	**hug**	100%	0%	0%	6	0.99	84%	0%	4%	12%	995	269	936	213
113.	**hunt**	96%	2%	2%	3	0.86	79%	0%	0%	21%	1254	372	1282	395
114.	**iron**	96%	0%	4%	1	0.06	100%	0%	0%	0%	977	328	977	328
115.	**ride**	90%	6%	4%	11	2.47	42%	0%	0%	58%	1521	490	1203	352
116.	**juggle**	100%	0%	0%	3	0.28	96%	0%	0%	4%	961	244	967	247
117.	**jump**	98%	0%	2%	6	1.39	71%	0%	10%	18%	1353	396	1318	388
118.	**kick**	100%	0%	0%	2	0.24	96%	0%	0%	4%	866	196	853	185
119.	**kiss**	100%	0%	0%	1	0.00	100%	0%	0%	0%	958	186	958	186
120.	**kneel**	92%	4%	4%	7	1.11	83%	0%	0%	17%	1331	505	1252	447
121.	**knight**	78%	18%	4%	9	1.66	69%	0%	0%	31%	1774	573	1768	635
122.	**knit**	94%	6%	0%	4	1.60	53%	0%	0%	47%	1552	459	1432	350
123.	**knock**	98%	2%	0%	2	0.17	98%	0%	0%	2%	1168	511	1169	517
124.	**lasso**	94%	2%	4%	8	1.70	68%	0%	0%	32%	1357	552	1243	358
125.	**laugh**	98%	2%	0%	2	0.27	96%	0%	0%	4%	977	360	956	349
126.	**lick**	100%	0%	0%	3	0.38	94%	0%	0%	6%	1120	378	1100	374
127.	**relax**	94%	4%	2%	10	2.59	28%	0%	19%	53%	1441	415	1315	214
128.	**lift**	94%	2%	4%	7	1.83	53%	0%	15%	32%	1371	445	1312	352
129.	**light**	100%	0%	0%	3	0.54	90%	2%	0%	8%	1298	368	1304	367
130.	**listen**	100%	0%	0%	3	1.07	72%	0%	22%	6%	1245	404	1263	424
131.	**load**	88%	4%	8%	10	2.49	32%	0%	5%	64%	1608	446	1626	397
132.	**unlock**	94%	0%	6%	7	1.93	49%	0%	0%	51%	1296	393	1182	342
133.	**look**	94%	2%	4%	6	0.87	87%	2%	6%	4%	1494	527	1439	502

ACTION PICTURES	Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No. Dominant name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
134. **magnify**	96%	4%	0%	8	2.01	52%	0%	0%	48%	1552	454	1522	438
135. **mail**	96%	0%	4%	8	1.37	77%	0%	2%	21%	1246	409	1134	326
136. **make**	86%	8%	6%	8	1.72	67%	12%	0%	21%	1569	579	1419	412
137. **march**	96%	2%	2%	3	1.05	67%	0%	0%	33%	1191	398	1217	379
138. **marry**	92%	6%	2%	8	1.51	72%	0%	13%	15%	1376	481	1301	416
139. **massage**	100%	0%	0%	2	0.24	96%	0%	0%	4%	1130	321	1141	323
140. **measure**	100%	0%	0%	2	0.14	98%	0%	0%	2%	1168	259	1174	258
141. **meditate**	88%	10%	2%	5	1.40	68%	0%	0%	32%	1515	579	1379	343
142. **melt**	100%	0%	0%	3	0.72	84%	0%	0%	16%	1183	299	1175	272
143. **milk**	92%	2%	6%	3	0.80	85%	0%	0%	15%	1404	504	1360	416
144. **mine**	70%	26%	4%	8	1.73	57%	0%	0%	43%	2013	647	1991	681
145. **miss**	98%	0%	2%	6	1.90	35%	0%	2%	63%	1225	327	1295	260
146. **mix**	92%	0%	8%	6	2.03	43%	0%	30%	26%	1351	501	1286	414
147. **mop**	96%	2%	2%	5	1.50	63%	0%	0%	38%	1332	461	1258	313
148. **oil**	90%	8%	2%	4	0.74	89%	0%	0%	11%	1498	460	1421	396
149. **open**	94%	6%	0%	9	2.09	57%	0%	2%	40%	1341	452	1122	268
150. **operate**	82%	12%	6%	9	2.02	54%	0%	0%	46%	1754	435	1628	389
151. **parachute**	98%	2%	0%	6	1.39	73%	0%	0%	27%	1399	490	1288	456
152. **bite**	96%	2%	2%	5	1.42	63%	0%	0%	38%	1575	628	1520	518
153. **peel**	94%	0%	6%	4	0.68	89%	0%	0%	11%	1178	347	1175	362
154. **pet**	100%	0%	0%	2	0.14	98%	0%	0%	2%	935	272	934	275
155. **pick**	90%	6%	4%	8	1.75	64%	0%	2%	33%	1524	509	1478	432
156. **pinch**	94%	4%	2%	4	0.60	91%	0%	0%	9%	1137	318	1108	311
157. **plant**	100%	0%	0%	6	1.52	56%	0%	0%	44%	1376	358	1390	369
158. **play**	100%	0%	0%	2	0.24	96%	4%	0%	0%	1119	354	1109	353
159. **plow**	78%	20%	2%	8	1.81	59%	0%	0%	41%	1716	540	1590	472
160. **plug**	100%	0%	0%	3	0.61	88%	10%	0%	2%	1048	351	1046	323
161. **point**	96%	2%	2%	4	0.66	90%	0%	0%	10%	1102	356	1063	327
162. **polish**	98%	0%	2%	7	1.51	69%	0%	16%	14%	1233	388	1118	240
163. **pop**	98%	0%	2%	4	0.92	82%	0%	4%	14%	1261	470	1121	306
164. **pour**	100%	0%	0%	3	0.28	96%	0%	0%	4%	890	272	852	169
165. **pray**	98%	0%	2%	5	0.91	84%	0%	0%	16%	1224	391	1216	360
166. **propose**	82%	12%	6%	8	1.35	78%	0%	0%	22%	1650	612	1573	451
167. **pull**	96%	0%	4%	3	0.96	79%	0%	21%	0%	1255	375	1223	390
168. **push**	100%	0%	0%	1	0.00	100%	0%	0%	0%	871	200	871	200
169. **rain**	98%	2%	0%	5	0.59	92%	0%	0%	8%	1168	410	1115	380
170. **raise**	72%	24%	4%	12	2.50	31%	3%	0%	67%	1879	576	1675	699
171. **rake**	98%	0%	2%	2	0.17	98%	0%	0%	2%	990	215	981	209
172. **reach**	86%	2%	12%	6	0.96	86%	0%	0%	14%	1300	348	1261	348
173. **read**	90%	0%	10%	1	0.14	100%	0%	0%	0%	993	289	993	289
174. **count**	76%	20%	4%	13	2.66	26%	0%	0%	74%	1784	473	1526	549
175. **relax**	100%	0%	0%	10	2.36	44%	0%	20%	36%	1642	605	1394	386
176. **fix**	92%	2%	6%	6	0.97	85%	0%	2%	13%	1383	381	1321	328
177. **save**	98%	0%	2%	3	1.34	55%	0%	35%	10%	1270	288	1264	258
178. **ride**	98%	2%	0%	2	0.17	98%	0%	0%	2%	1001	255	1006	256
179. **roar**	92%	8%	0%	7	1.67	59%	0%	0%	41%	1650	663	1589	636
180. **roast**	100%	0%	0%	5	1.68	46%	0%	0%	54%	1305	380	1169	231
181. **row**	98%	2%	0%	2	0.35	94%	0%	6%	0%	947	240	913	189

ACTION PICTURES	Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No. Dominant name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
182. **run**	100%	0%	0%	2	0.14	98%	2%	0%	0%	912	306	918	306
183. **sail**	100%	0%	0%	2	0.14	98%	0%	0%	2%	992	234	988	234
184. **salute**	90%	6%	4%	1	0.14	100%	0%	0%	0%	1028	276	1028	276
185. **saw**	96%	0%	4%	2	0.52	90%	0%	0%	10%	1137	243	1133	244
186. **punish**	94%	4%	2%	11	2.61	34%	2%	11%	53%	1485	440	1614	517
187. **scoop**	96%	0%	4%	2	0.20	98%	0%	0%	2%	1117	233	1114	234
188. **itch**	94%	4%	2%	4	1.34	49%	0%	45%	6%	1562	488	1517	549
189. **carve**	98%	0%	2%	4	1.39	63%	0%	22%	14%	1371	378	1325	374
190. **sell**	96%	4%	0%	6	0.85	88%	2%	0%	10%	1628	587	1544	559
191. **serve**	96%	2%	2%	4	0.57	92%	0%	0%	8%	1181	278	1155	263
192. **sew**	92%	8%	0%	5	0.66	91%	0%	2%	7%	1417	510	1393	521
193. **shake**	100%	0%	0%	4	1.22	56%	0%	0%	44%	1430	568	1476	547
194. **wash**	98%	2%	0%	8	2.01	41%	0%	2%	57%	1599	541	1573	596
195. **sharpen**	92%	4%	4%	8	1.57	72%	0%	0%	28%	1526	329	1540	287
196. **shave**	100%	0%	0%	1	0.00	100%	0%	0%	0%	909	132	909	132
197. **shave**	98%	2%	0%	8	2.12	41%	0%	35%	24%	1362	300	1347	292
198. **shine**	94%	6%	0%	11	2.24	49%	2%	30%	19%	1828	531	1679	410
199. **shock**	72%	26%	2%	8	1.69	53%	0%	31%	17%	1648	426	1761	425
200. **shoot**	92%	0%	8%	3	0.64	89%	0%	9%	2%	1032	282	1012	281
201. **shower**	98%	0%	2%	4	0.70	88%	0%	0%	12%	974	219	947	188
202. **sing**	98%	0%	2%	2	0.17	98%	0%	0%	2%	928	149	925	149
203. **sink**	94%	2%	4%	5	1.51	62%	0%	0%	38%	1489	480	1471	533
204. **sit**	98%	2%	0%	3	0.31	96%	0%	0%	4%	984	296	964	274
205. **skate**	98%	0%	2%	2	0.78	78%	22%	0%	0%	1062	215	1085	221
206. **cut**	86%	14%	0%	11	2.29	42%	0%	0%	58%	1846	546	1661	568
207. **sleep**	94%	0%	6%	1	0.08	100%	0%	0%	0%	991	275	991	275
208. **cut**	100%	0%	0%	4	0.86	82%	0%	14%	4%	1056	249	1025	253
209. **slide**	100%	0%	0%	2	0.14	98%	0%	0%	2%	913	227	886	122
210. **slip**	100%	0%	0%	4	1.05	78%	0%	0%	22%	1238	353	1231	357
211. **smell**	96%	0%	4%	2	0.45	92%	0%	8%	0%	1176	292	1157	290
212. **smile**	96%	2%	2%	3	0.34	96%	0%	0%	4%	1119	309	1107	301
213. **smoke**	98%	0%	2%	1	0.03	100%	0%	0%	0%	921	147	921	147
214. **sneeze**	86%	2%	12%	4	1.28	51%	0%	0%	49%	1297	369	1255	310
215. **snow**	92%	2%	6%	5	0.93	85%	0%	0%	15%	1266	384	1221	337
216. **somersault**	96%	4%	0%	12	2.42	42%	0%	15%	44%	1381	535	1233	254
217. **sort**	94%	4%	2%	11	2.70	28%	2%	26%	45%	1713	593	1769	550
218. **plant**	78%	12%	10%	9	2.54	23%	3%	15%	59%	1692	519	1768	418
219. **spill**	98%	2%	0%	3	0.95	73%	0%	0%	27%	1733	387	1703	343
220. **sew**	90%	8%	2%	6	1.47	67%	0%	0%	33%	1557	503	1504	548
221. **cough**	92%	6%	2%	7	2.27	35%	0%	0%	65%	1701	548	1599	410
222. **splash**	100%	0%	0%	5	1.44	66%	0%	0%	34%	1417	393	1284	275
223. **spray**	92%	6%	2%	11	2.01	61%	0%	0%	39%	1480	491	1312	311
224. **spread**	96%	2%	2%	4	1.25	73%	0%	0%	27%	1351	397	1367	382
225. **squeeze**	92%	0%	8%	2	0.25	98%	0%	0%	2%	1133	294	1128	295
226. **stack**	98%	2%	0%	7	1.44	67%	0%	2%	31%	1324	412	1204	285
227. **stand**	94%	6%	0%	6	1.62	60%	11%	2%	28%	1627	450	1630	352
228. **steal**	94%	6%	0%	7	0.91	87%	0%	0%	13%	1743	475	1694	475
229. **sting**	86%	12%	2%	3	0.46	95%	0%	0%	5%	1765	590	1725	546

ACTION PICTURES	Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No. Dominant name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
230. **stir**	92%	4%	4%	5	1.32	74%	0%	0%	26%	1386	426	1278	316
231. **strain**	88%	10%	2%	10	2.34	39%	0%	25%	36%	1668	566	1531	323
232. **suck**	92%	6%	2%	9	1.30	80%	2%	0%	17%	1603	596	1633	617
233. **sunbathe**	94%	2%	4%	8	2.07	49%	0%	30%	21%	1481	512	1373	326
234. **surf**	100%	0%	0%	1	0.00	100%	0%	0%	0%	946	210	946	210
235. **look**	90%	6%	4%	9	2.27	47%	0%	27%	27%	1539	528	1429	565
236. **swat**	98%	0%	2%	9	1.74	69%	4%	14%	12%	1420	424	1342	356
237. **sweat**	98%	0%	2%	5	0.69	90%	0%	2%	8%	1239	456	1201	436
238. **sweep**	90%	0%	10%	3	0.41	96%	0%	0%	4%	958	202	956	202
239. **swim**	98%	0%	2%	1	0.03	100%	0%	0%	0%	852	195	852	195
240. **swing**	98%	0%	2%	1	0.03	100%	0%	0%	0%	874	134	874	134
241. **laugh**	64%	28%	8%	15	2.61	28%	0%	13%	59%	1785	477	1645	535
242. **teach**	88%	2%	10%	8	1.86	45%	0%	2%	52%	1477	434	1480	484
243. **tear**	98%	0%	2%	3	1.03	67%	0%	31%	2%	953	210	917	183
244. **talk**	96%	0%	4%	5	1.04	79%	0%	2%	19%	1175	389	1110	217
245. **think**	94%	4%	2%	9	1.78	62%	0%	6%	32%	1462	506	1434	531
246. **throw**	100%	0%	0%	3	0.38	94%	0%	0%	6%	1091	286	1055	248
247. **tickle**	96%	0%	4%	7	1.64	65%	0%	0%	35%	1258	428	1172	408
248. **tie**	98%	0%	2%	2	0.17	98%	2%	0%	0%	1093	370	1099	371
249. **frost**	78%	12%	10%	14	2.88	21%	0%	0%	79%	1678	483	1397	577
250. **tow**	96%	0%	4%	5	0.61	92%	0%	0%	8%	1181	311	1162	306
251. **trip**	98%	0%	2%	3	0.49	92%	0%	0%	8%	1185	428	1218	427
252. **type**	100%	0%	0%	1	0.00	100%	0%	0%	0%	792	146	792	146
253. **vacuum**	100%	0%	0%	2	0.14	98%	0%	0%	2%	996	216	993	217
254. **wade**	96%	2%	2%	6	1.85	42%	0%	0%	58%	1579	557	1446	513
255. **wag**	84%	14%	2%	13	2.42	38%	0%	0%	62%	1677	589	1320	237
256. **wait**	100%	0%	0%	2	0.99	56%	0%	0%	44%	1209	281	1195	212
257. **walk**	100%	0%	0%	1	0.00	100%	0%	0%	0%	929	337	929	337
258. **wash**	100%	0%	0%	7	1.82	44%	0%	4%	52%	1409	586	1537	544
259. **watch**	100%	0%	0%	4	0.42	94%	2%	0%	4%	1118	390	1081	336
260. **water**	96%	0%	4%	3	0.52	92%	0%	0%	8%	1165	324	1148	304
261. **wave**	96%	2%	2%	3	0.34	96%	0%	0%	4%	1224	407	1207	402
262. **sew**	36%	58%	6%	12	1.72	28%	0%	0%	72%	2491	573	2276	147
263. **weigh**	98%	0%	2%	2	0.17	98%	0%	0%	2%	1116	286	1113	288
264. **whisper**	100%	0%	0%	5	0.66	90%	0%	0%	10%	1127	338	1088	286
265. **whistle**	96%	0%	4%	4	0.95	81%	0%	0%	19%	1135	485	1050	335
266. **win**	96%	2%	2%	5	1.85	46%	0%	0%	54%	1404	371	1330	310
267. **wink**	96%	0%	4%	4	0.66	90%	0%	0%	10%	1024	231	989	178
268. **wash**	98%	0%	2%	6	1.72	45%	0%	0%	55%	1335	370	1297	436
269. **wish**	66%	18%	16%	11	2.26	30%	0%	0%	70%	2017	549	1915	366
270. **wrap**	96%	0%	4%	6	1.79	54%	0%	0%	46%	1305	435	1325	471
271. **twist**	98%	2%	0%	13	2.51	45%	0%	27%	29%	1433	449	1277	380
272. **write**	100%	0%	0%	5	0.56	92%	0%	0%	8%	1200	402	1139	270
273. **yawn**	100%	0%	0%	3	0.77	82%	0%	0%	18%	996	223	950	205
274. **yell**	98%	0%	2%	4	1.10	78%	0%	16%	6%	1266	402	1249	403
275. **zip**	100%	0%	0%	4	1.06	72%	26%	0%	2%	1113	340	1069	334

APPENDIX 1b

Empirically determined dominant names and main dependent variables for the object picture stimuli

No. and **Dominant name** specify the identity of the stimuli pictures. A * signals that the same target name was found by Snodgrass (1996). Measures of nameability (or **Correctness**) are based on the 3-point error coding scheme: representing the percent of subjects responding with a "Valid response", an "Invalid response" or failing to give any name, i.e., "No response". Besides the raw number of **alternatives**, the "H statistic" is presented: increasing H value indicates decreasing name agreement. **Name Agreement** measures specify the percent of all codable responses with a valid RT on which participants produced the dominant name (Lex 1), a morphophonological variant (Lex 2), a synonym (Lex 3) of the dominant name, or a response that failed to meet criteria for the Lexical Codes 1-3 (Lex 4). "**RT total**" refers to mean reaction time and STD values across all valid trials, "**RT target**" refers to reactions for dominant responses only.

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
1.	**accordion***	76%	22%	2%	5	0.92	87%	0%	0%	13%	1216	494	1179	496
2.	**acorn**	94%	4%	2%	2	0.70	83%	0%	0%	17%	1273	466	1242	472
3.	**airplane***	100%	0%	0%	3	1.13	70%	22%	8%	0%	800	210	778	148
4.	**alligator***	100%	0%	0%	4	0.61	90%	2%	6%	2%	886	223	881	227
5.	**anchor**	96%	4%	0%	1	0.06	100%	0%	0%	0%	951	282	951	282
6.	**ant***	100%	0%	0%	3	0.61	88%	0%	0%	12%	1240	482	1171	410
7.	**antlers**	100%	0%	0%	3	0.96	72%	0%	26%	2%	1231	422	1186	390
8.	**anvil**	68%	30%	2%	6	1.40	71%	0%	0%	29%	1507	693	1239	444
9.	**apple***	98%	0%	2%	1	0.03	100%	0%	0%	0%	810	255	810	255
10.	**fish tank**	100%	0%	0%	5	1.64	48%	0%	46%	6%	1090	347	1005	157
11.	**arm**	98%	0%	2%	2	0.66	84%	0%	0%	16%	910	251	923	256
12.	**arrow**	100%	0%	0%	2	0.14	98%	0%	0%	2%	788	250	785	252
13.	**artichoke***	68%	26%	6%	4	1.04	79%	0%	0%	21%	1463	687	1397	674
14.	**ashtray***	74%	22%	4%	7	1.10	84%	0%	0%	16%	1369	555	1250	453
15.	**asparagus***	86%	12%	2%	6	0.87	88%	0%	0%	12%	1429	462	1388	465
16.	**ax**	88%	6%	6%	2	0.67	86%	0%	14%	0%	1119	456	1085	436
17.	**baby**	100%	0%	0%	4	0.42	94%	0%	4%	2%	751	205	729	140
18.	**bottle**	98%	0%	2%	3	0.57	90%	8%	0%	2%	804	248	775	217
19.	**stroller**	94%	4%	2%	5	1.67	49%	0%	45%	6%	1319	555	1335	641
20.	**backpack**	100%	0%	0%	1	0.00	100%	0%	0%	0%	836	177	836	177
21.	**badge**	94%	4%	2%	9	1.70	68%	0%	4%	28%	1254	393	1221	404
22.	**bag**	98%	0%	2%	4	0.83	84%	14%	2%	0%	951	322	925	323
23.	**balcony**	98%	0%	2%	7	1.66	65%	0%	0%	35%	1366	365	1324	293
24.	**ball***	100%	0%	0%	1	0.00	100%	0%	0%	0%	886	295	886	295
25.	**balloon**	100%	0%	0%	1	0.00	100%	0%	0%	0%	702	125	702	125
26.	**banana**	100%	0%	0%	1	0.00	100%	0%	0%	0%	808	273	808	273
27.	**bandaid**	100%	0%	0%	2	0.40	92%	8%	0%	0%	757	118	743	106
28.	**banjo**	92%	4%	4%	5	0.84	87%	0%	0%	13%	1083	455	1036	297
29.	**barbecue**	98%	2%	0%	2	0.49	90%	0%	10%	0%	1034	345	1012	310
30.	**barrel***	96%	4%	0%	2	0.20	98%	0%	2%	0%	920	334	882	207
31.	**basket***	100%	0%	0%	2	0.14	98%	2%	0%	0%	840	275	832	272
32.	**bat**	96%	2%	2%	1	0.06	100%	0%	0%	0%	764	160	764	160
33.	**bathtub**	100%	0%	0%	3	0.86	78%	22%	0%	0%	976	211	966	224
34.	**bear***	100%	0%	0%	2	0.68	82%	18%	0%	0%	846	217	804	177
35.	**beard**	100%	0%	0%	3	0.28	96%	2%	0%	2%	1049	422	1033	411
36.	**beaver**	94%	6%	0%	10	1.58	74%	0%	0%	26%	1412	553	1395	586

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
37.	**bed***	100%	0%	0%	1	0.00	100%	0%	0%	0%	706	146	706	146
38.	**bee**	96%	0%	4%	3	1.21	69%	0%	0%	31%	1212	334	1207	332
39.	**bug**	100%	0%	0%	8	2.01	44%	2%	4%	50%	1310	576	1122	477
40.	**bell***	100%	0%	0%	1	0.00	100%	0%	0%	0%	703	112	703	112
41.	**belt**	98%	0%	2%	1	0.03	100%	0%	0%	0%	812	257	812	257
42.	**bench**	100%	0%	0%	2	0.33	94%	0%	6%	0%	900	365	896	356
43.	**bicycle***	100%	0%	0%	2	0.88	70%	30%	0%	0%	751	215	731	170
44.	**binoculars**	90%	6%	4%	1	0.14	100%	0%	0%	0%	1055	538	1055	538
45.	**bird**	100%	0%	0%	4	1.04	80%	0%	0%	20%	1000	349	915	297
46.	**blimp**	94%	4%	2%	6	1.13	81%	2%	9%	9%	1368	570	1359	613
47.	**wood**	98%	2%	0%	7	1.79	55%	4%	39%	2%	1189	422	1174	490
48.	**boat**	98%	0%	2%	3	1.12	71%	0%	0%	29%	1099	328	1059	300
49.	**bomb**	98%	0%	2%	5	0.69	90%	0%	0%	10%	1042	368	989	317
50.	**bone**	100%	0%	0%	1	0.00	100%	0%	0%	0%	872	221	872	221
51.	**book***	100%	0%	0%	1	0.00	100%	0%	0%	0%	656	102	656	102
52.	**boot***	100%	0%	0%	3	0.54	90%	2%	0%	8%	877	242	869	237
53.	**bottle***	98%	2%	0%	5	0.69	90%	4%	0%	6%	990	451	956	456
54.	**bowl***	98%	0%	2%	2	0.17	98%	0%	0%	2%	828	192	831	192
55.	**bow***	100%	0%	0%	4	1.05	78%	12%	0%	10%	937	281	927	277
56.	**box**	100%	0%	0%	1	0.00	100%	0%	0%	0%	753	240	753	240
57.	**boy**	100%	0%	0%	5	0.66	90%	2%	0%	8%	964	263	956	265
58.	**branch**	100%	0%	0%	5	1.48	68%	8%	10%	14%	1117	329	1092	264
59.	**bra**	100%	0%	0%	1	0.00	100%	0%	0%	0%	917	279	917	279
60.	**bread***	100%	0%	0%	2	0.14	98%	0%	2%	0%	774	154	773	155
61.	**bride**	100%	0%	0%	4	0.75	86%	0%	0%	14%	1211	381	1168	307
62.	**bridge**	100%	0%	0%	2	0.14	98%	0%	0%	2%	860	179	862	180
63.	**broom**	100%	0%	0%	1	0.00	100%	0%	0%	0%	821	216	821	216
64.	**brush***	100%	0%	0%	3	0.38	94%	6%	0%	0%	980	386	955	352
65.	**bus***	100%	0%	0%	1	0.00	100%	0%	0%	0%	771	168	771	168
66.	**butter**	100%	0%	0%	3	0.28	96%	0%	0%	4%	1049	328	1036	321
67.	**butterfly***	100%	0%	0%	1	0.00	100%	0%	0%	0%	720	178	720	178
68.	**button**	100%	0%	0%	1	0.00	100%	0%	0%	0%	917	273	917	273
69.	**cactus**	96%	2%	2%	1	0.06	100%	0%	0%	0%	933	179	933	179
70.	**cage**	98%	0%	2%	4	0.55	92%	0%	0%	8%	987	326	963	204
71.	**cake***	100%	0%	0%	1	0.00	100%	0%	0%	0%	789	215	789	215
72.	**camel**	96%	2%	2%	1	0.06	100%	0%	0%	0%	892	200	892	200
73.	**camera**	100%	0%	0%	1	0.00	100%	0%	0%	0%	725	121	725	121
74.	**can**	98%	0%	2%	3	0.41	94%	2%	0%	4%	963	324	940	318
75.	**candle***	100%	0%	0%	1	0.00	100%	0%	0%	0%	831	241	831	241
76.	**cane**	96%	0%	4%	3	0.34	96%	2%	0%	2%	948	345	922	322
77.	**cannon**	92%	6%	2%	1	0.11	100%	0%	0%	0%	1159	435	1159	435
78.	**canoe**	94%	2%	4%	2	0.99	62%	0%	0%	38%	1021	356	1164	347
79.	**can opener**	92%	8%	0%	3	0.39	96%	2%	0%	2%	1435	424	1433	430
80.	**hat**	96%	0%	4%	3	1.05	67%	2%	31%	0%	980	374	946	386
81.	**car**	100%	0%	0%	1	0.00	100%	0%	0%	0%	751	190	751	190
82.	**carousel**	96%	2%	2%	4	1.33	60%	0%	31%	8%	1179	374	1121	343
83.	**carrot***	100%	0%	0%	1	0.00	100%	0%	0%	0%	806	193	806	193
84.	**tape**	98%	0%	2%	4	0.93	80%	4%	16%	0%	891	271	875	290

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
85.	**castle**	100%	0%	0%	1	0.00	100%	0%	0%	0%	893	282	893	282
86.	**cat***	98%	0%	2%	3	0.31	96%	0%	4%	0%	767	190	766	190
87.	**celery***	86%	4%	10%	5	1.21	77%	0%	0%	23%	1430	543	1362	503
88.	**chain**	96%	0%	4%	1	0.06	100%	0%	0%	0%	943	232	943	232
89.	**chair***	100%	0%	0%	1	0.00	100%	0%	0%	0%	732	172	732	172
90.	**cheese**	82%	2%	16%	1	0.23	100%	0%	0%	0%	843	204	843	204
91.	**cherry***	100%	0%	0%	4	0.62	90%	0%	0%	10%	1091	318	1077	271
92.	**chest**	100%	0%	0%	4	0.42	94%	0%	0%	6%	988	273	959	215
93.	**chicken***	94%	0%	6%	4	1.25	72%	0%	9%	19%	1071	402	1010	371
94.	**chimney**	92%	4%	4%	1	0.11	100%	0%	0%	0%	1169	285	1169	285
95.	**church**	100%	0%	0%	3	0.28	96%	0%	2%	2%	1009	338	988	309
96.	**cigarette***	98%	2%	0%	4	0.45	94%	0%	0%	6%	1011	193	1016	196
97.	**city**	96%	0%	4%	6	0.94	85%	2%	4%	8%	1165	334	1158	335
98.	**clamp**	60%	34%	6%	11	1.97	50%	3%	3%	43%	1797	547	1823	545
99.	**clock**	100%	0%	0%	2	0.14	98%	0%	0%	2%	776	144	772	142
100.	**clothespin***	76%	20%	4%	5	1.52	63%	11%	0%	26%	1654	567	1589	534
101.	**cloud***	94%	6%	0%	5	1.06	81%	9%	0%	11%	1269	512	1204	416
102.	**clown***	98%	0%	2%	1	0.03	100%	0%	0%	0%	804	149	804	149
103.	**coat***	100%	0%	0%	4	1.22	56%	2%	40%	2%	1026	293	1010	286
104.	**dime**	100%	0%	0%	4	1.32	60%	0%	2%	38%	1062	323	1064	275
105.	**pillar**	86%	14%	0%	5	1.65	47%	0%	37%	16%	1464	527	1375	467
106.	**comb**	100%	0%	0%	1	0.00	100%	0%	0%	0%	717	133	717	133
107.	**cookie**	90%	6%	4%	3	0.83	82%	0%	0%	18%	1245	445	1213	426
108.	**cork**	92%	6%	2%	7	1.03	85%	0%	0%	15%	1347	456	1354	465
109.	**corkscrew**	76%	14%	10%	7	1.75	50%	3%	5%	42%	1599	607	1509	491
110.	**corn***	100%	0%	0%	1	0.00	100%	0%	0%	0%	837	192	837	192
111.	**cow***	96%	0%	4%	4	0.48	94%	0%	0%	6%	1115	394	1079	371
112.	**cowboy**	98%	0%	2%	5	1.02	80%	0%	0%	20%	1341	515	1263	434
113.	**crab**	100%	0%	0%	4	0.52	92%	0%	0%	8%	1076	377	1040	348
114.	**crackers**	98%	2%	0%	5	0.95	84%	6%	0%	10%	1130	423	1075	364
115.	**crib**	98%	0%	2%	3	0.74	84%	0%	2%	14%	1090	325	1127	304
116.	**cross**	100%	0%	0%	1	0.00	100%	0%	0%	0%	793	170	793	170
117.	**crown***	96%	2%	2%	3	0.44	94%	0%	0%	6%	956	276	945	281
118.	**block**	94%	4%	2%	9	2.47	30%	0%	28%	43%	1436	483	1335	505
119.	**cup***	100%	0%	0%	4	0.84	84%	12%	4%	0%	923	316	852	282
120.	**curtains**	100%	0%	0%	8	1.89	60%	16%	12%	12%	989	301	980	313
121.	**deer***	98%	2%	0%	6	0.73	90%	2%	0%	8%	1258	423	1182	347
122.	**dentist**	96%	0%	4%	4	0.73	88%	0%	0%	13%	1119	308	1075	231
123.	**desert**	98%	0%	2%	2	0.92	67%	0%	0%	33%	1088	306	1173	276
124.	**desk***	100%	0%	0%	1	0.00	100%	0%	0%	0%	975	257	975	257
125.	**diaper**	96%	2%	2%	6	1.91	48%	19%	0%	33%	1248	291	1189	212
126.	**dinosaur**	100%	0%	0%	2	0.14	98%	0%	0%	2%	1013	364	1012	368
127.	**doctor**	98%	2%	0%	2	0.66	84%	0%	0%	16%	1049	264	1076	241
128.	**dog***	100%	0%	0%	1	0.00	100%	0%	0%	0%	702	158	702	158
129.	**doll**	100%	0%	0%	5	0.84	86%	0%	0%	14%	992	245	1002	250
130.	**dolphin**	100%	0%	0%	2	0.14	98%	0%	0%	2%	889	243	894	243
131.	**donkey***	96%	2%	2%	6	1.25	77%	0%	13%	10%	1167	375	1060	261
132.	**door***	100%	0%	0%	1	0.00	100%	0%	0%	0%	719	153	719	153

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
133.	**dragon**	96%	4%	0%	1	0.06	100%	0%	0%	0%	891	296	891	296
134.	**drawer**	100%	0%	0%	1	0.00	100%	0%	0%	0%	994	213	994	213
135.	**dress**	100%	0%	0%	1	0.00	100%	0%	0%	0%	840	261	840	261
136.	**dresser***	100%	0%	0%	8	2.09	48%	2%	28%	22%	1207	388	1163	347
137.	**drill**	86%	10%	4%	7	1.70	63%	7%	0%	30%	1380	496	1311	310
138.	**drum**	100%	0%	0%	2	0.72	80%	20%	0%	0%	779	206	766	207
139.	**duck***	100%	0%	0%	3	0.28	96%	0%	0%	4%	977	336	958	314
140.	**dustpan**	84%	16%	0%	8	1.57	69%	14%	7%	10%	1528	534	1490	530
141.	**eagle**	100%	0%	0%	5	1.67	58%	0%	0%	42%	1134	390	1213	357
142.	**ear***	100%	0%	0%	1	0.00	100%	0%	0%	0%	681	105	681	105
143.	**earring**	68%	32%	0%	7	1.64	59%	0%	0%	41%	1803	605	1642	539
144.	**egg**	100%	0%	0%	2	0.14	98%	2%	0%	0%	883	255	874	249
145.	**elephant**	100%	0%	0%	2	0.14	98%	0%	0%	2%	847	221	837	210
146.	**envelope***	100%	0%	0%	2	0.40	92%	0%	0%	8%	803	190	794	178
147.	**eskimo**	88%	12%	0%	6	0.84	89%	0%	0%	11%	1306	580	1206	450
148.	**eye***	98%	0%	2%	2	0.17	98%	2%	0%	0%	703	107	700	105
149.	**fan**	98%	0%	2%	2	0.17	98%	0%	0%	2%	868	252	865	254
150.	**faucet**	100%	0%	0%	6	1.06	82%	0%	0%	18%	1168	405	1130	377
151.	**feather**	98%	0%	2%	2	0.17	98%	0%	0%	2%	977	404	977	408
152.	**fence***	100%	0%	0%	2	0.14	98%	0%	0%	2%	817	192	819	194
153.	**finger**	98%	2%	0%	2	0.17	98%	0%	0%	2%	787	193	775	174
154.	**fire**	100%	0%	0%	3	0.28	96%	0%	0%	4%	854	211	854	214
155.	**fireman**	100%	0%	0%	3	0.38	94%	4%	0%	2%	898	162	899	166
156.	**fire truck**	96%	2%	2%	4	1.29	65%	29%	0%	6%	1152	325	1066	255
157.	**fish**	98%	0%	2%	1	0.03	100%	0%	0%	0%	777	219	777	219
158.	**fishing pole**	94%	0%	6%	6	1.74	53%	32%	0%	15%	1231	298	1213	293
159.	**flag***	100%	0%	0%	1	0.00	100%	0%	0%	0%	847	243	847	243
160.	**flashlight**	98%	2%	0%	2	0.17	98%	2%	0%	0%	981	282	975	281
161.	**wine**	86%	12%	2%	10	1.96	58%	5%	0%	37%	1448	475	1321	443
162.	**floor**	96%	4%	0%	6	1.76	52%	0%	0%	48%	1463	507	1594	554
163.	**flower***	100%	0%	0%	1	0.00	100%	0%	0%	0%	754	144	754	144
164.	**flute***	98%	2%	0%	6	0.91	86%	0%	0%	14%	1492	558	1402	488
165.	**fly**	100%	0%	0%	3	0.54	90%	0%	0%	10%	1081	305	1080	297
166.	**foot***	100%	0%	0%	2	0.14	98%	2%	0%	0%	754	135	758	134
167.	**football***	100%	0%	0%	1	0.00	100%	0%	0%	0%	723	107	723	107
168.	**fork***	100%	0%	0%	1	0.00	100%	0%	0%	0%	723	120	723	120
169.	**fountain**	98%	0%	2%	3	0.69	86%	12%	0%	2%	990	292	966	166
170.	**fox***	98%	2%	0%	3	0.75	86%	0%	0%	14%	988	267	975	254
171.	**frog***	100%	0%	0%	1	0.00	100%	0%	0%	0%	751	135	751	135
172.	**funnel**	78%	22%	0%	2	0.41	97%	0%	0%	3%	1260	445	1243	438
173.	**trash**	98%	0%	2%	6	1.92	43%	0%	49%	8%	1183	363	1123	357
174.	**gas**	96%	0%	4%	7	2.08	40%	38%	4%	19%	1310	322	1240	279
175.	**fence**	96%	4%	0%	3	1.10	60%	0%	0%	40%	1040	342	988	307
176.	**genie**	88%	0%	12%	2	0.30	98%	0%	0%	2%	1217	268	1214	270
177.	**ghost**	100%	0%	0%	1	0.00	100%	0%	0%	0%	849	217	849	217
178.	**giraffe***	98%	2%	0%	1	0.03	100%	0%	0%	0%	783	155	783	155
179.	**girl**	100%	0%	0%	3	0.47	92%	6%	0%	2%	877	242	861	239
180.	**glass**	98%	0%	2%	2	0.87	71%	0%	29%	0%	838	191	845	164

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
181.	**glasses***	100%	0%	0%	2	0.24	96%	4%	0%	0%	766	159	758	156
182.	**globe**	100%	0%	0%	2	0.14	98%	0%	0%	2%	879	203	883	204
183.	**glove**	100%	0%	0%	1	0.00	100%	0%	0%	0%	848	212	848	212
184.	**goat**	98%	2%	0%	3	0.31	96%	0%	0%	4%	971	338	972	345
185.	**gorilla***	100%	0%	0%	3	1.10	70%	0%	0%	30%	1015	302	944	255
186.	**grapes**	100%	0%	0%	2	0.47	90%	10%	0%	0%	846	200	849	204
187.	**grasshopper***	98%	0%	2%	6	1.46	67%	0%	0%	33%	1244	418	1234	437
188.	**guitar***	100%	0%	0%	2	0.14	98%	0%	0%	2%	872	210	870	212
189.	**gun***	98%	0%	2%	5	0.69	90%	2%	6%	2%	758	256	709	146
190.	**hair**	100%	0%	0%	2	0.14	98%	0%	0%	2%	1007	298	999	296
191.	**brush**	100%	0%	0%	3	0.76	84%	12%	0%	4%	894	216	896	214
192.	**hamburger**	100%	0%	0%	4	0.86	84%	8%	0%	8%	847	213	828	179
193.	**hammer***	96%	0%	4%	1	0.06	100%	0%	0%	0%	724	134	724	134
194.	**hammock**	90%	8%	2%	2	0.53	91%	0%	0%	9%	1403	511	1378	485
195.	**hand***	94%	0%	6%	2	0.22	98%	0%	0%	2%	721	207	723	209
196.	**handcuffs**	98%	0%	2%	4	0.73	88%	6%	0%	6%	1139	312	1113	252
197.	**hanger***	98%	0%	2%	2	0.49	90%	10%	0%	0%	794	231	777	234
198.	**harp***	92%	6%	2%	3	0.39	96%	0%	0%	4%	956	388	914	297
199.	**hat***	94%	0%	6%	2	0.22	98%	0%	0%	2%	692	147	684	139
200.	**hay**	98%	2%	0%	4	0.93	80%	16%	2%	2%	1277	462	1198	365
201.	**heart***	100%	0%	0%	1	0.00	100%	0%	0%	0%	720	257	720	257
202.	**heel**	98%	0%	2%	3	0.66	88%	8%	0%	4%	1020	304	1014	291
203.	**helicopter***	100%	0%	0%	1	0.00	100%	0%	0%	0%	793	168	793	168
204.	**helmet**	100%	0%	0%	2	0.24	96%	4%	0%	0%	925	288	921	290
205.	**highchair**	94%	4%	2%	4	0.75	87%	2%	9%	2%	1234	508	1205	473
206.	**hinge**	82%	12%	6%	5	0.87	88%	2%	0%	10%	1388	461	1349	440
207.	**hippo**	94%	4%	2%	5	1.56	55%	30%	0%	15%	1159	308	1133	320
208.	**hoe**	94%	6%	0%	5	1.10	77%	0%	0%	23%	1357	518	1346	485
209.	**hoof**	96%	0%	4%	4	0.57	92%	2%	2%	4%	1126	375	1088	323
210.	**hook**	100%	0%	0%	1	0.00	100%	0%	0%	0%	919	291	919	291
211.	**horse***	100%	0%	0%	1	0.00	100%	0%	0%	0%	809	225	809	225
212.	**hose**	98%	2%	0%	2	0.27	96%	4%	0%	0%	989	215	983	218
213.	**house***	100%	0%	0%	2	0.14	98%	0%	0%	2%	755	192	745	180
214.	**fire hydrant**	96%	2%	2%	4	1.16	71%	23%	0%	6%	1161	577	1155	585
215.	**ice cream cone**	96%	0%	4%	3	1.13	52%	48%	0%	0%	785	149	804	150
216.	**igloo**	98%	2%	0%	1	0.03	100%	0%	0%	0%	963	340	963	340
217.	**iron***	100%	0%	0%	1	0.00	100%	0%	0%	0%	856	229	856	229
218.	**ironing board**	100%	0%	0%	5	0.66	90%	8%	0%	2%	1110	321	1105	334
219.	**jack**	82%	14%	4%	6	1.00	85%	7%	0%	7%	1635	554	1512	434
220.	**jacket**	96%	0%	4%	3	0.52	92%	0%	6%	2%	924	273	881	201
221.	**jar**	98%	0%	2%	3	0.57	90%	0%	0%	10%	1064	451	979	296
222.	**puzzle**	100%	0%	0%	2	0.14	98%	2%	0%	0%	866	225	866	228
223.	**jumprope**	100%	0%	0%	3	0.76	84%	16%	0%	0%	1112	323	1111	322
224.	**kangaroo***	100%	0%	0%	1	0.00	100%	0%	0%	0%	856	197	856	197
225.	**key***	88%	2%	10%	1	0.16	100%	0%	0%	0%	738	121	738	121
226.	**king**	98%	0%	2%	1	0.03	100%	0%	0%	0%	898	276	898	276
227.	**kite**	100%	0%	0%	1	0.00	100%	0%	0%	0%	796	239	796	239
228.	**knife***	96%	0%	4%	1	0.06	100%	0%	0%	0%	816	222	816	222

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
229.	**knight**	86%	10%	4%	4	0.77	88%	0%	0%	12%	1333	445	1318	454
230.	**knot**	94%	2%	4%	4	1.47	62%	0%	0%	38%	1176	315	1122	289
231.	**ladder**	100%	0%	0%	1	0.00	100%	0%	0%	0%	988	345	988	345
232.	**ladle**	94%	2%	4%	2	1.02	55%	0%	0%	45%	1248	410	1212	326
233.	**ladybug**	96%	2%	2%	3	1.22	67%	0%	0%	33%	1120	359	1164	303
234.	**lamp**	100%	0%	0%	2	0.40	92%	0%	0%	8%	830	244	835	254
235.	**lawnmower**	98%	0%	2%	3	0.31	96%	2%	2%	0%	1182	504	1166	490
236.	**leaf**	96%	0%	4%	1	0.06	100%	0%	0%	0%	848	319	848	319
237.	**leg***	94%	0%	6%	3	0.98	79%	0%	0%	21%	989	251	1019	268
238.	**lemon***	98%	0%	2%	3	0.31	96%	0%	0%	4%	933	316	911	300
239.	**leopard***	92%	4%	4%	5	1.44	54%	0%	0%	46%	1213	422	1194	357
240.	**letter**	100%	0%	0%	7	1.66	68%	12%	4%	16%	988	239	1030	246
241.	**lettuce**	98%	0%	2%	7	1.56	57%	0%	0%	43%	1059	371	1037	356
242.	**light bulb**	100%	0%	0%	3	0.48	92%	8%	0%	0%	752	160	737	135
243.	**lighthouse**	98%	2%	0%	3	0.41	94%	4%	0%	2%	1216	532	1197	516
244.	**lightning**	98%	0%	2%	3	0.79	84%	12%	0%	4%	954	202	944	187
245.	**light switch**	100%	0%	0%	5	1.45	64%	34%	0%	2%	976	290	966	205
246.	**lion**	98%	0%	2%	1	0.03	100%	0%	0%	0%	812	170	812	170
247.	**lips**	100%	0%	0%	3	0.38	94%	2%	0%	4%	702	145	696	142
248.	**lipstick**	100%	0%	0%	1	0.00	100%	0%	0%	0%	803	174	803	174
249.	**lizard**	98%	0%	2%	5	0.78	88%	0%	0%	12%	1229	521	1155	459
250.	**llama**	90%	8%	2%	7	1.39	76%	0%	0%	24%	1495	547	1387	454
251.	**lobster***	98%	2%	0%	5	0.96	84%	0%	0%	16%	1361	549	1289	542
252.	**lock***	98%	2%	0%	1	0.03	100%	0%	0%	0%	968	358	968	358
253.	**log**	100%	0%	0%	6	1.27	74%	0%	0%	26%	1032	371	975	301
254.	**magnet**	98%	0%	2%	2	0.27	96%	0%	0%	4%	1202	533	1189	537
255.	**mailbox**	100%	0%	0%	3	0.72	84%	0%	0%	16%	856	172	846	172
256.	**man**	100%	0%	0%	3	0.38	94%	2%	0%	4%	1018	408	978	323
257.	**map**	100%	0%	0%	1	0.00	100%	0%	0%	0%	847	203	847	203
258.	**mask**	100%	0%	0%	2	0.14	98%	0%	0%	2%	847	187	852	185
259.	**match**	96%	2%	2%	1	0.06	100%	0%	0%	0%	910	267	910	267
260.	**medal**	94%	2%	4%	3	0.62	89%	9%	0%	2%	1202	500	1197	521
261.	**microphone**	80%	20%	0%	5	0.79	90%	0%	0%	10%	1532	649	1473	607
262.	**microscope**	90%	8%	2%	2	0.70	84%	0%	0%	16%	1203	383	1212	399
263.	**mirror**	98%	0%	2%	1	0.03	100%	0%	0%	0%	873	193	873	193
264.	**mixer**	92%	4%	4%	6	2.09	39%	0%	24%	37%	1388	447	1367	439
265.	**priest**	92%	6%	2%	8	1.87	43%	0%	43%	13%	1322	473	1077	262
266.	**monkey**	100%	0%	0%	1	0.00	100%	0%	0%	0%	794	228	794	228
267.	**moon**	94%	0%	6%	1	0.08	100%	0%	0%	0%	804	196	804	196
268.	**moose**	92%	4%	4%	6	1.33	76%	0%	0%	24%	1269	438	1158	334
269.	**mop**	100%	0%	0%	2	0.33	94%	0%	0%	6%	920	311	933	315
270.	**mosquito**	92%	6%	2%	8	2.07	54%	0%	0%	46%	1589	564	1436	452
271.	**motorcycle***	100%	0%	0%	3	0.28	96%	0%	0%	4%	928	276	932	281
272.	**mountain***	100%	0%	0%	3	0.38	94%	0%	0%	6%	967	375	921	308
273.	**mouse**	98%	0%	2%	4	0.55	92%	2%	0%	6%	954	286	961	294
274.	**mousetrap**	98%	2%	0%	3	1.12	65%	35%	0%	0%	1269	470	1193	414
275.	**mushroom**	100%	0%	0%	1	0.00	100%	0%	0%	0%	746	152	746	152
276.	**music**	96%	0%	4%	5	1.63	50%	13%	35%	2%	1056	351	1072	402

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
277.	**nail**	98%	2%	0%	1	0.03	100%	0%	0%	0%	1086	414	1086	414
278.	**neck**	98%	2%	0%	5	1.36	67%	0%	0%	33%	1133	302	1057	211
279.	**necklace**	100%	0%	0%	5	0.94	82%	2%	0%	16%	863	195	821	162
280.	**needle**	94%	4%	2%	5	0.64	91%	2%	0%	6%	1514	660	1449	604
281.	**nest**	96%	0%	4%	4	1.07	73%	2%	0%	25%	994	372	1059	413
282.	**net**	100%	0%	0%	3	0.28	96%	0%	0%	4%	1007	388	1004	391
283.	**nose***	96%	0%	4%	1	0.06	100%	0%	0%	0%	721	87	721	87
284.	**nurse**	98%	0%	2%	3	0.31	96%	0%	0%	4%	1053	315	1039	295
285.	**nut***	94%	2%	4%	5	1.63	49%	0%	0%	51%	1385	419	1298	430
286.	**octopus**	98%	0%	2%	1	0.03	100%	0%	0%	0%	841	197	841	197
287.	**onion***	98%	0%	2%	4	0.45	94%	0%	0%	6%	1115	375	1100	360
288.	**orange***	98%	2%	0%	3	0.31	96%	0%	0%	4%	1129	439	1098	422
289.	**ostrich***	90%	10%	0%	5	1.08	80%	0%	0%	20%	1419	584	1337	547
290.	**owl***	100%	0%	0%	1	0.00	100%	0%	0%	0%	837	165	837	165
291.	**package**	100%	0%	0%	4	0.42	94%	0%	2%	4%	1088	295	1102	298
292.	**bucket**	100%	0%	0%	2	0.92	66%	0%	34%	0%	892	252	875	260
293.	**paintbrush***	98%	0%	2%	3	0.93	78%	18%	0%	4%	1067	318	1033	294
294.	**paint**	88%	8%	4%	8	1.93	57%	11%	0%	32%	1435	597	1366	663
295.	**palmtree**	98%	2%	0%	3	0.73	86%	14%	0%	0%	914	216	908	218
296.	**pan**	100%	0%	0%	4	0.84	84%	10%	2%	4%	891	261	865	252
297.	**panda**	94%	4%	2%	6	1.94	38%	28%	0%	34%	1129	382	1071	334
298.	**pants**	96%	4%	0%	3	0.59	90%	0%	0%	10%	779	207	757	200
299.	**paper**	100%	0%	0%	3	0.72	84%	14%	0%	2%	931	281	930	266
300.	**paperclip**	86%	10%	4%	4	0.99	81%	5%	0%	14%	1327	638	1262	541
301.	**parachute**	86%	10%	4%	4	1.45	60%	0%	0%	40%	1452	530	1437	561
302.	**parrot**	96%	4%	0%	2	0.77	79%	0%	0%	21%	1045	450	910	178
303.	**paw**	92%	2%	6%	6	1.51	67%	0%	0%	33%	1406	459	1341	478
304.	**peach***	88%	2%	10%	7	1.38	75%	0%	0%	25%	1293	420	1247	374
305.	**peacock**	90%	8%	2%	5	0.78	89%	0%	0%	11%	1025	340	1010	289
306.	**peanut***	90%	0%	10%	1	0.14	100%	0%	0%	0%	780	190	780	190
307.	**pear**	100%	0%	0%	1	0.00	100%	0%	0%	0%	949	250	949	250
308.	**peas**	94%	4%	2%	5	1.58	57%	38%	0%	4%	1240	401	1201	397
309.	**pelican**	86%	10%	4%	4	1.04	79%	0%	0%	21%	1194	519	1102	364
310.	**pen***	100%	0%	0%	1	0.00	100%	0%	0%	0%	753	134	753	134
311.	**pencil***	100%	0%	0%	1	0.00	100%	0%	0%	0%	702	186	702	186
312.	**pencilsharpener**	62%	34%	4%	4	0.96	84%	10%	0%	6%	1608	587	1617	612
313.	**penguin**	96%	0%	4%	1	0.06	100%	0%	0%	0%	897	266	897	266
314.	**piano***	98%	0%	2%	1	0.03	100%	0%	0%	0%	798	225	798	225
315.	**picture**	96%	0%	4%	4	0.85	83%	2%	13%	2%	1022	355	1009	352
316.	**pig***	100%	0%	0%	1	0.00	100%	0%	0%	0%	855	212	855	212
317.	**bird**	98%	0%	2%	9	2.42	37%	0%	0%	63%	1527	626	1399	546
318.	**piggybank**	98%	0%	2%	4	0.45	94%	6%	0%	0%	972	198	965	194
319.	**pillow**	100%	0%	0%	1	0.00	100%	0%	0%	0%	867	184	867	184
320.	**pineapple***	98%	0%	2%	2	0.17	98%	0%	0%	2%	883	332	871	325
321.	**pinecone**	80%	16%	4%	9	1.56	73%	0%	0%	28%	1578	567	1536	522
322.	**pipe***	94%	4%	2%	2	0.22	98%	0%	0%	2%	867	327	866	330
323.	**pirate**	98%	0%	2%	5	0.77	88%	0%	2%	10%	1186	362	1118	273
324.	**pitcher***	90%	8%	2%	6	1.79	58%	0%	0%	42%	1362	583	1248	444

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
325.	**pitchfork**	96%	4%	0%	6	1.52	65%	0%	2%	33%	1369	567	1397	564
326.	**pizza**	100%	0%	0%	1	0.00	100%	0%	0%	0%	973	296	973	296
327.	**plate**	100%	0%	0%	4	0.42	94%	2%	0%	4%	1051	322	1013	280
328.	**pliers***	94%	6%	0%	4	1.22	60%	0%	0%	40%	1426	690	1521	723
329.	**plug***	96%	2%	2%	3	0.34	96%	2%	2%	0%	1262	531	1241	523
330.	**policeman**	100%	0%	0%	11	2.27	54%	26%	4%	16%	1397	466	1132	307
331.	**pool**	98%	0%	2%	3	0.95	73%	27%	0%	0%	879	174	871	183
332.	**popcorn**	98%	2%	0%	1	0.03	100%	0%	0%	0%	745	236	745	236
333.	**popsicle**	86%	14%	0%	5	1.22	74%	2%	0%	23%	1504	640	1380	555
334.	**porcupine**	94%	6%	0%	2	0.22	98%	0%	0%	2%	1321	574	1291	541
335.	**pot**	80%	16%	4%	8	1.52	73%	0%	0%	28%	1532	581	1361	473
336.	**potato***	90%	10%	0%	3	0.51	93%	0%	0%	7%	1238	464	1214	431
337.	**present**	96%	2%	2%	5	1.52	67%	2%	13%	19%	955	325	893	242
338.	**priest**	98%	0%	2%	5	0.59	92%	0%	4%	4%	1184	328	1165	309
339.	**pumpkin**	98%	2%	0%	1	0.03	100%	0%	0%	0%	909	207	909	207
340.	**purse**	100%	0%	0%	2	0.14	98%	0%	2%	0%	780	169	772	161
341.	**pyramid**	96%	4%	0%	2	0.20	98%	0%	0%	2%	990	347	987	350
342.	**queen**	98%	0%	2%	1	0.03	100%	0%	0%	0%	931	297	931	297
343.	**rabbit***	98%	0%	2%	2	0.66	84%	0%	16%	0%	742	179	746	192
344.	**raccoon***	90%	4%	6%	5	0.97	84%	0%	0%	16%	1163	452	1079	331
345.	**radio**	100%	0%	0%	4	0.75	86%	2%	0%	12%	1072	275	1007	203
346.	**radish**	72%	12%	16%	7	1.77	58%	0%	0%	42%	1755	411	1768	424
347.	**rain**	92%	4%	4%	3	0.70	87%	2%	0%	11%	941	317	891	265
348.	**rainbow**	96%	0%	4%	2	0.20	98%	0%	0%	2%	1014	292	1004	286
349.	**rake**	100%	0%	0%	2	0.14	98%	0%	0%	2%	833	178	828	176
350.	**razor**	98%	0%	2%	3	0.41	94%	0%	4%	2%	1099	302	1089	309
351.	**record player**	96%	4%	0%	5	0.93	83%	2%	2%	13%	1103	385	1040	343
352.	**refrigerator***	100%	0%	0%	3	0.61	88%	12%	0%	0%	854	172	842	172
353.	**rhinoceros***	96%	2%	2%	6	1.17	77%	15%	0%	8%	1055	463	998	346
354.	**gun**	98%	2%	0%	2	0.87	71%	0%	0%	29%	851	308	848	351
355.	**ring**	100%	0%	0%	1	0.00	100%	0%	0%	0%	785	220	785	220
356.	**road**	100%	0%	0%	3	0.48	92%	0%	8%	0%	981	305	925	224
357.	**robot**	100%	0%	0%	2	0.14	98%	0%	0%	2%	822	257	793	156
358.	**rock**	98%	2%	0%	2	0.17	98%	0%	0%	2%	912	262	910	265
359.	**rocket**	100%	0%	0%	3	0.54	90%	8%	2%	0%	861	234	854	240
360.	**rocking chair**	100%	0%	0%	4	1.14	66%	34%	0%	0%	883	237	878	153
361.	**rollerskate**	98%	0%	2%	3	1.13	51%	49%	0%	0%	861	132	844	144
362.	**rolling pin**	94%	6%	0%	4	1.14	74%	17%	0%	9%	1143	461	1113	441
363.	**roof**	98%	0%	2%	3	0.41	94%	2%	0%	4%	1092	296	1094	304
364.	**rooster***	98%	0%	2%	4	1.44	55%	0%	0%	45%	1089	410	1175	408
365.	**rope**	100%	0%	0%	1	0.00	100%	0%	0%	0%	810	183	810	183
366.	**rose**	98%	0%	2%	2	0.82	76%	0%	0%	24%	859	150	870	160
367.	**rug**	100%	0%	0%	3	1.19	68%	0%	10%	22%	990	372	964	367
368.	**ruler***	100%	0%	0%	1	0.00	100%	0%	0%	0%	779	199	779	199
369.	**saddle**	98%	2%	0%	1	0.03	100%	0%	0%	0%	1019	284	1019	284
370.	**safe**	92%	4%	4%	7	1.20	80%	2%	0%	17%	1253	376	1243	358
371.	**safety pin**	90%	4%	6%	7	1.82	53%	27%	0%	20%	1143	494	1278	560
372.	**sailboat**	96%	0%	4%	4	0.95	79%	17%	0%	4%	1057	241	1076	249

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
373.	**sailor**	100%	0%	0%	4	0.61	90%	0%	0%	10%	1048	242	1031	228
374.	**salt**	96%	4%	0%	4	1.09	75%	19%	0%	6%	1037	386	972	346
375.	**sandwich***	100%	0%	0%	1	0.00	100%	0%	0%	0%	775	136	775	136
376.	**saw***	98%	2%	0%	1	0.03	100%	0%	0%	0%	863	181	863	181
377.	**saxophone**	94%	4%	2%	6	1.14	81%	4%	0%	15%	1103	382	1061	329
378.	**scale**	90%	10%	0%	8	2.02	56%	13%	9%	22%	1388	504	1387	513
379.	**scarf**	100%	0%	0%	2	0.14	98%	0%	0%	2%	1111	270	1116	271
380.	**scissors***	94%	2%	4%	1	0.08	100%	0%	0%	0%	741	179	741	179
381.	**scorpion**	96%	4%	0%	4	0.67	90%	0%	0%	10%	1318	419	1252	340
382.	**screw**	98%	0%	2%	2	0.55	88%	0%	0%	12%	1217	426	1176	368
383.	**screwdriver***	96%	2%	2%	1	0.06	100%	0%	0%	0%	1179	458	1179	458
384.	**seahorse**	82%	12%	6%	5	0.87	88%	0%	0%	12%	1157	349	1132	332
385.	**seal***	98%	0%	2%	4	0.92	82%	0%	0%	18%	1221	556	1115	388
386.	**seesaw**	96%	4%	0%	3	0.93	75%	0%	23%	2%	1196	458	1196	496
387.	**sewing machine**	100%	0%	0%	2	0.14	98%	0%	0%	2%	1063	394	1068	396
388.	**shark**	96%	0%	4%	3	0.34	96%	0%	0%	4%	1019	294	1014	284
389.	**sheep***	88%	2%	10%	5	1.43	64%	0%	0%	36%	1307	392	1269	364
390.	**shell**	100%	0%	0%	6	0.98	84%	6%	0%	10%	1129	329	1101	280
391.	**boat**	98%	2%	0%	3	1.20	53%	0%	47%	0%	982	327	860	308
392.	**shirt**	98%	0%	2%	5	1.16	76%	2%	0%	22%	1272	504	1334	536
393.	**shoe***	98%	0%	2%	1	0.03	100%	0%	0%	0%	737	155	737	155
394.	**shoulder**	100%	0%	0%	2	0.80	76%	0%	0%	24%	1118	328	1162	351
395.	**shovel**	98%	2%	0%	1	0.03	100%	0%	0%	0%	858	214	858	214
396.	**shower**	100%	0%	0%	3	0.72	84%	16%	0%	0%	993	386	897	195
397.	**sink**	96%	0%	4%	3	0.34	96%	2%	0%	2%	1010	322	984	256
398.	**skateboard**	100%	0%	0%	1	0.00	100%	0%	0%	0%	823	140	823	140
399.	**skeleton**	100%	0%	0%	1	0.00	100%	0%	0%	0%	817	130	817	130
400.	**skirt***	94%	0%	6%	4	1.01	77%	0%	0%	23%	1031	397	992	206
401.	**skis**	82%	2%	16%	3	0.51	95%	2%	0%	2%	1087	383	1039	274
402.	**skunk***	100%	0%	0%	2	0.14	98%	0%	0%	2%	1052	337	1044	335
403.	**sled***	100%	0%	0%	2	0.24	96%	0%	4%	0%	1198	388	1188	378
404.	**slide**	96%	2%	2%	1	0.06	100%	0%	0%	0%	1003	390	1003	390
405.	**slingshot**	90%	6%	4%	5	0.99	82%	11%	0%	7%	1308	320	1265	295
406.	**slipper**	96%	2%	2%	5	1.48	63%	4%	0%	33%	1347	501	1256	327
407.	**smoke**	98%	0%	2%	4	0.83	84%	0%	0%	16%	1212	278	1221	295
408.	**snail**	98%	0%	2%	2	0.17	98%	0%	0%	2%	919	175	918	177
409.	**snake***	96%	0%	4%	1	0.06	100%	0%	0%	0%	775	141	775	141
410.	**snowman***	98%	0%	2%	1	0.03	100%	0%	0%	0%	920	306	920	306
411.	**sock***	96%	0%	4%	1	0.06	100%	0%	0%	0%	712	144	712	144
412.	**couch***	100%	0%	0%	3	0.93	74%	0%	24%	2%	876	217	828	184
413.	**soldier**	96%	0%	4%	11	1.85	69%	2%	0%	29%	1324	645	1170	439
414.	**spaghetti**	100%	0%	0%	3	0.38	94%	0%	0%	6%	905	204	903	201
415.	**spatula**	84%	14%	2%	5	0.92	86%	0%	0%	14%	1444	569	1472	574
416.	**spider**	98%	0%	2%	1	0.03	100%	0%	0%	0%	907	177	907	177
417.	**thread**	98%	0%	2%	7	1.53	65%	6%	0%	29%	1361	414	1426	396
418.	**spoon***	98%	0%	2%	1	0.03	100%	0%	0%	0%	777	228	777	228
419.	**squirrel**	100%	0%	0%	3	0.61	88%	0%	0%	12%	1225	535	1234	560
420.	**stairs**	100%	0%	0%	4	1.12	74%	26%	0%	0%	1042	306	1011	275

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
421.	**statue**	98%	2%	0%	4	0.55	92%	0%	4%	4%	1234	561	1214	558
422.	**steering wheel**	100%	0%	0%	2	0.94	64%	36%	0%	0%	1139	340	1158	334
423.	**stethoscope**	92%	6%	2%	4	0.53	93%	0%	0%	7%	1281	461	1209	314
424.	**stocking**	98%	0%	2%	9	2.45	43%	6%	45%	6%	1402	594	1218	331
425.	**stool**	96%	0%	4%	2	0.68	83%	0%	0%	17%	959	249	973	209
426.	**stove**	100%	0%	0%	3	0.96	72%	0%	26%	2%	1120	307	1122	278
427.	**strawberry**	98%	0%	2%	1	0.03	100%	0%	0%	0%	1052	300	1052	300
428.	**stroller**	88%	10%	2%	4	0.91	84%	5%	0%	11%	1316	592	1346	631
429.	**submarine**	98%	0%	2%	3	0.67	88%	0%	0%	12%	1144	234	1145	223
430.	**suitcase***	96%	0%	4%	4	1.00	79%	0%	4%	17%	924	205	902	210
431.	**sun***	100%	0%	0%	1	0.00	100%	0%	0%	0%	762	145	762	145
432.	**swan***	94%	0%	6%	3	1.07	74%	0%	0%	26%	1029	328	1049	297
433.	**sweater***	94%	2%	4%	4	1.58	55%	0%	0%	45%	1122	375	1122	364
434.	**swing**	98%	0%	2%	2	0.85	73%	27%	0%	0%	939	403	942	454
435.	**sword**	100%	0%	0%	4	0.52	92%	0%	2%	6%	1082	348	1084	360
436.	**needle**	96%	2%	2%	5	1.45	63%	2%	27%	8%	1184	458	1169	491
437.	**table***	100%	0%	0%	2	0.14	98%	0%	0%	2%	848	244	852	246
438.	**tail**	96%	2%	2%	6	1.28	77%	10%	0%	13%	1432	407	1383	351
439.	**tank**	84%	12%	4%	5	0.75	90%	0%	0%	10%	1181	540	1155	536
440.	**tape recorder**	96%	4%	0%	6	1.31	75%	15%	4%	6%	1017	204	1009	222
441.	**teapot**	100%	0%	0%	8	2.29	44%	34%	8%	14%	1302	568	1085	388
442.	**tear**	96%	2%	2%	8	2.10	50%	8%	0%	42%	1186	320	1134	182
443.	**teepee**	94%	2%	4%	4	1.12	70%	0%	2%	28%	1214	454	1167	453
444.	**teeth**	96%	2%	2%	2	0.77	79%	0%	21%	0%	1009	340	949	337
445.	**telephone***	100%	0%	0%	2	0.86	72%	28%	0%	0%	761	234	752	262
446.	**telescope**	98%	2%	0%	2	0.17	98%	0%	0%	2%	1035	438	1011	409
447.	**tv**	98%	0%	2%	2	0.97	61%	0%	39%	0%	799	166	786	184
448.	**tennis racket**	100%	0%	0%	3	1.11	56%	42%	0%	2%	911	317	963	383
449.	**tent**	98%	0%	2%	1	0.03	100%	0%	0%	0%	744	110	744	110
450.	**thermos**	92%	4%	4%	5	0.85	87%	0%	0%	13%	1287	434	1289	460
451.	**thimble***	98%	2%	0%	5	0.69	90%	0%	0%	10%	1270	585	1198	535
452.	**thumb**	100%	0%	0%	3	0.28	96%	4%	0%	0%	870	113	870	114
453.	**tie**	100%	0%	0%	2	0.14	98%	2%	0%	0%	760	180	758	182
454.	**tiger**	94%	4%	2%	4	0.60	91%	0%	0%	9%	1077	392	1072	398
455.	**tire**	100%	0%	0%	2	0.47	90%	0%	10%	0%	805	225	804	230
456.	**toaster***	100%	0%	0%	3	0.28	96%	2%	0%	2%	855	155	860	156
457.	**toe**	88%	10%	2%	6	1.68	52%	39%	0%	9%	1304	471	1211	413
458.	**toilet**	100%	0%	0%	1	0.00	100%	0%	0%	0%	825	158	825	158
459.	**tomato***	100%	0%	0%	2	0.14	98%	0%	0%	2%	981	328	962	301
460.	**grave**	100%	0%	0%	8	1.95	62%	0%	12%	26%	1364	523	1228	491
461.	**toothbrush***	100%	0%	0%	1	0.00	100%	0%	0%	0%	811	197	811	197
462.	**top***	84%	16%	0%	6	0.98	86%	7%	0%	7%	1226	576	1083	431
463.	**towel**	98%	0%	2%	3	0.84	80%	0%	0%	20%	973	203	990	206
464.	**railroad tracks**	100%	0%	0%	10	2.81	28%	68%	0%	4%	1056	370	957	281
465.	**tractor**	92%	4%	4%	4	0.77	87%	0%	0%	13%	1276	485	1216	399
466.	**stoplight**	100%	0%	0%	7	1.74	62%	32%	4%	2%	1047	337	1021	349
467.	**train***	96%	0%	4%	1	0.06	100%	0%	0%	0%	838	174	838	174
468.	**trash can**	98%	0%	2%	5	1.31	69%	27%	2%	2%	971	342	984	387

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
469.	**tree***	98%	0%	2%	1	0.03	100%	0%	0%	0%	796	332	796	332
470.	**tripod**	78%	18%	4%	6	1.21	79%	0%	0%	21%	1683	477	1571	423
471.	**trophy**	88%	10%	2%	8	1.72	50%	2%	2%	45%	1679	621	1452	647
472.	**truck***	100%	0%	0%	3	0.28	96%	2%	0%	2%	990	340	987	338
473.	**trumpet***	98%	0%	2%	4	1.11	69%	0%	0%	31%	1045	387	1053	409
474.	**chest**	92%	2%	6%	4	1.35	63%	0%	26%	11%	1212	499	1233	421
475.	**turkey**	96%	2%	2%	3	0.34	96%	0%	0%	4%	1159	412	1160	420
476.	**turtle**	100%	0%	0%	1	0.00	100%	0%	0%	0%	734	169	734	169
477.	**tweezers**	90%	4%	6%	5	0.69	91%	0%	0%	9%	1322	617	1328	611
478.	**typewriter**	100%	0%	0%	1	0.00	100%	0%	0%	0%	778	231	778	231
479.	**umbrella***	100%	0%	0%	1	0.00	100%	0%	0%	0%	738	178	738	178
480.	**unicorn**	100%	0%	0%	1	0.00	100%	0%	0%	0%	928	213	928	213
481.	**unicycle**	96%	4%	0%	4	0.95	81%	0%	0%	19%	1173	360	1179	380
482.	**vacuum**	100%	0%	0%	2	0.68	82%	18%	0%	0%	946	228	930	224
483.	**vase**	96%	4%	0%	3	0.44	94%	0%	0%	6%	1168	426	1171	436
484.	**vest**	100%	0%	0%	3	0.28	96%	0%	0%	4%	935	190	919	160
485.	**violin**	100%	0%	0%	4	0.86	82%	0%	0%	18%	1057	393	1051	371
486.	**volcano**	100%	0%	0%	1	0.00	100%	0%	0%	0%	1063	190	1063	190
487.	**waffle**	74%	22%	4%	15	2.49	46%	8%	0%	46%	1505	577	1270	391
488.	**wagon***	82%	14%	4%	5	1.21	76%	0%	5%	20%	1210	739	1192	743
489.	**waiter**	96%	0%	4%	6	0.94	85%	0%	2%	13%	1161	360	1156	351
490.	**bricks**	100%	0%	0%	5	1.90	38%	24%	0%	38%	1032	276	1050	271
491.	**wallet**	88%	10%	2%	10	1.47	77%	0%	2%	20%	1466	576	1382	578
492.	**walnut**	94%	6%	0%	4	1.21	62%	0%	0%	38%	1373	549	1282	411
493.	**walrus**	96%	2%	2%	5	0.96	83%	0%	0%	17%	1060	415	1006	354
494.	**closet**	100%	0%	0%	5	0.82	86%	0%	2%	12%	1112	354	1078	347
495.	**washing machine**	98%	2%	0%	5	1.14	73%	22%	0%	4%	1105	289	1085	275
496.	**watch***	100%	0%	0%	1	0.00	100%	0%	0%	0%	780	162	780	162
497.	**watering can**	70%	26%	4%	18	2.89	31%	29%	0%	40%	1843	644	1577	425
498.	**watermelon***	100%	0%	0%	2	0.14	98%	2%	0%	0%	939	324	920	298
499.	**spiderweb**	100%	0%	0%	2	0.90	68%	32%	0%	0%	869	157	869	159
500.	**well**	96%	4%	0%	3	0.34	96%	2%	0%	2%	997	418	991	424
501.	**whale**	98%	0%	2%	3	0.31	96%	0%	0%	4%	1075	288	1050	254
502.	**wheat**	72%	16%	12%	8	1.75	58%	0%	0%	42%	1542	602	1428	526
503.	**wheel***	100%	0%	0%	1	0.00	100%	0%	0%	0%	913	260	913	260
504.	**wheelbarrow**	100%	0%	0%	5	0.84	86%	6%	0%	8%	1226	460	1207	469
505.	**wheelchair**	98%	0%	2%	1	0.03	100%	0%	0%	0%	881	222	881	222
506.	**whip**	90%	10%	0%	3	0.76	87%	0%	0%	13%	1333	311	1272	276
507.	**whistle***	98%	0%	2%	1	0.03	100%	0%	0%	0%	790	200	790	200
508.	**wig**	100%	0%	0%	2	0.33	94%	0%	0%	6%	930	269	933	277
509.	**windmill**	90%	6%	4%	4	0.55	93%	2%	0%	4%	1252	555	1226	559
510.	**window**	100%	0%	0%	1	0.00	100%	0%	0%	0%	822	140	822	140
511.	**glass**	98%	0%	2%	4	1.20	67%	29%	0%	4%	942	274	946	289
512.	**wing**	96%	2%	2%	4	0.48	94%	0%	0%	6%	1022	332	996	260
513.	**witch**	100%	0%	0%	1	0.00	100%	0%	0%	0%	879	154	879	154
514.	**wolf**	100%	0%	0%	4	1.51	56%	0%	0%	44%	1235	454	1262	430
515.	**woman**	98%	0%	2%	6	1.41	69%	0%	18%	12%	1130	413	1057	379
516.	**worm**	98%	0%	2%	3	0.31	96%	2%	0%	2%	1106	452	1110	461

OBJECT PICTURES		Correctness			Alternatives		Name Agreement				RT - total		RT - target	
No.	Target Name	Valid	No resp	Invalid	No.	H stat	Lex 1	Lex2	Lex3	Lex4	Mean	STD	Mean	STD
517.	**wrench**	88%	12%	0%	3	0.44	95%	2%	0%	2%	1346	689	1331	702
518.	**yoyo**	98%	2%	0%	3	0.31	96%	0%	0%	4%	1155	368	1141	367
519.	**zebra**	98%	2%	0%	1	0.03	100%	0%	0%	0%	864	204	864	204
520.	**zipper**	96%	2%	2%	1	0.06	100%	0%	0%	0%	969	237	969	237

APPENDIX 2a

The main independent variables for the picture and the dominant response of the 275 action items

No. and **Dominant response** specify the identity of the stimuli pictures, and specify the name given by the largest number of participants in the study (number of occurrences in brackets). **Alternative names** given as responses, and number for each (if more than 1) is also provided in the third column. The last three columns present information about the word attributes of the dominant responses: **Log natural frequency** from CELEX. **Infant objective AOA**: based on Mac Arthur CDI norms for English 1=(8–16 month) 2=(17–30 month) 3=(above). **Objective Visual complexity** (based on picture file size in jpg format).

No.	Dominant response	Alternative namings (N of occurrences)	Ln Freq	Obj AOA	Obj VC
1.	**dive (50)**		2.64	3	16005
2.	**drink (42)**	sip 3	4.87	1	25613
3.	**paint (48)**		4.29	2	22022
4.	**ski (28)**	to ski	1.95	3	17193
5.	**cut (50)**		5.25	2	15235
6.	**blow (48)**		4.44	1	19790
7.	**argue (27)**	yell 9, talk 6, laugh 2, debate, bicker, argument	4.79	3	23082
8.	**walk (17)**	arrive 8, enter 4, approach 4, go 3, begin, attend	5.74	1	23319
9.	**fly (20)**	chase 8, scare 4, escape 4, eat 2, bark 2, attack 2, swoop, growl, fly swat, flee, fight	4.57	3	27331
10.	**wake up (16)**	wake 11, awake 9, rise 3, awaken 2, sit, heat, get up	0.00	3	26195
11.	**win (15)**	give 9, award 8, show 2, accept 2, won, trophy, receive, exchange, celebrate	5.04	3	22180
12.	**bake (22)**	cook 17, play 4, pretend, make cake, heat up	3.22	3	17724
13.	**balance (16)**	walk 7, dance 5, tightrope walk 3, perform 2, tightwire, tightrope, pole vault, climb, acrobat	3.37	3	28045
14.	**bark (48)**		2.40	3	18031
15.	**beg (45)**	sit 2, help, food	3.43	3	17686
16.	**bite (48)**	claw, chew	3.33	1	24562
17.	**sniff (9)**	wipe 8, smell 6, bleed 5, blow 3, eat 2, wipe your nose, sneeze, hit, clean, blow nose, bloody nose	2.64	3	19855
18.	**boil (33)**	cook 12, steam 2, heat	3.78	3	30327
19.	**bounce (40)**	dribble 6, play 3	2.83	3	18068
20.	**bow (44)**	act 2, look, learn	2.83	3	15564
21.	**bowl (46)**	throw 3	2.64	3	16487
22.	**box (40)**	punch 6, fight 3	0.69	3	16757
23.	**break (42)**	strike 2, light 2, hit 2, ignite	5.44	1	21546
24.	**brush (49)**	toothbrush	3.22	3	23911
25.	**buckle (35)**	tie 4, lace 2, fasten 2, strap, sandle, put on shoe, apply	1.61	3	21513
26.	**burn (36)**	fire 9, burn down	4.49	3	31906
27.	**bury (36)**	grave 2, put, mourn, hole, funeral, dig, die, dead	3.93	3	32313
28.	**pay (34)**	buy 10, purchase 2, give 2, to pay	5.86	3	27841

No.	Dominant response	Alternative namings (N of occurrences)	Ln Freq	Obj AOA	Obj VC
29.	**yell (24)**	shout 15, call 8, scream, holler, cough	3.14	3	27343
30.	**camp (22)**	cook 13, burn 4, fire 3, roast 2, make fire, light, cookout	2.83	3	46823
31.	**carry (39)**	lift 5, pick up, move	5.74	2	17053
32.	**carve (21)**	chisel 17, sculpt 3, cut 2, sculpture, inject, draw, chip	3.04	3	36764
33.	**catch (47)**	reach 2	5.27	2	15966
34.	**celebrate (10)**	sing 6, surprise 4, give 4, wish 3, bake 3, present 2, party 2, blow 2, birthday 2, gift, cake	3.18	3	38102
35.	**chase (46)**	run 2, play, dog	3.04	2	20541
36.	**cheer (25)**	yell 9, shout 6, to sing, sing, dance, cheerleader, cheerlead, chant, celebrate, announce	2.77	3	36542
37.	**chew (17)**	play 11, bite 9, tug 4, pull 3, gnaw 2, nibble, carry	3.04	3	21375
38.	**clap (44)**	slap 2, smack, polish, brace	2.56	2	27294
39.	**climb (48)**	scale 2	4.53	2	37429
40.	**cut (20)**	trim 16, prune 7, shear 2, garden 2, tree, snip, clip	5.25	2	24765
41.	**slam (14)**	open 12, close 12, shut 3, hurt 2, smash, hit, drawer, bang	2.77	3	28874
42.	**sort (8)**	collect 5, organize 3, count 3, package 2, view, study, pin, pickup, pick out, observe, make, look, label, fix, categorize, buy	3.71	3	19525
43.	**comb (47)**	brush 2	2.30	3	16924
44.	**play (21)**	read 12, write 5, piano 2, compose 2, to write, sing, read music, play piano	6.00	1	24382
45.	**conduct (31)**	orchestrate 3, compose 3, direct 2, preach, lead	3.66	3	13067
46.	**cook (41)**	stir 6, make dinner, boil, bake	4.29	2	28428
47.	**cough (31)**	sick 8, sneeze 7	2.56	3	33349
48.	**count (39)**	point 6, touch 3	4.16	3	16391
49.	**crash (39)**	dive 3, fly, drop, divebomb	3.00	3	8351
50.	**crawl (50)**		3.26	3	16855
51.	**cross (25)**	walk 20, read	4.33	3	30627
52.	**cry (49)**	yell	4.80	1	22897
53.	**curl (38)**	cut 6, style 2, perm, fix, curling	2.77	3	27471
54.	**curtsey (30)**	bow 13, dance 3, plie	0.69	3	14133
55.	**dance (47)**	swing 3	4.20	1	30516
56.	**decorate (25)**	ice 7, frost 4, squeeze 2, pastry, make, frosting, cook, apply	3.04	3	20524
57.	**deliver (41)**	mail 3, ring, knock, give, delivery	3.85	3	21286
58.	**tornado (15)**	destroy 13, storm 2, wreck, swirl, ruin, hurricane, fly away, disaster, demolish, break, blow	1.61	3	19925
59.	**dig (25)**	shovel 17, work, stand	3.71	3	17106
60.	**dip (45)**	scoop 3, spread	2.89	3	20402
61.	**cut (14)**	paint 10, dissect 3, carve 3, slice 2, open 2, tear, split, clean	5.25	2	18411
62.	**drip (28)**	measure 3, drop 3, titrate 2, distill 2, burn 2, weigh, siphon, pour, filter, evaporate, boil	2.40	3	15971
63.	**drag (31)**	pull 7, carry 6, lift 2, tug, suitcase, move, lug	3.89	3	28354

No.	Dominant response	Alternative namings (N of occurrences)	Ln Freq	Obj AOA	Obj VC
64.	**write (25)**	draw 20, study, grade, exam	6.14	1	17332
65.	**drill (38)**	screw 4, shoot 3, shoe, glue, fix	2.56	3	14929
66.	**drip (48)**	leak, faucet	2.40	3	3918
67.	**drive (49)**	steer	5.39	1	35400
68.	**break (22)**	drop 9, cry 5, surprise 2, yell, shock, scream, scared, break something	5.44	1	16955
69.	**drown (46)**	drowned 2	3.26	3	20210
70.	**dry (17)**	blow 17, blowdry 15, hairdry	3.89	2	42036
71.	**dust (36)**	sweep 6, brush 4, wipe, clean	2.20	3	13403
72.	**eat (31)**	hot dog	5.67	1	21812
73.	**dump (24)**	empty 10, trash 3, throw 3, unload, throw away, take away, take, pour, pick up, emptying, empty trash	2.89	2	31506
74.	**erase (41)**	write 2, sprinkle 2, shake 2, look 2	1.61	3	23620
75.	**erupt (30)**	explode 11, volcano 3, blow 3, fire, blow up	1.95	3	27002
76.	**look (24)**	examine 10, observe 4, view 2, watch, peer, magnify, inspect	7.21	1	26796
77.	**stretch (17)**	exercise 14, bend 7, touch 4, bow 2, toe touch, reach, organize	4.22	3	19720
78.	**explode (30)**	erupt 10, blow 4, blow up 2, explosion	3.14	3	23934
79.	**scared (9)**	scare 7, scream 6, fall 5, faint 4, laugh 2, frighten 2, fright 2, point, fear, ball, afraid	3.00	3	16850
80.	**fall (41)**	climb 9	5.69	1	26229
81.	**feed (39)**	sprinkle 4, spread, give	4.90	1	22683
82.	**fence (30)**	fight 10, sword 3, swordfight, swashbuckle, stab, lunge, lance	1.39	3	10775
83.	**fight (33)**	wrestle 5, hit 4, beat 2, play, beat up	4.96	3	27377
84.	**file (24)**	look 4, index 4, find 4, sort 2, check 2, search, pull, organize, look up, browse	3.09	3	13190
85.	**fill (28)**	pump 6, gas 4, fill up 2, pump gas, give gas, fuel, fix	4.93	3	27175
86.	**drip (13)**	measure 13, filter 5, drain 3, pour 2, trip, titrate, funnel, experiment, distillation, decant, burn	2.40	3	12628
87.	**fish (50)**		3.47	3	12729
88.	**float (39)**	wade 4, swim 2, relax, drown, bathe	3.53	3	26049
89.	**run (12)**	pour 8, flow 3, water 2, faucet 2, wash, turn, spout, sink, rinse, drip, clean	6.09	1	17893
90.	**fly (50)**		4.57	3	13178
91.	**fold (38)**	turn, sort, read, organize, open, look, flip through	3.66	3	24426
92.	**follow (36)**	walk 8, waddle 2, walking, run, quack	5.69	3	19976
93.	**scare (42)**	frighten 3, mask, angry, act	2.08	3	24409
94.	**arrest (22)**	search 13, frisk 7, pat down	2.83	3	21843
95.	**cry (20)**	sad 13, frown 11, pout 3	4.80	3	25714
96.	**cook (25)**	fry 21, scramble, grill, fry eggs, boil	4.29	2	30811
97.	**give (42)**	accept 2, surprise, give present, gift, exchange	7.15	1	27760
98.	**glue (31)**	paste 14, white-out 2, stick, paint	1.39	3	20359

No.	Dominant response	Alternative namings (N of occurrences)	Ln Freq	Obj AOA	Obj VC
99.	**golf (38)**	swing 3, putt 2, hit 2, tee off, putting, play, drive	1.39	3	53094
100.	**whisper (24)**	talk 14, gossip 7, discuss, chat	3.78	3	27687
101.	**shake (28)**	greet 9, meet 6, shake hands, mail, congratulate	4.88	2	34427
102.	**cook (24)**	barbecue 16, grill 8, fry, flip	4.29	2	25184
103.	**grind (11)**	open 7, turn 2, listen 2, wind, weigh, tap, put, play, music, mix, ground, cook	3.33	3	17383
104.	**hammer (34)**	nail 7, hit 7, pound	2.56	3	24852
105.	**arrest (27)**	handcuff 4, escort 3, cuff 2, walk, take, hold, handcuffs, find	2.83	3	28944
106.	**hang (22)**	dry 21, wet 2, wring, trench, pin up, laundry	4.85	3	37462
107.	**hatch (39)**	born 4, open, break free, birth	1.79	3	19137
108.	**hide (40)**	peek 3, play 2, surprise, peekaboo, discover	4.62	2	25967
109.	**hit (39)**	bat 7, swing 4	4.62	1	23139
110.	**hitchhike (45)**	hitch 3, wave	0.69	3	26145
111.	**howl (37)**	bark 13	2.40	3	18071
112.	**hug (42)**	hold 2, embrace 2, dance 2, love, comfort	2.48	1	16095
113.	**hunt (38)**	shoot 9, kill	3.40	3	45398
114.	**iron (48)**		1.79	3	13323
115.	**ride (19)**	fight 8, joust 7, lance 2, knight 2, charge 2, run, horseback, gallop, fence, attack	4.06	1	18780
116.	**juggle (48)**	toss, throw	1.10	3	14974
117.	**jump (35)**	chase 7, hop 4, leap frog, leap, catch	4.22	1	15496
118.	**kick (48)**	punt 2	3.76	1	17222
119.	**kiss (50)**		4.09	1	31961
120.	**kneel (38)**	sit 3, squat, sad, pray, mope, bow	3.18	3	14002
121.	**knight (27)**	cut 3, sword 2, stab 2, point, kill, initiate, dub, christen	0.69	3	10071
122.	**knit (25)**	sew 14, stitch 4, crochet 4	2.30	3	28962
123.	**knock (48)**	open	4.01	2	30189
124.	**lasso (32)**	twirl 5, whirl 3, rope 2, lassoo 2, spin, hoop, catch	0.00	3	18091
125.	**laugh (47)**	happy 2	5.14	3	39099
126.	**lick (47)**	seal 2, spit	2.48	2	18076
127.	**relax (13)**	lay 10, rest 9, lie 8, lounge 2, nap, lie down, gaze, dream, daydream	3.99	3	27671
128.	**lift (25)**	carry 11, pick up 7, wash, strain, pull, pick	4.49	3	18073
129.	**light (45)**	burn 4, light on fire	4.01	3	20907
130.	**listen (36)**	hear 11, strain 3	5.18	2	37439
131.	**load (14)**	deliver 13, lift 5, carry 3, pick up 2, pack 2, mail 2, store, stack, package	3.33	3	21792
132.	**unlock (23)**	open 13, turn 5, lock 3, key, insert, enter	2.77	3	13709
133.	**look (41)**	gaze 2, view, reflection, look at, admire	7.21	1	19979
134.	**magnify (25)**	look 9, examine 8, observe 2, look closely, inspect, catch, butterfly	2.08	3	28008
135.	**mail (37)**	drop 3, deliver 3, send, play, drop off, deposit, apply	1.61	3	25541

No.	Dominant response	Alternative namings (N of occurrences)	Ln Freq	Obj AOA	Obj VC
136.	**make (29)**	make bed 4, fold 2, cover 2, clean 2, bed 2, wash, to make bed	7.75	2	20999
137.	**march (32)**	walk 15, walking	3.43	3	33014
138.	**marry (33)**	wed 6, marriage 2, wedding, vows, say, read, kiss	4.84	3	23413
139.	**massage (48)**	rub 2	1.61	3	21386
140.	**measure (49)**	look	3.61	3	28509
141.	**meditate (30)**	sit 6, pray 6, observe, concentrate	1.39	3	19237
142.	**melt (42)**	drip 7, ice cream	3.22	3	19825
143.	**milk (39)**	wash 5, squeeze 2	2.40	3	28992
144.	**mine (20)**	dig 7, build 3, pick, open, fix, clean, catch	1.61	3	51502
145.	**miss (17)**	swing 15, hit 14, strike, bat, baseball	4.45	3	21872
146.	**mix (20)**	blend 11, beat 8, whip 3, stir 3, scramble	3.95	3	12204
147.	**mop (30)**	wash 10, clean 6, lift, dip	1.95	3	20337
148.	**oil (40)**	grease 2, drip 2, shoot	1.61	3	11309
149.	**open (27)**	wrap 6, unwrap 4, cover 3, close 2, box 2, uncover, lift, hide	5.44	1	25550
150.	**operate (22)**	cut 7, surgery 4, fix 3, take, perform, operation, open, examine	4.42	3	21850
151.	**parachute (36)**	fly 5, parasail 3, fall 3, sail, land	0.00	3	20365
152.	**bite (30)**	peck 13, feed 3, pinch, pick	3.33	1	22192
153.	**peel (42)**	carve 3, slice, apple	2.40	3	14440
154.	**pet (49)**	pat	1.39	3	17815
155.	**pick (29)**	cut 6, prune 4, trim 2, smell, pluck, grow, admire	5.25	2	27082
156.	**pinch (43)**	pull 2, tear, pick	2.30	3	17920
157.	**plant (28)**	dig 17, garden 2, shovel, root, chop down	3.43	3	27170
158.	**play (48)**	play piano 2	6.00	1	26095
159.	**plow (23)**	farm 6, mow 4, rake 2, tractor, harvest, cultivate, blow	2.83	3	29785
160.	**plug (44)**	plug in 5, insert	2.08	3	11886
161.	**point (43)**	look 3, serve, direct	4.89	3	16800
162.	**polish (34)**	shine 8, wash 2, clean 2, wipe, burn, brass	3.09	3	19609
163.	**pop (40)**	explode 6, burst 2, bust	3.00	3	15804
164.	**pour (48)**	fill, drink	4.38	2	26916
165.	**pray (41)**	kneel 5, cry, bow, beg	3.37	3	45299
166.	**propose (32)**	kneel 2, bow 2, marry, hold, greet, give, ask	4.16	3	18173
167.	**pull (38)**	tug 6, tow 4	5.23	1	30784
168.	**push (50)**		4.84	1	22838
169.	**rain (45)**	stop, protect, drench, cover	2.77	3	24435
170.	**raise (11)**	answer 7, ask 5, question 3, yell 2, win 2, wave, read, raise hand, look, happiness, cheer	5.17	3	19998
171.	**rake (48)**	shovel	1.95	3	15121
172.	**reach (37)**	grab 2, touch, lift, jump, hang	5.55	3	18105
173.	**read (45)**		5.92	1	30065

No.	Dominant response	Alternative namings (N of occurrences)	Ln Freq	Obj AOA	Obj VC
174.	**count (10)**	receive 8, pay 6, find 3, surprise 2, money 2, smile, open, hold, happy, get, excite, earn	4.16	3	17024
175.	**relax (22)**	sit 11, rest 8, tired 2, lounge 2, wait, slouch, remove, exhausted, collapse	3.99	3	22183
176.	**fix (39)**	plumb 3, work, tow, tighten, repair	3.71	2	24690
177.	**save (27)**	rescue 17, help 5	4.81	3	42839
178.	**ride (48)**	sit	4.06	1	18320
179.	**roar (27)**	growl 12, bark 3, scowl, scare, cry, anger	3.14	3	32379
180.	**roast (23)**	cook 19, burn 5, grill 2, fire	2.30	3	33211
181.	**row (46)**	paddle 3	0.69	3	31568
182.	**run (49)**	running	6.09	1	17276
183.	**sail (49)**	read	3.04	3	18904
184.	**salute (45)**		1.39	3	15575
185.	**saw (43)**	cut 5	1.39	3	38695
186.	**punish (16)**	scold 9, point 9, discipline 5, stand 2, zack a man, to punish, teach, reprimand, banish, admonish	3.18	3	17021
187.	**scoop (47)**	ice cream	2.08	3	24485
188.	**itch (23)**	scratch 21, swat 2, sting	1.61	3	24896
189.	**carve (31)**	sculpt 11, chisel 6, mold	3.04	3	26513
190.	**sell (42)**	yell 2, to sell, pick, choose, bake	4.98	3	36299
191.	**serve (44)**	dinner 2, feed, eat	5.01	3	32192
192.	**sew (42)**	thread, string, stitch, fix	2.48	3	23884
193.	**shake (28)**	climb 20, grab, drop	4.88	2	21729
194.	**wash (20)**	shampoo 19, wet 3, rinse 2, pour 2, dye hair, color, clean	4.54	1	24257
195.	**sharpen (33)**	turn 4, roll 3, carve 2, wind, unroll, sharp, sand	2.30	3	19312
196.	**shave (50)**		2.71	3	30336
197.	**shave (20)**	shear 17, groom 4, wash 3, cut 2, shed, leash, bathe	2.71	3	31758
198.	**shine (23)**	light 12, spray 2, flashlight 2, flash 2, wash, to shine, shower, search, look, clean	3.56	3	34381
199.	**shock (19)**	electrocute 11, talk, speak, sing, plug, flick, electrify	3.47	3	20024
200.	**shoot (41)**	fire 4, hunt	4.32	3	19808
201.	**shower (43)**	wash 4, scrub, bathe	1.95	3	28383
202.	**sing (48)**	whistle	4.37	1	23644
203.	**sink (29)**	drop 10, fall 6, float, dunk	3.93	3	13410
204.	**sit (47)**	wait, seated	6.22	2	18449
205.	**skate (38)**	rollerskate 11	1.39	2	17040
206.	**cut (18)**	spread 12, skin 4, carve 2, smear, prepare, make, knife, glue, clean, butter	5.25	2	29384
207.	**sleep (47)**		4.87	1	33733
208.	**cut (41)**	slice 7, tuck, carve	5.25	2	24500

No.	Dominant response	Alternative namings (N of occurrences)	Ln Freq	Obj AOA	Obj VC
209.	**slide (49)**	fall	3.58	2	32449
210.	**slip (39)**	fall 6, trip 4, tumble	4.13	3	27692
211.	**smell (44)**	sniff 4	3.87	3	17591
212.	**smile (46)**	laugh, happy	5.09	1	40153
213.	**smoke (49)**		3.81	3	17842
214.	**sneeze (22)**	cough 19, sober, cry	1.39	3	24147
215.	**snow (39)**	rain 3, storm 2, cold, blizzard	1.61	3	44104
216.	**somersault (20)**	tumble 13, roll 6, stand, roll over, perform, headstand, gymnastics, flip, fall, cartwheel, break	0.00	3	14621
217.	**sort (13)**	mail 13, file 6, organize 5, deliver 3, place 2, sort mail, pile, order, count, categorize	3.71	3	32981
218.	**plant (9)**	spread 7, sow 6, feed 5, sprinkle 4, seed 4, drop 2, to plant, farm	3.43	3	34133
219.	**spill (36)**	pour 12, drop	2.94	2	23590
220.	**sew (30)**	spin 9, spindle 3, weave, to weave, sway	2.48	3	24959
221.	**cough (16)**	spit 12, whistle 7, sneeze 5, blow 4, yell, halk	2.56	3	25134
222.	**splash (33)**	swim 8, play 7, wash, wade	2.40	1	35117
223.	**spray (28)**	squirt 7, splash 3, wet, tease, sprinkle, soak, shoot, rinse, play, hose	2.40	3	23144
224.	**spread (35)**	butter 6, cut 5, slice 2	4.49	3	25846
225.	**squeeze (45)**	juice	3.37	3	17216
226.	**stack (33)**	build 11, place, pile, look, carry, balance	2.48	3	11764
227.	**stand (28)**	sit 11, stand up 5, stretch, rise, fasten	6.15	2	19300
228.	**steal (41)**	watch, thieve, take, purse, pickpocket, grab	3.97	3	39600
229.	**sting (41)**	suck, bite	2.20	3	23887
230.	**stir (34)**	spoon 4, dip 4, mix 3, scoop	3.74	3	18270
231.	**strain (17)**	drain 11, drip 7, sift 2, scoop 2, to drip, sip, rinse, ladle, hot	3.04	3	11285
232.	**suck (37)**	cough 2, whistle, think, suck the thumb, lick, flick, bit, baby	3.61	3	15863
233.	**sunbathe (23)**	tan 10, bathe 7, suntan 3, lie, lay out, lay, bake	1.10	3	25963
234.	**surf (50)**		0.00	3	20492
235.	**look (21)**	survey 8, observe 6, view 3, peer 2, measure 2, see, focus, examine	7.21	1	21677
236.	**swat (34)**	slap 4, smack 3, miss 2, kill 2, swat a fly, spot, hit, fly swat	0.69	3	34760
237.	**sweat (44)**	hot 2, swelter, perspire, cry	2.89	3	16947
238.	**sweep (43)**	brush, broom	3.95	2	17562
239.	**swim (49)**		3.87	1	16766
240.	**swing (49)**		4.04	1	18530
241.	**laugh (9)**	giggle 4, smile 3, cough 3, whisper 2, taste 2, whistle, think, talk, suck, sniff, eat, choose, chew, admire	5.14	3	22368
242.	**teach (20)**	point 16, explain 3, write, point out, instruct, display, demonstrate	4.97	3	25360
243.	**tear (33)**	rip 15, break	4.13	2	27082
244.	**talk (38)**	call 7, telephone, greet, converse	6.24	2	27347

No.	Dominant response	Alternative namings (N of occurrences)	Ln Freq	Obj AOA	Obj VC
245.	**think (29)**	play 10, study 2, ponder, lose, frustrated, contemplate, concentrate, chess	7.60	2	25052
246.	**throw (47)**	fight 2, snowball	5.08	1	24589
247.	**tickle (31)**	play 9, wrestle 3, tackle 2, giggle, fight, attack	1.61	1	18027
248.	**tie (48)**	tie shoelace	4.13	3	23682
249.	**frost (8)**	taste 7, bake 7, lick 3, touch 2, take 2, eat 2, decorate 2, slice, sculpt, make, look, cook, beg	1.39	3	22918
250.	**tow (44)**	drag, crash, carry, car	1.61	3	26871
251.	**trip (45)**	kick 3, push	2.08	3	20799
252.	**type (50)**		2.89	3	19194
253.	**vacuum (49)**	clean	0.69	3	30285
254.	**wade (20)**	swim 15, play 10, walk, stand, lay	2.20	3	25717
255.	**wag (16)**	play 13, dig 2, beg 2, shake, scratch, pounce, look, jump, fun, dog, bark, attach	1.61	3	19445
256.	**wait (28)**	sit 22	5.77	2	21443
257.	**walk (50)**		5.74	1	14385
258.	**wash (22)**	cry 20, sweat 3, clean 2, soothe, cool, bathe	4.54	1	31102
259.	**watch (47)**	watch tv, television, fix	5.53	1	25732
260.	**water (44)**	pour 3, feed	2.30	3	32706
261.	**wave (46)**	swing, salute	3.83	3	15853
262.	**sew (5)**	weave 2, open 2, walk, to clean, sort, paint, operate, make, lift, enter, clean	2.48	3	35207
263.	**weigh (48)**	measure	3.43	3	22346
264.	**whisper (45)**	speak 2, talk, gossip, giggle	3.78	3	31922
265.	**whistle (39)**	sing 6, blow 2, play	2.64	3	19276
266.	**win (22)**	run 11, finish 11, race 2, cross 2	5.04	3	17468
267.	**wink (43)**	blink 3, listen, close	2.20	3	20114
268.	**wash (22)**	clean 19, wipe 5, shine, polish, dust	4.54	1	35246
269.	**wish (10)**	think 9, dream 3, birthday 3, imagine 2, surprise, sing, party, happy, give, gift	5.24	2	38643
270.	**wrap (26)**	tie 9, open 9, unwrap 2, untie, bow	3.58	3	18443
271.	**twist (22)**	wring 12, crumple 4, wrinkle 2, to wring, tear, squeeze, squeegee, krinkle, fold, dry, crumble, bend	3.69	3	13715
272.	**write (46)**	work, revise, play, draw	6.14	1	16774
273.	**yawn (41)**	stretch 8, shout	2.20	3	13506
274.	**yell (38)**	shout 6, yawn 3, holler 2	3.14	3	20192
275.	**zip (36)**	unzip 12, zipper, zip up	1.10	3	24128

APPENDIX 2b

The main independent variables for the picture and the dominant response of the 520 object items

No. and **Dominant response** specify the identity of the stimuli pictures, and specify the name given by the largest number of participants in the study (number of occurrences in brackets). **Alternative names** given as responses, and number for each (if more than 1) is also provided in the third column. The last five columns present information about the word attributes of the dominant responses: **Log natural frequency** from CELEX. **Goodness of depiction ratings** (1-worst, 7-best). **Infant objective AOA**: based on Mac Arthur CDI norms for English 1=(8–16 month) 2=(17–30 month) 3=(above). Adult **ratings of AOA** (9 point scale converted to true age, e.g., 8.13 years). (for objects only) **Objective Visual complexity** (based on picture file size in jpg format).

No.	Pictures	Alternative namings (N of occurrences)	Ln Freq	Pict goodness	Obj AOA	subj AOA	Obj VisC
1.	**accordion* (33)**	harpsichord 2, violin, organ, harp	0.69	5.65	3	6.12	21540
2.	**acorn (39)**	nut 8	1.10	5.15	3	4.44	9198
3.	**airplane* (35)**	plane 11, jet 4	1.95	5.90	3	3.58	16810
4.	**alligator* (45)**	crocodile 3, lizard, gator	1.10	5.90	2	4.04	14874
5.	**anchor (48)**		1.95	6.55	3	5.02	14010
6.	**ant* (44)**	bug 5, praying mantis	2.56	5.70	2	2.75	13915
7.	**antlers (36)**	horns 13, antelopes	0.00	5.40	3	5.10	12147
8.	**anvil (24)**	weight 4, knife 2, iron 2, sharp object, mallet	0.69	5.25	3	6.87	8356
9.	**apple* (49)**		3.43	6.20	1	2.27	8241
10.	**fish tank (24)**	aquarium 19, tank 3, fish 3, water tank	0.00	6.20	3	5.33	45899
11.	**arm (41)**	hand 8	5.35	5.50	1	2.06	6270
12.	**arrow (49)**	bow	2.77	6.55	3	4.15	5990
13.	**artichoke* (27)**	asparagus 5, vegetable, avocado	1.10	5.50	3	6.21	15203
14.	**ashtray* (31)**	nut, hole, holder, coaster, cigarette, bowl	2.30	4.40	3	5.25	12932
15.	**asparagus* (38)**	vegetable, stick, lady's fingers, brussels sprout, branch	1.10	5.00	3	5.96	9654
16.	**ax (38)**	hatchet 6	2.30	6.35	3	4.81	7849
17.	**baby (47)**	infant, child, boy	5.56	6.35	1	2.04	18598
18.	**bottle (44)**	baby bottle 4, jar	4.76	6.40	3	2.77	8529
19.	**stroller (23)**	carriage 16, baby carriage 5, crib 2, bassinet	0.69	5.80	1	4.23	17135
20.	**backpack (50)**		0.00	6.10	3	4.52	31598
21.	**badge (32)**	star 6, medal 3, sheriff's badge, sheriff, police badge, pin, law, emblem	2.30	5.60	3	5.13	15109
22.	**bag (41)**	paper bag 6, sack, lunch bag	4.39	6.15	3	2.98	18014
23.	**balcony (32)**	doors 8, porch 3, door 3, veranda, terrace, patio	2.64	4.75	3	5.46	35416
24.	**ball* (50)**		4.72	5.85	1	2.06	13345
25.	**balloon (50)**		1.95	6.10	1	2.71	8015
26.	**banana (50)**		2.20	6.10	1	2.79	8767
27.	**bandaid (46)**	bandage 4	0.00	5.75	3	3.13	13392
28.	**banjo (40)**	guitar 3, violin, ukelele, instrument	0.00	6.10	3	5.85	17479

No.	Pictures	Alternative namings (N of occurrences)	Ln Freq	Pict goodness	Obj AOA	subj AOA	Obj VisC
29.	**barbecue (44)**	grill 5	1.10	6.15	3	4.69	12302
30.	**barrel* (47)**	keg	3.09	6.15	3	4.98	18478
31.	**basket* (49)**	picnic basket	3.22	6.25	1	3.92	23651
32.	**bat (48)**		2.71	6.25	2	3.62	16687
33.	**bathtub (39)**	tub 10, bath	1.10	6.05	1	2.65	18067
34.	**bear* (41)**	polar bear 9	2.83	6.50	1	2.96	14353
35.	**beard (48)**	man with a beard, eskimo	3.26	4.70	3	4.00	30362
36.	**beaver (35)**	badger 3, mole 2, wood chuck, squirrel, rodent, mouse, hamster, animal, aardvark	1.39	5.10	3	4.40	11319
37.	**bed* (50)**		5.14	6.25	1	2.04	13761
38.	**bee (33)**	fly 9, bug 6	2.89	5.60	1	2.79	12184
39.	**bug (22)**	beetle 18, roach 3, spider 2, insect 2, wasp, June bug, cockroach	3.76	5.25	3	4.67	12207
40.	**bell* (50)**		3.33	5.95	3	3.31	11109
41.	**belt (49)**		3.30	5.80	2	3.75	18762
42.	**bench (47)**	chair 3	3.18	6.05	2	4.29	25379
43.	**bicycle* (35)**	bike 15	1.79	6.60	1	3.33	24322
44.	**binoculars (45)**		4.64	6.40	3	5.44	18262
45.	**bird (40)**	robin 4, sparrow 3, pigeon 3	0.00	6.15	1	2.40	13239
46.	**blimp (38)**	hot air balloon 3, balloon 3, zeppelin, plane, hot air blimp	4.58	5.50	3	5.40	9051
47.	**wood (27)**	board 12, plank 6, slab of wood, piece of wood, lumber, ladder	2.08	4.80	3	3.37	17090
48.	**boat (35)**	ship 10, yacht 4	1.95	5.85	2	2.87	11180
49.	**bomb (44)**	dynamite 2, firecracker, cannon ball, cannon	3.74	4.85	3	4.94	6984
50.	**bone (50)**		4.25	5.95	3	3.48	14370
51.	**book* (50)**		6.08	6.35	3	2.42	8619
52.	**boot* (45)**	shoe 4, cowboy boot	3.69	5.20	1	3.54	8857
53.	**bottle* (44)**	wine bottle 2, wineglass, vase, jar	4.76	6.00	1	3.12	6551
54.	**bowl* (48)**	cup	3.53	5.70	1	2.75	9408
55.	**bow* (39)**	bowtie 6, ribbon 4, tie	2.64	6.30	3	4.00	14836
56.	**box (50)**		4.63	6.40	1	2.87	18074
57.	**boy (45)**	kid 2, person, little boy, child	5.86	5.80	1	2.00	15675
58.	**branch (34)**	tree 6, limb 5, tree branch 4, twig	4.55	5.65	3	3.90	7227
59.	**bra (50)**		1.95	5.35	3	6.08	11410
60.	**bread* (49)**	loaf	4.32	6.15	1	2.67	10161
61.	**bride (43)**	wedding 5, princess, married	2.56	5.35	3	4.90	14046
62.	**bridge (49)**	gate	4.20	6.35	3	4.21	27543
63.	**broom (50)**		2.20	6.45	1	3.42	11261
64.	**brush* (47)**	hairbrush 2, scrub brush	2.89	5.70	1	2.85	12280

No.	Pictures	Alternative namings (N of occurrences)	Ln Freq	Pict goodness	Obj AOA	subj AOA	Obj VisC
65.	**bus* (50)**		4.38	6.45	1	3.25	23164
66.	**butter (48)**	plate, cheese	3.33	5.55	1	3.60	15536
67.	**butterfly* (50)**		2.40	6.75	1	3.00	24645
68.	**button (50)**		3.30	5.95	1	3.37	5726
69.	**cactus (48)**		1.39	5.20	3	4.87	55204
70.	**cage (45)**		2.83	4.85	3	4.37	15117
71.	**cake* (50)**		3.56	6.40	1	2.69	16237
72.	**camel (48)**		3.26	6.25	3	4.29	26026
73.	**camera (50)**		3.61	6.35	2	3.90	16408
74.	**can (46)**	tomatoes 2, tomato can	2.30	6.10	2	3.17	10069
75.	**candle* (50)**		2.83	6.45	3	3.85	8385
76.	**cane (46)**	walking cane, crutch	2.40	5.80	3	4.56	5668
77.	**cannon (46)**		1.95	5.95	3	5.19	17678
78.	**canoe (29)**	boat 18	1.95	5.75	3	4.94	27029
79.	**can opener (44)**	opener, bag	0.00	4.70	3	4.69	16172
80.	**hat (32)**	cap 15, golfer hat	4.23	5.15	3	3.98	9464
81.	**car (50)**		5.87	6.35	1	2.56	9255
82.	**carousel (29)**	merry-go-round 15, ferris wheel 3, carnival	0.69	6.50	3	5.19	32489
83.	**carrot* (50)**		2.20	6.05	1	3.04	13201
84.	**tape (39)**	cassette 8, tape cassette, cassette tape	3.56	6.40	3	5.27	26164
85.	**castle (50)**		3.33	5.45	3	4.02	22746
86.	**cat* (47)**	kitty, kitten	4.22	6.35	1	2.02	9894
87.	**celery* (33)**	lettuce 5, vegetable 2, cabbage 2, food	1.39	5.25	3	4.27	22928
88.	**chain (48)**		3.89	6.15	3	4.44	12912
89.	**chair* (50)**		4.92	6.55	1	2.65	11238
90.	**cheese (41)**		3.47	5.55	1	2.98	12988
91.	**cherry* (45)**	plum 2, apple 2, orange	2.08	5.40	3	3.44	4325
92.	**chest (47)**	torso, muscles, muscle	3.89	5.70	3	4.08	31663
93.	**chicken* (34)**	rooster 7, hen 4, turkey 2	3.74	6.15	1	2.94	12886
94.	**chimney (46)**		2.40	5.95	3	4.06	9730
95.	**church (48)**	temple, school	5.21	6.10	1	3.40	34595
96.	**cigarette* (46)**	smokes, smoke, match	4.28	5.95	3	4.94	7988
97.	**city (41)**	town 2, street 2, traffic, cityscape, castle	5.55	4.80	2	3.85	44479
98.	**clamp (15)**	vice 4, wrench 2, tool 2, tightening bolt, screw, pin, hook, grip, clasp, c clamp	1.39	5.15	3	6.37	8045
99.	**clock (49)**	7 o'clock	3.69	6.60	1	3.25	25639
100.	**clothespin* (24)**	clip 6, pin 4, paperclip 3, clothes hanger	0.00	6.20	3	4.90	10833
101.	**cloud* (38)**	clouds 4, mashed potatoes 3, sponge, fluff	4.04	3.00	2	3.15	11916
102.	**clown* (49)**		1.61	6.45	2	3.04	21244

No.	Pictures	Alternative namings (N of occurrences)	Ln Freq	Pict goodness	Obj AOA	subj AOA	Obj VisC
103.	**coat* (28)**	jacket 20, suit, overcoat	4.13	5.30	1	3.44	13847
104.	**dime (30)**	coin 16, penny 3, 1 cents	1.79	5.75	3	3.56	14784
105.	**pillar (20)**	column 16, tower 3, pole 3, pier	2.83	4.85	3	6.13	11413
106.	**comb (50)**		1.79	6.15	1	3.19	28324
107.	**cookie (37)**	oreo 7, jewelry	1.61	4.80	1	2.06	7256
108.	**cork (39)**	glass 2, wood, thimble, eraser, cup, can	1.79	4.30	3	5.63	18503
109.	**corkscrew (19)**	screw 11, screwdriver 4, wine opener, cork opener, cork, bottle opener	0.69	5.65	3	6.08	11421
110.	**corn* (50)**		3.22	6.30	2	3.44	16041
111.	**cow* (45)**	ox, goat, bull	3.71	6.40	1	2.71	17300
112.	**cowboy (39)**	man 7, western guy, sheriff, guy	1.95	5.25	2	3.67	21168
113.	**crab (46)**	lobster 2, spider, scorpion	2.30	5.90	3	4.40	21262
114.	**crackers (41)**	graham crackers 3, cracker 3, pretzels, mats	0.00	4.75	1	2.65	16150
115.	**crib (41)**	bed 7, cradle	0.69	5.90	1	3.10	13719
116.	**cross (50)**		3.14	6.55	3	3.98	9790
117.	**crown* (45)**	hat 2, king	3.22	6.30	3	4.21	23655
118.	**block (14)**	cube 13, box 9, square 4, ice cube 2, bread 2, package, ice, butter	4.01	3.95	3	4.94	10667
119.	**cup* (42)**	teacup 5, mug 2, coffee cup	4.36	5.80	1	2.25	8190
120.	**curtains (30)**	curtain 8, drapes 5, window 3, window sill, window shades, window blinds, draperies	0.00	5.10	3	4.19	15194
121.	**deer* (44)**	reindeer, goat, elk, antlers, antelope	2.56	6.40	1	3.81	15056
122.	**dentist (42)**	doctor 4, patient, doctor and patient	2.30	5.20	3	4.08	14931
123.	**desert (33)**	cactus 16	3.74	6.10	3	4.38	45024
124.	**desk* (50)**		4.52	6.30	3	3.71	17761
125.	**diaper (23)**	underwear 11, diapers 9, pants 3, underpants, panties	1.10	4.50	1	2.65	17126
126.	**dinosaur (49)**	dragon	1.79	6.00	3	3.33	12393
127.	**doctor (41)**	man 8	5.22	4.60	2	3.04	17528
128.	**dog* (50)**		4.75	6.45	1	1.90	12012
129.	**doll (43)**	child 3, girl 2, little girl, baby	3.26	5.35	1	2.21	26607
130.	**dolphin (49)**	penguin	1.39	6.70	3	4.27	9949
131.	**donkey* (37)**	mule 5, pony 2, horse 2, cow, ass	2.71	6.05	1	4.06	15643
132.	**door* (50)**		5.96	6.00	1	2.52	12638
133.	**dragon (48)**		2.30	6.15	3	3.79	19272
134.	**drawer (50)**		3.22	5.90	1	3.77	16141
135.	**dress (50)**		4.48	5.75	1	3.33	23619
136.	**dresser* (24)**	drawers 12, chest 7, desk 3, dresser drawers, drawer, chest of drawers, bureau	1.79	5.90	3	4.25	21173
137.	**drill (27)**	screwdriver 6, gun 5, drill gun 2, tool, screw gun, hand drill	2.20	5.80	3	5.46	16254

No.	Pictures	Alternative namings (N of occurrences)	Ln Freq	Pict goodness	Obj AOA	subj AOA	Obj VisC
138.	**drum (40)**	drums 10	2.83	6.40	3	3.67	39085
139.	**duck* (48)**	goose, bird	0.00	6.40	1	2.71	11588
140.	**dustpan (29)**	pan 6, scooper 2, rake, pail, duster, dust mop, broom pan	0.69	5.45	3	4.96	17095
141.	**eagle (29)**	bird 12, hawk 4, parrot 3, falcon 2	2.30	5.70	3	4.46	15555
142.	**ear* (50)**		4.49	6.25	1	2.31	9033
143.	**earring (20)**	diamond 7, necklace 2, jewelry 2, pendant, jewel, diamonds	1.39	2.85	3	4.40	5676
144.	**egg (49)**	hard-boiled egg	4.47	5.20	1	2.96	10440
145.	**elephant (49)**	big	3.22	6.50	1	3.29	24585
146.	**envelope* (46)**	letter 4	3.22	6.30	3	4.69	11394
147.	**eskimo (39)**	man with hood, man, face, beast, ape	0.00	4.55	3	5.10	11857
148.	**eye* (48)**	eye ball	6.26	6.50	1	2.15	9104
149.	**fan (48)**	blower	2.89	6.10	3	4.06	35152
150.	**faucet (41)**	water 3, sink 3, tap, spigot, fountain	1.10	5.85	3	4.58	17509
151.	**feather (48)**	leaf	3.09	6.05	3	3.62	21626
152.	**fence* (49)**	gate	3.43	6.50	3	3.79	17349
153.	**finger (48)**	pointer	4.82	6.40	1	2.06	5370
154.	**fire (48)**	flames, fireplace	5.09	6.40	3	3.06	52543
155.	**fireman (47)**	firefighter 2, fire hydrant	1.61	6.10	2	3.40	26161
156.	**fire truck (31)**	fire engine 13, fire 3, truck	0.00	5.80	1	3.52	41094
157.	**fish (49)**		5.10	6.30	1	2.62	12019
158.	**fishing pole (25)**	fishing rod 14, fishing 3, fishing line 2, fishing hook 2, pole	0.00	5.55	3	4.81	5685
159.	**flag* (50)**		3.30	5.75	2	3.58	9461
160.	**flashlight (48)**	light	1.79	5.95	3	4.04	15410
161.	**wine (25)**	bottle 8, jug 3, wine bottle, red wine, flask, drink, chianti, champagne, bucket	4.38	4.05	3	6.98	24975
162.	**floor (25)**	corner 11, tile 9, tiles, flower, cage	4.34	4.15	3	2.75	20982
163.	**flower* (50)**		4.54	6.65	1	2.62	15082
164.	**flute* (42)**	pipe 3, saxophone, pole, pen, fishing rod	1.39	3.75	3	5.31	7456
165.	**fly (45)**	bee 4, bug	3.61	6.30	3	2.88	11935
166.	**foot* (49)**	feet	5.79	6.60	1	2.06	7638
167.	**football* (50)**		3.53	6.65	3	3.94	12165
168.	**fork* (50)**		2.77	6.50	1	2.79	8818
169.	**fountain (42)**	water fountain 6, waterfall	2.56	6.05	3	4.65	32442
170.	**fox* (42)**	wolf 4, coyote 3	2.77	5.55	3	3.90	16437
171.	**frog* (50)**		2.30	6.05	1	3.00	14773
172.	**funnel (38)**	glass	1.10	5.10	3	5.96	6468
173.	**trash (21)**	garbage 14, junk 10, dump 2, mess, junkyard	1.61	4.95	1	3.85	48626

No.	Pictures	Alternative namings (N of occurrences)	Ln Freq	Pict goodness	Obj AOA	subj AOA	Obj VisC
174.	**gas (19)**	gas pump 16, gas station 6, gas tank 3, pump 2, gasoline pump, gasoline	4.36	4.35	2	4.50	8961
175.	**fence (29)**	gate 18, door	3.43	4.70	3	3.71	13819
176.	**genie (43)**	ghost	0.69	6.10	3	5.08	18559
177.	**ghost (50)**		3.47	6.00	3	3.33	23538
178.	**giraffe* (49)**		1.10	6.75	1	3.58	18422
179.	**girl (46)**	little girl 3, dress	6.08	6.30	1	1.92	15540
180.	**glass (35)**	cup 14	4.98	6.45	1	2.79	14175
181.	**glasses* (48)**	eyeglasses 2	3.50	6.50	1	3.60	11525
182.	**globe (49)**	earth	2.48	6.35	3	4.56	24454
183.	**glove (50)**		3.00	6.20	2	3.88	11509
184.	**goat (47)**	sheep 10, ram	3.37	6.25	3	3.71	15302
185.	**gorilla* (35)**	ape 12, monkey 3	1.39	6.05	3	3.94	17084
186.	**grapes (45)**	grape 5	0.00	5.65	2	3.06	23841
187.	**grasshopper* (33)**	cricket, bug 2, beetle 2, insect, caterpillar	1.39	5.95	3	3.81	13119
188.	**guitar* (49)**	violin	2.08	6.45	3	4.31	12032
189.	**gun* (44)**	pistol 2, rifle, revolver, handgun	4.61	6.05	3	3.90	10904
190.	**hair (49)**	woman	5.30	5.50	1	2.00	41463
191.	**brush (42)**	hairbrush 6, comb 2	2.89	5.75	1	3.73	16664
192.	**hamburger (42)**	sandwich 4, burger 3, cheeseburger	1.79	5.95	2	3.21	26501
193.	**hammer* (48)**		2.48	6.60	1	3.69	9533
194.	**hammock (41)**	cot 4	0.69	5.20	3	5.58	10853
195.	**hand* (46)**	fingers	6.59	6.25	1	1.98	13345
196.	**handcuffs (43)**	cuffs 3, hands 2, criminal	1.10	5.75	3	5.67	21347
197.	**hanger* (44)**	coat hanger 5	1.10	6.60	3	4.35	7003
198.	**harp* (44)**	harmonica, cello	1.39	5.55	3	5.62	14170
199.	**hat* (46)**	fedora	4.23	6.25	1	2.65	8732
200.	**hay (39)**	haystack 8, straw, rubbish	2.77	4.25	3	4.15	23594
201.	**heart* (50)**		5.11	6.85	3	2.90	7316
202.	**heel (43)**	high heel 4, shoe 2	3.40	4.95	3	4.77	14448
203.	**helicopter* (50)**		2.83	6.45	2	4.46	18241
204.	**helmet (48)**	football helmet 2	2.64	5.55	3	4.83	15650
205.	**highchair (41)**	baby chair 4, crib, chair	0.00	6.30	1	3.21	19638
206.	**hinge (36)**	lock 2, latch, hat, door hinge	1.61	5.05	3	5.85	6973
207.	**hippo (26)**	hippopotamus 14, rhinoceros 5, rhino, animal	0.69	5.35	3	4.33	12429
208.	**hoe (36)**	rake 8, spade, shovel, plow	1.39	5.90	3	5.65	6124
209.	**hoof (44)**	foot 2, horse's foot, horse hoof	2.20	4.45	3	5.04	13837
210.	**hook (50)**		3.64	6.05	3	4.35	10144
211.	**horse* (50)**		4.89	6.55	1	2.90	18397

No.	Pictures	Alternative namings (N of occurrences)	Ln Freq	Pict goodness	Obj AOA	subj AOA	Obj VisC
212.	**hose (47)**	garden hose 2	1.61	6.05	2	3.92	26130
213.	**house* (49)**	barn	6.41	6.15	1	2.25	18069
214.	**fire hydrant (34)**	hydrant 11, fire 2, water	0.00	6.00	3	5.31	25793
215.	**ice cream cone (25)**	ice cream 22, cone	0.00	6.15	1	2.87	7742
216.	**igloo (49)**		0.69	6.35	3	5.25	9673
217.	**iron* (50)**		4.28	6.15	3	4.50	16843
218.	**ironing board (45)**	ironing table 2, iron table, iron, board	0.00	6.35	3	5.02	12848
219.	**jack (35)**	car jack 2, tire jack, crank, changing the car, car	1.95	5.25	3	5.77	11170
220.	**jacket (44)**	coat 3, shirt	3.76	5.60	1	3.25	30351
221.	**jar (44)**	bottle 4, container	3.00	6.00	2	3.77	7664
222.	**puzzle (49)**	puzzle pieces	2.30	5.90	2	3.73	46171
223.	**jumprope (42)**	rope 6, jumping rope 2	0.00	5.80	3	3.77	11207
224.	**kangaroo* (50)**		1.39	6.40	3	4.37	14555
225.	**key* (44)**		4.47	6.30	1	3.40	7493
226.	**king (49)**		4.61	6.40	3	3.60	31165
227.	**kite (50)**		1.79	6.40	3	3.38	17880
228.	**knife* (48)**		3.81	5.95	2	3.25	8773
229.	**knight (38)**	horse 3, warrior, fighter	2.64	5.70	3	4.71	15019
230.	**knot (29)**	rope 10, pretzel 6, tie 2	2.71	5.15	3	4.17	12224
231.	**ladder (50)**		2.83	5.90	2	3.94	25701
232.	**ladle (26)**	spoon 21	0.69	5.05	3	6.10	6129
233.	**ladybug (32)**	beetle 11, bug 5	0.00	5.30	3	3.54	10682
234.	**lamp (46)**	light 4	3.58	6.35	1	3.75	13522
235.	**lawnmower (47)**	mower, grass cutter	0.00	6.15	2	4.54	18238
236.	**leaf (48)**		4.41	6.30	3	3.25	26600
237.	**leg* (37)**	foot 6, knee 4	5.17	5.70	1	2.19	6995
238.	**lemon* (47)**	melon, fruit	2.77	5.55	3	3.42	8524
239.	**leopard* (25)**	cheetah 17, tiger 2, panther, jaguar	2.20	5.75	3	4.73	23203
240.	**letter (34)**	letters 6, paper 3, papers 2, notes 2, mail 2, envelope	5.33	5.90	3	4.02	40467
241.	**lettuce (28)**	cabbage 16, rose, leafs, leaf, flower, broccoli	2.08	5.45	3	3.90	17140
242.	**light bulb (46)**	light 2, bulb 2	0.00	6.75	1	4.13	10034
243.	**lighthouse (46)**	light tower 2, watch tower	1.39	6.40	3	5.06	31692
244.	**lightning (41)**	lightning bolt 6, thunder 2	2.71	5.85	3	4.17	30782
245.	**light switch (32)**	switch 11, light 5, switcher, socket	0.00	6.45	3	3.90	7739
246.	**lion (49)**		3.26	6.50	1	3.13	32267
247.	**lips (47)**	mouth 2, lip	0.00	6.35	2	2.77	6586
248.	**lipstick (50)**		2.08	6.30	3	4.60	6029
249.	**lizard (43)**	reptile 2, gecko 2, iguana, alligator	1.61	5.65	3	3.94	12070

No.	Pictures	Alternative namings (N of occurrences)	Ln Freq	Pict goodness	Obj AOA	subj AOA	Obj VisC
250.	**llama (34)**	sheep 3, lamb 3, camel 2, goat, emu, animal	0.00	5.10	3	6.17	10293
251.	**lobster* (41)**	scorpion 3, crawdad 2, crab 2, crawfish	1.39	5.80	3	5.10	20034
252.	**lock* (49)**		2.77	5.95	3	4.06	9706
253.	**log (37)**	wood 8, trunk 2, tree stump, tree, branch	2.48	5.75	3	3.92	13517
254.	**magnet (47)**	horseshoe 2	1.39	5.70	3	4.40	23234
255.	**mailbox (42)**	mail 7, letters	1.10	6.40	3	3.83	19211
256.	**man (47)**	person 2, young man	7.40	5.55	1	2.27	15791
257.	**map (50)**		3.71	6.10	3	4.35	41029
258.	**mask (49)**	face	3.04	5.40	3	4.15	13646
259.	**match (48)**		4.06	5.50	3	4.02	13078
260.	**medal (42)**	medallion 4, badge	2.48	4.95	3	4.90	21541
261.	**microphone (36)**	tool, paddle, oar, fly swatter	2.20	4.00	3	5.17	9962
262.	**microscope (38)**	telescope 7	2.20	6.50	3	5.96	20349
263.	**mirror (49)**		3.91	5.50	3	3.08	11938
264.	**mixer (18)**	blender 13, beater 6, beaters 5, eggbeater 3, appliance	1.10	5.55	3	5.08	18578
265.	**priest (20)**	monk 18, pope 3, religious guy, preacher, man, Indian, father	3.91	4.35	3	6.31	10111
266.	**monkey (50)**		2.94	6.35	1	3.23	18988
267.	**moon (47)**		4.09	6.30	1	2.85	3730
268.	**moose (35)**	elk 3, deer 3, antlers 2, antelope 2, caribou	0.69	6.25	2	4.67	23330
269.	**mop (47)**	broom 3	1.39	6.10	2	4.31	14393
270.	**mosquito (25)**	fly 6, bug 5, insect 4, dragon fly 3, wasp, moth, daddy longlegs	1.79	4.00	3	4.56	20758
271.	**motorcycle* (48)**	bike, bicycle	2.71	6.25	1	4.69	24207
272.	**mountain* (47)**	peak 2, glacier	4.44	5.45	3	3.63	13588
273.	**mouse (45)**	rat 2, squirrel, mice	2.94	6.45	1	2.92	13250
274.	**mousetrap (32)**	trap 15, rat trap 2	0.69	5.75	3	4.79	18345
275.	**mushroom (50)**		2.64	6.15	3	4.31	8337
276.	**music (24)**	notes 17, music notes 4, musical notes 2, piano notes	4.90	5.80	3	3.38	5175
277.	**nail (49)**		3.26	6.30	2	3.69	9585
278.	**neck (33)**	chin 11, mouth 2, face 2, ear	4.38	4.95	3	2.83	5700
279.	**necklace (41)**	pearls 6, pearl necklace, jewelry, beads	1.61	5.00	1	4.35	8347
280.	**needle (43)**	stick, needle and thread, match, flag	2.83	5.70	3	4.40	8377
281.	**nest (35)**	eggs 11, egg nest, egg	2.89	5.85	3	3.54	12296
282.	**net (48)**	fish catcher, basket	3.09	5.85	3	4.37	9970
283.	**nose* (48)**		4.41	6.35	1	2.02	4703
284.	**nurse (47)**	woman, person	3.91	5.15	2	3.98	19385
285.	**nut* (23)**	bolt 16, screw 6, washer, hinge	3.18	5.90	2	4.40	7235

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286.	**octopus (49)**		1.10	6.50	3	4.79	33010
287.	**onion* (46)**	radish, garlic, coconut	2.83	5.35	3	4.35	11645
288.	**orange* (47)**	grapefruit, bowling ball	3.04	4.90	1	2.79	10314
289.	**ostrich* (36)**	bird 5, flamingo 2, emu, big bird	1.39	5.80	3	5.19	13009
290.	**owl* (50)**		2.08	6.35	1	3.87	15316
291.	**package (47)**	parcel, mail, box	3.04	5.55	3	4.85	29767
292.	**bucket (33)**	pail 17	3.04	5.90	2	3.65	14552
293.	**paintbrush* (38)**	brush 9, pen 2	0.69	5.75	3	3.79	7932
294.	**paint (25)**	palette 8, paint palette 3, easel 3, paints 2, tablet, painting, paint ladle	3.30	5.05	3	7.31	11757
295.	**palmtree (42)**	tree 5, palm 2	0.00	5.90	3	5.12	18577
296.	**pan (42)**	frying pan 5, pot 2, skillet	3.33	6.00	3	3.50	9738
297.	**panda (18)**	panda bear 13, bear 12, polar bear 2, koala bear, koala	0.69	5.60	3	4.60	29117
298.	**pants (43)**	jeans 4, bell- bottoms	2.83	5.95	1	2.63	16138
299.	**paper (42)**	papers 7, notes	5.42	5.85	1	2.87	33840
300.	**paperclip (35)**	safety pin 5, clip 2, magnet	0.00	6.55	3	5.12	21555
301.	**parachute (26)**	balloon 11, package 4, hot air balloon 2	1.61	5.40	3	5.27	25199
302.	**parrot (38)**	bird 10	1.61	5.65	3	4.23	18115
303.	**paw (31)**	claw 8, hair 3, foot 2, hoof, foot of a bear	1.95	3.80	3	4.13	21167
304.	**peach* (33)**	orange 4, fruit 3, pear, nectarine, apricot, apple	1.95	4.35	3	3.52	6893
305.	**peacock (40)**	ostrich 2, turkey, rooster, pheasant	1.61	6.40	3	4.69	62243
306.	**peanut* (45)**		1.79	5.85	3	3.38	10266
307.	**pear (50)**		1.95	5.50	3	3.58	18960
308.	**peas (27)**	pea pod 11, pea 7, soy beans, pod	0.00	5.05	1	3.25	24609
309.	**pelican (34)**	bird 6, stork 2, seagull	1.10	6.20	3	5.19	13369
310.	**pen* (50)**		3.30	6.50	1	3.35	9078
311.	**pencil* (50)**		3.00	6.65	2	3.06	7899
312.	**pencil sharpener(26)**	sharpener 3, pencil eraser, eraser	0.00	3.85	3	4.79	19617
313.	**penguin (48)**		1.79	6.10	1	4.42	20074
314.	**piano* (49)**		3.33	6.70	3	4.04	19570
315.	**picture (40)**	painting 6, ship, picture of a ship	5.16	5.30	1	3.31	16812
316.	**pig* (50)**		3.78	6.20	1	2.90	10411
317.	**bird (18)**	pigeon 12, chicken 9, hen 3, turkey 2, dove 2, quail, game hen, animal	4.64	5.10	3	4.58	11709
318.	**piggybank (46)**	piggy, pig, bank	0.00	5.70	3	3.52	24489
319.	**pillow (50)**		3.00	4.50	1	2.94	16592
320.	**pineapple* (48)**	artichoke	1.39	6.55	3	4.58	20721
321.	**pinecone (29)**	acorn 3, cone 2, tree thing, plant, pineapple, pine, avocado, artichoke	0.00	4.75	3	4.29	10484

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322.	**pipe* (46)**	cigar	3.47	6.35	3	4.94	7235
323.	**pirate (43)**	sailor 3, sword, captain, buccaneer	1.79	6.30	3	4.06	37716
324.	**pitcher* (26)**	jug 8, vase 5, jar 3, kettle 2, pourer	0.69	6.00	3	4.73	8789
325.	**pitchfork (31)**	fork 10, rake 4, trident, spade, hoe	0.00	5.60	3	5.75	6158
326.	**pizza (50)**		1.10	4.80	1	3.60	40526
327.	**plate (47)**	setting, place setting, dinner plate	4.03	5.80	1	2.87	21533
328.	**pliers* (28)**	wrench 17, wire cutters, clamp	0.69	6.25	3	5.83	9876
329.	**plug* (46)**	socket, plug in	2.30	6.20	3	4.13	11385
330.	**policeman (27)**	police officer 8, police 5, man 3, traffic man, traffic guard, sailor, police woman, officer, crossing guard, cop	3.66	5.10	2	3.54	21428
331.	**pool (36)**	swimming pool 12, water pool	3.74	6.15	2	3.29	28244
332.	**popcorn (49)**		0.69	6.50	2	3.52	26185
333.	**popsicle (32)**	plug 7, ice cream 2, roll, popsicles	0.00	4.95	2	2.92	9409
334.	**porcupine (46)**	animal	0.69	5.65	3	5.02	20053
335.	**pot (29)**	trashcan 3, kettle 2, box 2, trash, pan, briefcase, basket	3.61	4.75	3	3.67	5266
336.	**potato* (42)**	nut 2, food	3.61	3.75	2	3.73	6576
337.	**present (32)**	gift 6, package 5, box 4, birthday present	2.89	5.95	3	2.98	11938
338.	**priest (45)**	preacher, pope, minister, man	3.91	5.60	3	5.19	15587
339.	**pumpkin (49)**		1.10	5.95	2	3.10	18960
340.	**purse (49)**	pocketbook	2.40	6.10	1	4.06	21948
341.	**pyramid (47)**	teepee	2.08	6.35	3	5.33	19838
342.	**queen (49)**		3.99	5.95	3	3.67	11277
343.	**rabbit* (41)**	bunny 8	3.00	6.65	1	2.96	11295
344.	**raccoon* (38)**	fox 2, cat 2, animal 2, skunk	0.00	5.80	3	4.37	16186
345.	**radio (43)**	stereo 5, thermometer, clock radio	4.49	4.40	1	3.67	19880
346.	**radish (21)**	beet 5, onion 3, turnip 2, leaf 2, flower 2, leaves	0.69	4.00	3	5.73	11066
347.	**rain (40)**	puddle 5, rain drops	4.29	5.55	1	2.52	20795
348.	**rainbow (47)**	cloud	2.08	4.15	3	3.23	32529
349.	**rake (49)**	spade	1.10	5.85	3	4.21	5156
350.	**razor (46)**	shaver 2, washer	2.30	5.80	3	5.62	14404
351.	**record player (40)**	record 5, turntable, tape, player	0.00	6.00	3	4.44	18552
352.	**refrigerator* (44)**	fridge 5, frigerator	2.40	5.95	1	3.65	7828
353.	**rhinoceros* (37)**	rhino 7, horn, hippo, bull, boar	1.10	6.75	3	4.71	18320
354.	**gun (35)**	rifle 14	4.61	5.60	3	5.65	9010
355.	**ring (50)**		1.39	5.80	3	4.02	7652
356.	**road (46)**	street 2, highway 2	5.52	5.85	3	3.35	26797
357.	**robot (49)**	r2d2	2.08	6.15	3	4.44	9502
358.	**rock (48)**	trash	4.76	4.55	1	2.62	16005

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359.	**rocket (45)**	rocket ship 4, spaceship	2.71	6.05	3	4.48	18164
360.	**rocking chair (33)**	chair 15, rocking, rocker	0.00	6.25	1	3.77	17826
361.	**roller skate (25)**	skate 23, roller skates	0.00	6.35	3	4.50	16620
362.	**rolling pin (35)**	roller 8, pin 3, iron	0.00	6.10	3	5.33	8674
363.	**roof (46)**	house 2, rooftop	4.04	4.80	2	3.75	13178
364.	**rooster* (27)**	chicken 17, turkey 3, hen 2	0.69	5.95	2	3.92	17393
365.	**rope (50)**		3.76	6.20	3	3.77	34568
366.	**rose (37)**	flower 12	3.09	5.75	3	3.94	25742
367.	**rug (34)**	blanket 11, carpet 5	2.77	5.35	3	3.56	13474
368.	**ruler* (50)**		2.94	6.35	3	4.06	10785
369.	**saddle (49)**		2.40	5.45	3	4.88	10307
370.	**safe (37)**	refrigerator 3, vault 2, safety deposit box, lock, fridge, case	2.08	5.60	3	4.79	10940
371.	**safety pin (24)**	pin 12, needle 4, paper clip 2, hook, clothes pin, bobby pin	0.69	6.55	3	5.13	13291
372.	**sailboat (38)**	boat 8, ship, sailing	0.00	6.25	3	3.98	19076
373.	**sailor (45)**	man 3, soldier, person	2.56	5.15	3	4.63	12192
374.	**salt (36)**	salt shaker 9, pepper 2, shaker	3.64	5.80	2	3.58	8601
375.	**sandwich* (50)**		0.00	6.10	2	3.00	13607
376.	**saw* (49)**		0.69	6.15	3	4.00	11302
377.	**saxophone (38)**	horn 3, trumpet 2, sax 2, trombone, instrument	0.69	6.35	3	5.90	8795
378.	**scale (25)**	scales 6, weight 5, balance 4, weights 2, pendulum, measuring thing, justice	4.42	6.20	3	5.38	14308
379.	**scarf (49)**	tie	2.56	5.15	2	4.69	24187
380.	**scissors* (47)**		1.61	6.80	1	3.42	13042
381.	**scorpion (43)**	lobster 2, crab 2, insect	1.10	5.90	3	5.69	13037
382.	**screw (43)**	nail 6	2.40	6.10	3	4.65	8170
383.	**screwdriver* (48)**		1.39	6.50	3	4.65	9051
384.	**seahorse (36)**	sea dragon 2, unicorn, starfish, scorpion	0.00	6.45	3	5.12	9744
385.	**seal* (40)**	walrus 6, sea lion 2, otter	2.71	5.55	3	3.96	12172
386.	**seesaw (36)**	teeter-totter 11, swing	0.69	6.40	3	3.63	18444
387.	**sewing machine (49)**	sewing	0.00	6.25	3	4.94	29901
388.	**shark (46)**	whale, fish	3.04	6.25	3	4.21	14311
389.	**sheep* (28)**	lamb 11, cow 2, bull 2, animal	3.71	5.50	1	3.42	12385
390.	**shell (42)**	sea shell 3, clam 2, feather, fan, cape	3.85	4.30	3	3.44	18590
391.	**boat (26)**	ship 21, cruise ship 2	4.34	5.90	3	3.33	33033
392.	**shirt (37)**	jacket 8, coat 2, dress shirt, blouse	4.13	5.75	1	2.60	23660
393.	**shoe* (49)**		4.38	6.50	1	2.25	14105
394.	**shoulder (38)**	arm 12	4.86	5.00	2	3.52	6274
395.	**shovel (49)**		1.61	6.40	1	4.00	11955

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396.	**shower (42)**	shower head 7, shower faucet	3.09	5.85	2	3.62	20173
397.	**sink (46)**	sinks, faucet	2.77	6.10	1	3.13	26560
398.	**skateboard (50)**		0.69	5.85	3	5.29	14225
399.	**skeleton (50)**		2.56	6.50	3	4.58	10724
400.	**skirt* (36)**	dress 9, slip, apron	3.40	4.80	3	4.38	7277
401.	**skis (39)**	ski, skates	0.00	5.05	3	4.88	20764
402.	**skunk* (49)**	raccoon	0.00	6.05	3	4.19	16683
403.	**sled* (48)**	sleigh 2	0.69	5.75	2	3.75	16722
404.	**slide (48)**		2.56	6.55	1	3.00	20613
405.	**slingshot (37)**	sling 5, stick thing, sling blade, boom sling	0.69	6.00	3	5.13	25531
406.	**slipper (30)**	shoe 12, bootie 3, slippers 2, foot thing	2.30	4.45	2	3.85	11221
407.	**smoke (41)**	chimney 6, smoke stack, fire	3.89	5.45	3	3.77	10642
408.	**snail (48)**	slug	1.61	6.05	3	3.56	16426
409.	**snake* (48)**		3.18	6.30	3	3.31	23761
410.	**snowman* (49)**		0.00	6.55	2	3.17	9725
411.	**sock* (48)**		2.94	6.35	1	2.65	8316
412.	**couch* (37)**	sofa 12, bed	2.40	6.45	2	4.17	15863
413.	**soldier (33)**	army man 4, man 2, hunter 2, man with gun, man with a gun, G.I. Joe, fighter, army soldier, army guy, army	4.43	5.65	3	4.87	9301
414.	**spaghetti (47)**	pasta 2, noodles	1.79	6.10	1	3.40	32766
415.	**spatula (36)**	shovel 3, spade, skillet, flipper	0.00	5.65	3	5.52	7762
416.	**spider (49)**		2.08	6.25	3	3.21	37059
417.	**thread (32)**	spool 11, spool of thread 2, yarn, string spool, needle and thread, needle	2.83	5.00	3	6.13	13706
418.	**spoon* (49)**		2.77	6.20	1	2.52	7344
419.	**squirrel (44)**	chipmunk 5, raccoon	1.95	6.40	1	3.54	21975
420.	**stairs (37)**	staircase 9, stairway 3, stair	3.81	5.60	1	3.13	27602
421.	**statue (45)**	sculpture 2, Michelangelo, lady	3.18	5.20	3	4.96	7359
422.	**steering wheel (32)**	wheel 18	0.00	5.60	3	4.73	21824
423.	**stethoscope (43)**	telescope, sound, doctors	0.69	5.50	3	6.04	13841
424.	**stocking (21)**	pantyhose 10, hose 5, nylon 4, stockings 3, sock 2, nylons 2, scarf, hosery	2.56	4.60	3	5.21	16152
425.	**stool (40)**	chair 8	2.56	6.15	3	4.29	10988
426.	**stove (36)**	oven 13, burners	3.04	5.80	1	3.87	29248
427.	**strawberry (49)**		1.95	5.55	2	3.00	16771
428.	**stroller (37)**	carriage 4, baby stroller 2, baby carriage	0.69	6.00	1	3.67	22353
429.	**submarine (43)**	ship 3, boat 3	2.89	5.35	3	5.02	12481
430.	**suitcase* (38)**	briefcase 7, luggage 2, bag	3.00	5.75	3	4.44	13318
431.	**sun* (50)**		5.03	5.90	1	2.23	18102

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432.	**swan* (35)**	goose 8, duck 4	2.08	6.35	3	4.69	12465
433.	**sweater* (26)**	shirt 11, sweatshirt 8, jacket 2	2.77	5.05	1	3.50	11622
434.	**swing (36)**	swing set 13	2.94	6.55	1	3.44	21224
435.	**sword (46)**	knife 2, saber, blade	2.89	5.85	3	4.12	10243
436.	**needle (30)**	syringe 12, shot 4, hypodermic needle, hypodermic	2.83	5.80	3	6.96	10658
437.	**table* (49)**	desk	5.46	6.40	1	2.79	12010
438.	**tail (37)**	hair 4, mane 2, horse's tail 2, horse tail 2, pony tail	3.61	4.65	3	3.17	20747
439.	**tank (38)**	tractor, tanker, ship, army	3.69	6.25	3	4.67	11180
440.	**tape recorder (36)**	tape player 6, record player 2, cassette player 2, recorder, audio cassette	1.10	6.15	3	5.08	35631
441.	**teapot (22)**	teakettle 12, pot 5, kettle 4, pitcher 3, teacup 2, vase, cup	1.61	6.20	3	4.29	17625
442.	**tear (24)**	crying 11, cry 5, tears 2, tear drop 2, face 2, sadness, sad	4.09	5.20	3	3.46	8908
443.	**teepee (33)**	tent 12, Indian tent, canopy	0.00	5.75	3	4.58	15294
444.	**teeth (38)**	dentures 10	1.39	5.90	1	2.60	8898
445.	**telephone* (36)**	phone 14	4.66	6.40	1	3.27	19758
446.	**telescope (48)**	stethoscope	2.20	6.25	3	5.44	21547
447.	**tv (30)**	television 19	0.00	6.50	1	3.17	18950
448.	**tennis racket (28)**	racket 21, tennis	0.00	5.45	3	5.15	12242
449.	**tent (49)**		3.81	6.45	3	4.35	16963
450.	**thermos (40)**	pitcher 2, mug 2, coffee mug, coffee can	1.10	5.35	3	5.04	5251
451.	**thimble* (44)**	cup 2, thumb thing, needle, bucket	0.00	5.15	3	5.46	9987
452.	**thumb (48)**	thumb's up, thumb up	3.33	6.35	3	2.42	6695
453.	**tie (49)**	neck tie	3.56	6.10	3	3.87	19103
454.	**tiger (43)**	lion 2, cheetah, bobcat	2.56	6.65	1	3.40	45476
455.	**tire (45)**	wheel 5	2.48	6.20	3	3.88	14920
456.	**toaster* (48)**	toasters, toast	0.69	6.45	3	4.21	13290
457.	**toe (23)**	toes 14, big toe 3, thumb 2, foot, fingers	3.40	4.20	1	2.19	15263
458.	**toilet (50)**		3.37	6.35	3	2.71	22049
459.	**tomato* (49)**	apple	2.71	5.80	3	3.38	8388
460.	**grave (31)**	tomb 6, tombstone 3, gravestone 3, headstone 2, death 2, cemetery 2, graveyard	3.09	5.90	3	6.08	21614
461.	**toothbrush* (50)**		1.10	6.00	1	2.58	8597
462.	**top* (36)**	spinning top 2, spinning thing, spinner, spin top, spin	5.15	4.85	3	3.21	10581
463.	**towel (39)**	blanket 9, cloth	3.14	5.25	1	3.17	24097
464.	**railroad tracks (14)**	tracks 11, train tracks 8, railroad 5, track 4, train track 3, railroad track 2, rails, railroad tie, crossroads	0.00	6.10	3	4.79	40664

No.	Pictures	Alternative namings (N of occurrences)	Ln Freq	Pict goodness	Obj AOA	subj AOA	Obj VisC
465.	**tractor (40)**	car 4, truck, trailor	2.48	5.00	2	4.19	9518
466.	**stoplight (31)**	light 8, traffic light 6, lights 2, traffic signal, stop sign, signal	0.00	6.05	3	4.65	17265
467.	**train* (48)**		4.41	6.25	1	3.33	18361
468.	**trash can (34)**	garbage can 10, trash 3, pail, garbage	0.00	6.20	3	3.67	13895
469.	**tree* (49)**		5.26	6.40	1	2.23	26074
470.	**tripod (31)**	telescope 2, stand 2, camera stand 2, pod, camera	0.69	5.70	3	6.98	13049
471.	**trophy (22)**	cup 16, vase, trophy cup, goblet, glass, chalice, award	1.61	4.10	3	4.94	19720
472.	**truck* (48)**	gas truck, bus	3.61	5.95	1	3.00	10639
473.	**trumpet* (34)**	horn 13, trombone, clarinet	2.20	6.15	3	5.23	13615
474.	**chest (29)**	trunk 12, box 4, safe	3.89	5.75	3	4.60	20690
475.	**turkey (46)**	rooster, peacock	1.79	6.50	1	3.29	15338
476.	**turtle (50)**		1.61	6.55	1	3.25	14768
477.	**tweezers (41)**	scissors, pliers, pinchers, compass	1.10	5.80	3	5.50	7308
478.	**typewriter (50)**		2.48	6.20	3	5.27	28850
479.	**umbrella* (50)**		2.71	6.50	3	3.87	15140
480.	**unicorn (50)**		0.69	6.40	3	4.33	12749
481.	**unicycle (39)**	tricycle 6, wheel 2, bike	0.00	6.05	3	5.73	20238
482.	**vacuum (41)**	vacuum cleaner 9	2.77	6.20	1	4.19	34257
483.	**vase (45)**	jar 2, pot	2.08	5.45	3	4.69	20221
484.	**vest (48)**	jacket, blazer	2.08	5.95	3	5.02	10103
485.	**violin (41)**	guitar 7, cello, bass guitar	1.95	6.20	3	5.19	8571
486.	**volcano (50)**		1.95	5.60	3	4.94	54995
487.	**waffle (17)**	manhole cover 4, waffles 3, manhole 2, tape, sewer, pie, pancake, nickel, grate, fan, crackers, cracker, cover, butter	0.69	4.30	3	3.92	11129
488.	**wagon* (31)**	wheelbarrow 6, cart 2, wheel cart, wheel	2.48	6.30	3	3.19	20209
489.	**waiter (41)**	food 2, chef 2, server, pizza man, pizza	3.14	5.85	3	5.27	27418
490.	**bricks (19)**	wall 18, brick 7, brick wall 5, chimney	0.00	4.90	3	3.02	11402
491.	**wallet (34)**	door 2, stove, folder, drawer, corner, checkbook, cabinet, briefcase, billfold	2.20	4.60	3	4.50	10594
492.	**walnut (29)**	nut 16, shell, clam	1.79	5.20	3	4.85	30661
493.	**walrus (40)**	seal 4, sea lion 2, sea otter, elephant seal	0.69	6.15	3	4.73	11083
494.	**closet (43)**	dresser 4, wardrobe, bureau, armoire	2.48	5.45	3	6.60	30610
495.	**washing machine (36)**	washer 10, washing, dryer, dishwasher	0.69	6.25	2	4.56	29160
496.	**watch* (50)**		3.71	6.30	1	3.79	14511
497.	**watering can (11)**	watering pail 3, water pot 2, water can 2, pot 2, pail 2, flower pot 2, watering thing, watering something, watering pitcher, watering, water pitcher, water bucket, water, pitcher, canister, can, bucket	0.00	6.05	3	5.21	12701

No.	Pictures	Alternative namings (N of occurrences)	Ln Freq	Pict goodness	Obj AOA	subj AOA	Obj VisC
498.	**watermelon* (49)**	melon	0.00	4.55	3	3.42	9982
499.	**spiderweb (34)**	web 16	0.00	6.55	3	3.87	14705
500.	**well (46)**	wishing well, water	1.79	6.40	3	4.50	12965
501.	**whale (47)**	shark, dolphin	2.48	5.40	3	3.63	15429
502.	**wheat (21)**	weeds 6, corn 4, grain, foxtail, flowers, cactus, bushes	3.40	5.10	3	5.44	28962
503.	**wheel* (50)**		3.81	6.00	3	3.15	22753
504.	**wheelbarrow (43)**	barrow 3, cart 2, wheel cart, barrel	0.69	6.25	3	4.77	20045
505.	**wheelchair (49)**		1.39	6.65	3	5.00	33755
506.	**whip (39)**	fishing pole 4, fishing line 2	2.71	4.95	3	5.02	10916
507.	**whistle* (49)**		2.30	6.70	3	3.92	10521
508.	**wig (47)**	hair 3	2.64	5.85	3	5.38	22371
509.	**windmill (42)**	mill, lighthouse, fan	2.30	6.65	3	5.19	12430
510.	**window (50)**		5.30	6.00	1	3.06	26944
511.	**glass (33)**	wine glass 13, cup 2, champagne glass	4.98	5.75	3	6.02	7194
512.	**wing (45)**	feathers, bird, arm	4.08	5.95	3	3.90	27747
513.	**witch (50)**		3.50	6.25	3	3.38	27723
514.	**wolf (28)**	dog 13, coyote 8, howling	2.40	5.60	2	4.08	15672
515.	**woman (34)**	lady 9, mother 3, mom, grandma, girl	6.75	5.80	3	2.83	14462
516.	**worm (47)**	worms, snake	2.89	5.70	3	3.25	20764
517.	**wrench (42)**	screwdriver, monkey wrench	1.39	6.25	3	5.54	7594
518.	**yoyo (47)**	thread, needle	0.00	5.55	3	4.12	8066
519.	**zebra (49)**		1.10	6.70	2	3.67	36034
520.	**zipper (48)**		1.10	5.50	1	3.46	5830

Table 1: Sources of Object-Naming Stimuli

Study	Source	N°
PN-Object	**Snodgrass & Vanderwart, 1980[1]**	**174**
	Alterations of Snodgrass & Vanderwart[1]	**2**
	Peabody Picture Vocabulary Test, 1981[2]	**70**
	Martinez V.A. - Dronkers, N. F.[3]	**39**
	Abbate & La Chapelle "Pictures Please", 1984[4,5]	**168**
	Max Planck Institute for Psycholinguistics[6]	**20**
	Boston Naming Test, 1983[7]	**5**
	Oxford "One Thousand Pictures"[8]	**25**
	Miscellaneous	**17**
PN-Action	**Action Naming test, 1986[9]**	**27**
	Peabody Picture Vocabulary Test, 1981[1]	**57**
	Abbate & La Chapelle "Pictures Please", 1984[3,4]	**92**
	Oxford "One Thousand Pictures"[7]	**89**
	Miscellaneous	**10**

[1] Snodgrass, J.G., & Vanderwart, M. (1980). A standardized set of 260 pictures: Norms for name agreement, familiarity and visual complexity. Journal of Experimental Psychology: Human Learning and Memory, 6, 174-215.

[2] Dunn, Lloyd M., & Dunn, Leota M. (1981). Peabody Picture Vocabulary Test -Revised. Circle Pines, MN: American Guidance Service.

[3] Picture set created and used by Martinez, V. A. and Dronkers, N. F.

[4] Abbate, M.S., & La Chapelle, N.B. (1984a). Pictures, please! An articulation supplement. Communication Skill Builders, Inc.

[5] Abbate, M.S., & La Chapelle, N.B. (1984b). Pictures, please! A language supplement. Communication Skill Builders, Inc.

[6] Max Planck Institute for Psycholinguistics, Postbus 310, NL- 6500 AH Nijmegen, The Netherlands

[7] Kaplan, E., Goodglass, H., & Weintraub, S. (1983). Boston Naming Test. Philadelphia: Lee & Febiger.

[8] Carver, C. (1965) Oxford Junior Workbooks. Oxford University Press, UK.

[9] Loraine, K. Obler & Martin Albert (1986) Action Naming Test.

Table 2: Characteristics of the Dominant Action and Object Names Produced in the Picture Naming Tasks

	OBJECT NAMING				ACTION NAMING				*T*-test
Dominant responses	**N**	**Mean**	**STD**	**RANGE**	**N**	**Mean**	**STD**	**RANGE**	***P* <**
Length in syllables	520	1.74	0.83	1 – 5	275	1.22	0.49	1 – 3	0.01
Length in characters	520	5.89	2.22	2 – 15	275	4.63	1.23	3 – 10	0.01
Initial frication	520	27.3%		0 – 1	275	27.6%		0 – 1	n.s.
Ln Frequency (CELEX)	520	2.50	1.569	0 – 7.40	275	3.52	1.523	0 – 7.76	0.01
Objective AOA (CDI)	520	2.34	0.879	1 – 3	275	2.53	0.770	1 – 3	0.01
Obj. Vis. Complexity (KB)	520	16.7	8926	3.7 – 62.2	275	23.7	7.8	3.9 – 53.1	0.01
Items with shared name	520	4.6%		0 – 1	275	23.3%		0 – 1	0.01
Complex words	520	16.3%		0 – 1	275	1.1%		0 – 1	0.01

Table 3: Pictures With Shared Dominant Names in Object and Action Naming
(The picture numbers of pictures sharing the same name are listed in brackets)

Action naming			**Object naming**
3 or 4 pictures	*2 pictures sharing the same dominant response*		
cut (5,40,61,206,208)	arrest (94,105)	ride (115,178)	bird (45,317)
cook (46,96,102)	bite (16,152)	run (89,182)	boat (48,391)
drip (62,66,86)	break (23,68)	shake (101,193)	bottle (18,53)
look (76,133,235)	carve (32,189)	shave (196,197)	brush (64,191)
sew (192,220,262)	cough (47,221)	sort (42,217)	chest (92,474)
wash (194,258,268)	count (48,174)	walk (8,257)	fence (152,175)
	cry (52,95)	whisper (100,264)	glass (180,511)
	fly (9,9)	win (11,266)	gun (189,354)
	laugh (125,241)	write (64,272)	hat (80,199)
	plant (157,218)	yell (29,274)	needle (280,436)
	play (44,158)		priest (265,338)
	relax (127,175)		stroller (19,428)

Table 4: Descriptive Statistics of Dependent Variables

	OBJECT NAMING				ACTION NAMING				*T*-test
	N	Mean	STD	RANGE	N	Mean	STD	RANGE	*P* <
% Valid response	520	96.1%		60-100%	275	93.5%		36 - 100%	0.01
% No response	520	2.3%		0-34%	275	3.9%		0 - 58%	0.01
% Invalid response	520	1.5%		0-16%	275	2.6%		0 - 36%	0.01
Number of Types	520	3.35	2.28	1-18	275	5.48	3.31	1 - 17	0.01
H statistics	520	0.67	0.61	0-2.9	275	1.2	0.77	0 - 2.88	0.01
% Lex 1dom	520	85.0%		28-100%	275	71.3%		21 - 100%	0.01
% Lex 2phon	520	3.7%		0-68%	275	0.9%		0 - 50%	0.01
% Lex 3syn	520	2.4%		0-49%	275	4.3%		0 - 54%	0.01
% Lex 4err	520	9.0%		0-63%	275	23.5%		0 - 80%	0.01
RT total MEAN	520	1041	230	656-1843	275	1329	288	792 - 2491	0.01
RT total STD	520	330	137	87-739	275	404	124	132-667	0.01
RT target MEAN	520	1019	211	656-1823	275	1279	270	792 - 2276	0.01
RT target STD	520	307	127	87-739	275	362	126	122-762	0.01
RT Lex2$_{phon}$ MEAN	163	1238	398	573-3057	36	1583	556	640-2730	0.01
RT Lex3syn MEAN	93	1334	390	722-2704	82	1554	375	721 - 3222	0.01
RT Lex4err MEAN	330	1339	395	584-2789	242	1561	336	673 - 2845	0.01

Table 5a: Descriptive Statistics of INDEPENDENT variables in the SHARED and NONSHARED Picture Names in Object and Action Naming

	Object: non-shared			Object: shared			*T*-test	Action: non-shared			Action: shared			*T*-test
	N	Mean	STD	N	Mean	STD	P<	N	Mean	STD	N	Mean	STD	P<
Length in syllables	496	1.77	0.83	24	1.25	0.44	0.01	211	1.25	0.52	64	1.09	0.29	0.05
Length in characters	496	5.94	2.25	24	5	1.38	0.05	211	4.75	1.28	64	4.22	0.97	0.01
Initial frication	496	27%		24	33%		n.s.	211	32.7%		64	10.9%		0.01
Ln Frequency (CELEX)	496	2.45	1.56	24	3.48	1.41	0.01	211	3.26	1.5	64	4.35	1.3	0.01
Objective AOA (CDI)	496	2.35	0.88	24	2.29	0.96	n.s.	211	2.62	0.7	64	2.19	0.91	0.01
Obj. Vis. Complexity	496	16859	8998	24	14184	6940	n.s.	211	23510	8093	64	24022	6761	n.s.
Complex words	496	17.1%		24	0%			211	1.4%		64	0%		

Table 5b: Descriptive Statistics of DEPENDENT variables
in the SHARED and NONSHARED Picture Names in Object and Action Naming

	Object: non-shared			Object: shared			T-test	Action: non-shared			Action: shared			*T*-test
	N	Mean	STD	N	Mean	STD	P<	N	Mean	STD	N	Mean	STD	*P* <
% Valid response	496	96.1%		24	96.8%		n.s.	211	93.9%		64	91.9%		0.1
% No response	496	2.4%		24	1.6%		n.s.	211	3.3%		64	6.1%		0.01
% Invalid response	496	1.5%		24	1.7%		n.s.	211	2.8%		64	2%		0.1
Number of Types	496	3.32	2.3	24	4	1.75	n.s.	211	5.13	3.11	64	6.64	3.68	0.01
H statistics	496	0.66	0.61	24	0.97	0.53	0.05	211	1.1	0.73	64	1.53	0.83	0.01
% Lex 1dom	496	85.5%		24	75%		0.05	211	74.8%		64	59.7%		0.01
% Lex 2phon	496	3.7%		24	3%		n.s.	211	1.1%		64	0.3%		n.s.
% Lex 3syn	496	2%		24	10.8%		0.01	211	3.9%		64	5.7%		n.s.
% Lex 4err	496	8.9%		24	11.2%		n.s.	211	20.2%		64	34.3%		0.01
RT total MEAN	496	1041												

Figure 1. Distribution of PNA and PNO pictures according to name agreement

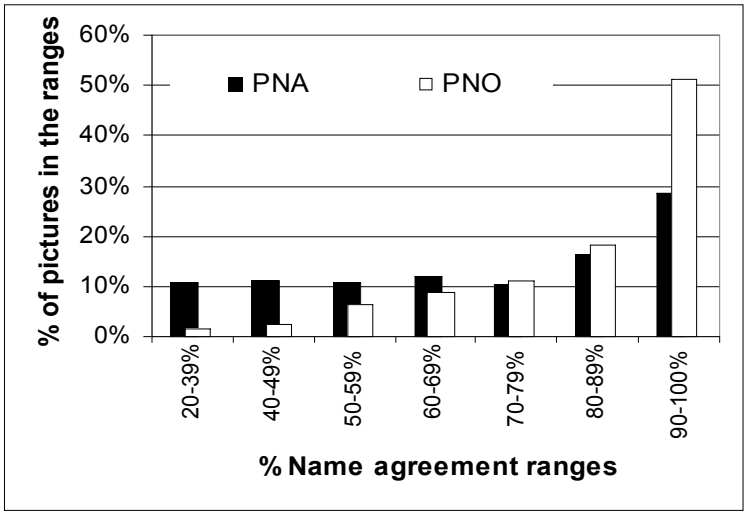

Figure 2. Histogram of object and action naming response times

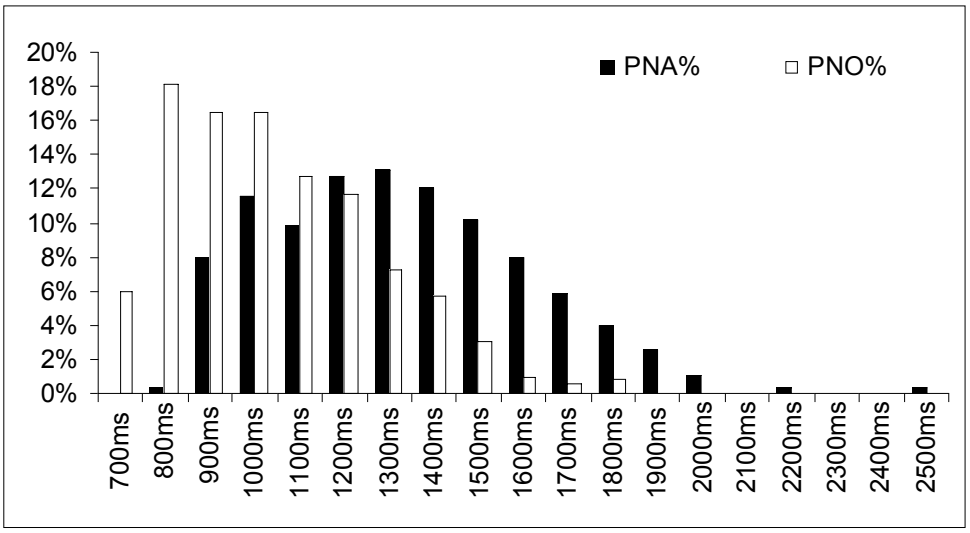

Figure 3. Mean RT of dominant responses of PNO and PNA pictures according to name agreement

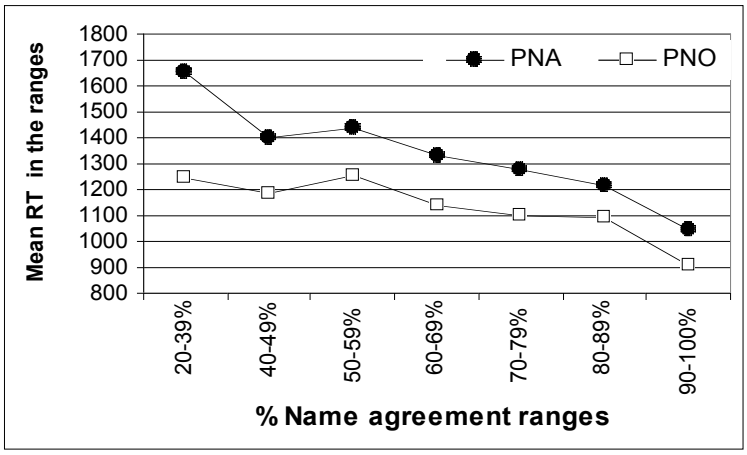

Figure 4a. Word frequency mean of different RT ranges

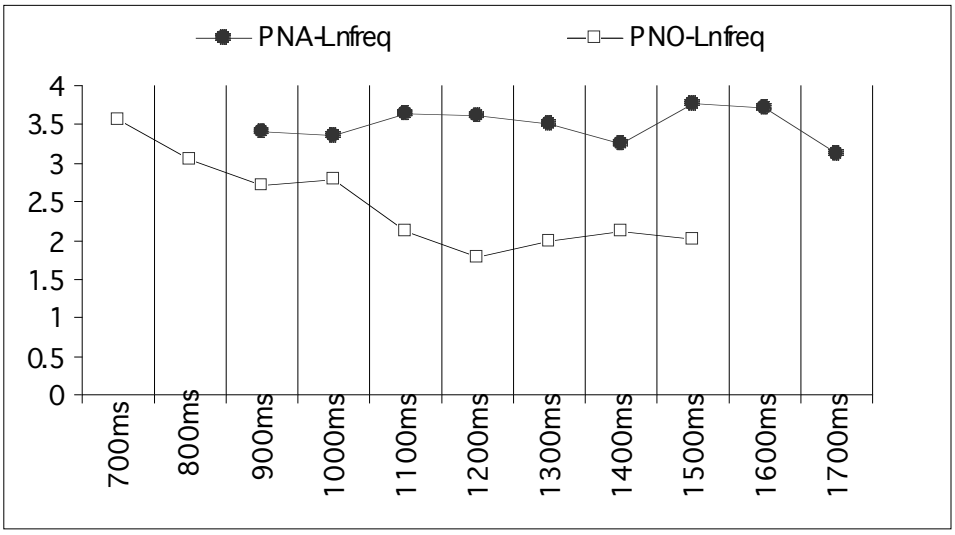

Figure 4b. Mean of objective AOA values of different RT ranges

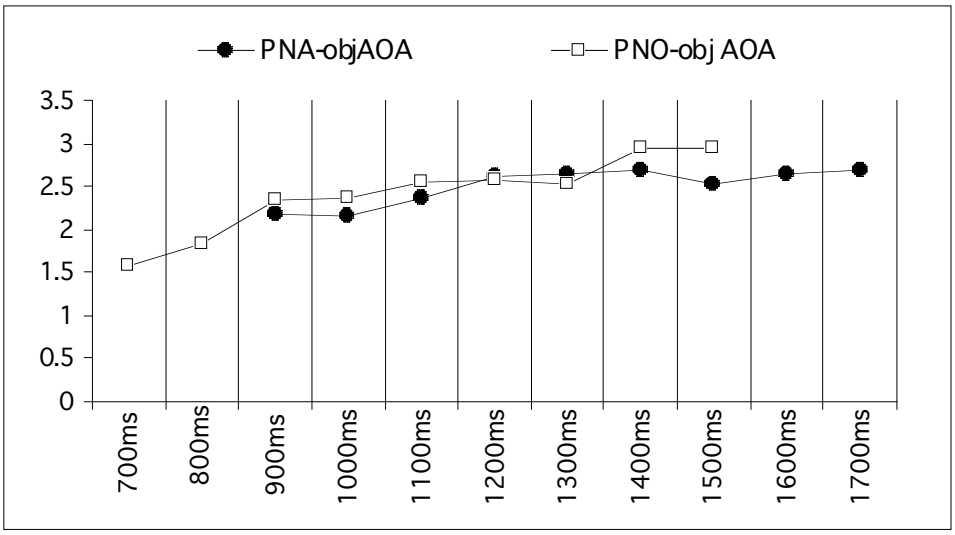

Figure 4c. Average picture complexity measures in the RT Ranges