**Supplementary material for *Avoiding dative overgeneralization errors: Semantics, statistics or both?* (Ambridge, Pine, Rowland & Freudenthal, 2012).**

**Section A: Procedure for calculating the pre-emption predictor**

In order to estimate the number of PO- and DO-dative uses of each verb in the corpora, we used a computer program (custom written by the final author) to classify strings of part-of-speech categories as NPs (e.g., NOUN; DET+NOUN; DET+ADJ+NOUN; ADJ+NOUN), and to extract all instances of each verb followed by two NPs. This yielded a total of approximately 330,000 candidate dative sentences from the BNC and 4,300 from the Post-Manchester corpus. As it was not possible to check each of these sentences by hand, we extracted from each corpus a sample of 25 candidate PO-datives and 25 candidate DO-datives for each verb (or the full set for verbs with <25 candidates). These samples were then hand-checked to derive, for each corpus, verb-by-verb accuracy figures for the automatic PO- and DO-dative counts. These accuracy figures were extrapolated to all candidate datives in the relevant corpus to estimate the total number of PO- and DO-dative uses of each verb.

Intuitively, these estimates appear to be reliable. For example, the verbs with the most DO-dative uses in the BNC are (in descending order) *give, tell, show, ask, offer, send, bring, cost, hand* and *pay*. For PO-dative uses, they are *give, bring, take, send, pay, say, offer, sell, leave* and *provide*. In order to obtain a more concrete evaluation of the reliability of our estimates, we calculated the correlation between our PO- and DO-dative counts and counts obtained automatically from the fully-parsed ICE-GB corpus. For PO-datives, the correlation with the ICE-GB counts was *r*=0.93 for the BNC (all texts) and *r*=0.79 for the Post-Manchester corpus. For DO-datives, the corresponding figures were *r*=0.96 and *r*=0.95 respectively. Thus, we can be confident that the counting procedure used was reliable. Since the correlation between the spoken subpart of the BNC and the entire corpus was also high for both predictors (*r*=0.73 for the entrenchment predictors, *r*=0.77 for the pre-emption predictor, *p*<0.001 in both cases) we decided to use the counts obtained from the full corpus for all BNC analyses. The resulting database, which probably constitutes the largest and most complete set of PO- and DO-dative counts obtained to date is available for download from the first author’s website at http://pcwww.liv.ac.uk/~ambridge/datives

**Section B: Semantic features rated by participants and (in bold) the broad-range rule/narrow-range class to which each relates**

**Broad range rule for PO-dative ("A causes B to go to C")**:

* A acts on B, causing it to go (either literally or metaphorically) to C
* The verb can denote a change of possession but does not necessarily do so
* The verb's meaning is defined by the identity of B more than the identity of C
* B literally moves
* The verb specifies both the event that causes the transfer (either literal or metaphorical) of B and the movement (either literal or metaphorical) of B
* The event that causes the transfer (either literal or metaphorical) of B and the movement (either literal or metaphorical) of B take place at the same time
* The verb highlights the manner of the transfer, more than its end result

**Broad range rule for DO-dative ("A causes C to have B"):**

* A has B and then causes it to enter into the possession of C
* The transfer (either literal or metaphorical) is successful and complete
* A no longer possesses B after he/she has transferred possession of B to C
* After the event, C is in possession of B
* C is capable of possessing (either literally or metaphorically) B
* A acts on C, causing him/her to possess (either literally or metaphorically) B
* When A performs the action, he/she must have C in mind
* C's reaction to the event is part of the meaning of the verb
* The verb's meaning is defined by the identity of C more than the identity of B
* C is usually animate
* The verb highlights the end result of the transfer, more than the manner in which it occurs

N**arrow-range semantic classes**

* **"Transfer is mediated by a separation in time and space, sometimes bridged by a particular means of transfer" (e.g., *send, ship, mail*)**

Transfer is mediated by a separation in time and space

The verb specifies the means of transfer

* **"Verbs of instantaneous imparting of force in some manner causing ballistic motion" (e.g., *throw, toss, flip*)**

A instantaneously imparts force in some manner onto B, causing ballistic motion

* **"Continuous imparting of force in some manner causing accompanied motion" (e.g., *carry, pull, push*)**

A continuously imparts force in some manner onto B, causing accompanied motion

* **"Verbs…[that] specify the direction of motion…and not its manner" (e.g., *bring, take*)**

The verb specifies the direction of motion more than its manner

* **"Verbs of future (not) having" (e.g., *offer, promise, bequeath refuse, deny*)**

A makes some commitment that C can/cannot have B in the future

* **"Verbs of fulfilling" (e.g., *present, credit, reward*) NB: Pinker defines this class in terms of the three properties below**

B is something that C deserves, needs, or is worthy of

The verb comes from - or is related to - a noun

C benefits from the action

* **"Verbs of illocutionary communication" (e.g., *tell, show, ask*)**

A successfully causes C to know (/perceive/apprehend/be aware of) B (an idea or stimulus)

* **"Manner of speaking verbs" (e.g., *shout, scream, murmur*)**

The verb specifies the manner of speaking (by A)

B is usually abstract rather than concrete

* **"The communicator's attitude with respect to the truth of that content may be specified by the verb" (e.g.*, assert, question, claim*)**

The verb specifies A's attitude with respect to the truth of B (an idea or statement)

* **"Verbs specifying an instrument of communication" (e.g., *radio, satellite, email*)**

The verb specifies an instrument or means of communication

A possible objection to this rating procedure is that the logic of the present study is circular: In the semantic (or phonological) feature-ratings task, participants may have used their knowledge of whether each verb appears in the PO-dative, DO-dative, both, or neither as the basis for their ratings. For example, participants might have reasoned as follows: I know that the PO-dative is associated with *manner of speaking* more than the DO-dative. Hence since *shriek* is more felicitous in the PO- than DO-dative, I should rate it highly on the item “The verb specifies the manner of speaking”. However, it seems unlikely that participants would be explicitly aware of the necessary semantic/phonological signatures of the PO- and DO-dative constructions, particularly given that there is an ongoing debate as to whether or not the two constructions actually differ in this way (e.g., Bresnan & Nikitina, 2007; Krifka, 2003; Felbaum, 2005).

**Section C: Model comparison procedure for main analysis (all verbs; *N*=301 for adults, *N*=44 for children)**

The first model (termed the *Broad-semantics* model) included only the broad-range semantic predictors, with all three explaining a significant proportion of unique variance (see Table 2a). Adding the narrow-range semantic predictors (for a model termed the *Narrow-semantics model*, see Table 2b) yielded significantly improved coverage of the data (see the first row labelled *Model Comparisons* at the foot of Table 2). Three of the four narrow-range semantic predictors explained a significant proportion of unique variance, with the other, *bequeathing*, only narrowly missing significance (*p*=0.054). The third model added the single predictor relating to the Latinate morphophonological constraint on the DO-dative (for a model termed the *Semantics + morphophonology* model). Because this predictor reflects the extent to which participants consider each verb to be Latinate, and because at least some Latinate verbs are less than fully grammatical in the DO-dative, a positive correlation with the outcome variable (preference for PO- over DO-dative uses) was predicted. This pattern was observed (see Table 2c), with this predictor leading to a significantly improved model (see Table 2, *Model Comparisons*). Furthermore, with this predictor in the model, all four narrow-range semantic predictors were now significant. Presumably, failure to control for Latinate status adversely affected the ability of the model to make use of the *Bequeathing* predictor, which narrowly missed significance in the previous model.

The next two models added the pre-emption predictor and the residualized entrenchment predictor respectively. The predictors were added in this order due to theoretical considerations. Considering, for example, a PO-only verb, the prediction of the pre-emption hypothesis is that hearing this verb *in the* *PO-dative construction* increases the inference that DO-dative uses are ungrammatical. The prediction of the entrenchment hypothesis is that hearing this verb used in *any* construction increases the inference that DO-dative uses are ungrammatical. Thus, by adding first the pre-emption predictor and subsequently the residualized entrenchment predictor, it is possible to investigate whether (a) dative uses or (b) dative+other uses contribute more to this inference, as predicted by the pre-emption and entrenchment hypotheses respectively. Note that using this residualized entrenchment predictor avoids the problematic direct comparison between a pre-emption count and the entrenchment count of which it is a subset (as in Stefanowitsch, 2008). Rather than directly pitting entrenchment and pre-emption against one another - which, given this problem, cannot be done in a meaningful way - we investigate whether entrenchment explains additional variance above and beyond pre-emption.

These models are shown in Tables 2d and 2e. The model comparisons reveal that the pre-emption measure is a significant predictor, but the entrenchment measure explains no additional variance. In order to clarify the roles of pre-emption and entrenchment, we additionally ran these analyses with entrenchment entered first (along with all other semantic/morphophonological predictors), followed by a residualized pre-emption predictor (for reasons of space, the details of this model are not shown). This revealed that adding pre-emption to a model containing entrenchment yielded a significant improvement (χ*2*

=10.34, *p*=0.001), with both predictors significant in the final model. Thus, the entrenchment and pre-emption predictors are explaining largely the same variance, with each a significant predictor if it is entered into the regression model before the other. However, of the two, only one predictor - pre-emption - explains additional variance that the other cannot. Given this pattern, for the main analysis, we report the models where the raw pre-emption predictor is entered before the residualized entrenchment predictor (though in terms of overall model coverage this final model is statistically equivalent to one including the raw entrenchment predictor and the residualized pre-emption predictor).

Interestingly, with the pre-emption (and/or entrenchment) predictor in the model, the morphophonological predictor was no longer significant. This suggests that whilst the restriction against Latinate verbs appearing in the DO-dative construction is real, participants may learn the prohibition on a verb-by-verb basis. That is, whilst, for example *donate* is deemed somewhat ungrammatical in the DO-dative, it is not deemed any more ungrammatical than a non-Latinate verb that has been attested in the PO-dative construction with a similar frequency to *donate*. This is not to say that one would not observe an effect of morphophonology if participants were tested on novel pseudo-Latinate verbs. Indeed, two studies of this type have found such an effect (Gropen et al., 1989; Ambridge et al., 2012).

In contrast, the semantic predictors account for a significant proportion of variance even with the pre-emption (and/or entrenchment) predictor in the model. That is, if we consider two verbs that appear only in the PO-dative construction, and with approximately equal frequency, the perceived ungrammaticality of DO-dative uses differs depending on the verbs' narrow-range semantic properties. To confirm this pattern, and verify that the semantic predictors are indeed capturing variance in participants' judgments that the pre-emption predictor is not, we investigated the effects of removing the semantic predictors (see Table 2f, *Pre-emption-only* model). This had a large and significant detrimental effect on the predictive ability of the model (see Table 2, *Model Comparisons, d vs f*). Indeed, even with the advantage of having considerably fewer predictors, the pre-emption-only model has a higher AIC score (indicating worse model fit) than the model that additionally contains the semantic and morphophonological predictors.

Finally, returning to the optimal model (see Table 2d) we investigated whether adding (a) by-participant random slopes for each effect and (b) interaction terms improved model fit. Barr et al. (submitted) demonstrate that mixed models that do not include random slopes are often anticonservative. As also discussed by these authors, a problem that arises when including many different random effects is that the estimation procedure frequently fails to converge (or requires a prohibitive amount of processing time to do so). We therefore successively compared a model containing only random intercepts (for participant and item) with models that additionally contained by-participant random slopes for (a) the three broad-range predictors, (b) the five narrow range semantic/morphophonological predictors and (c) the pre-emption predictor. Compared with the random-intercepts only model (using the AIC criterion and Log Likelihood test), these models were (a) no different (χ*2*[9]=12.2, *p*=0.20), (b) significantly worse (χ*2*[15]=25.88, *p*=0.04) and (c) significantly better (χ*2*[3]=23.56, *p*<0.001). This latter finding indicates significant between-participant variation with respect to the effect of pre-emption (as we shall see later, this is most likely age-related). Unfortunately, estimation of *p* values from models with random slopes is not straightforward (Barr et al., submitted). However, since the *t* values for each effect in the model with and without random slopes for pre-emption are almost identical, we can be confident that the *t* (and *p*) values presented in Table 2 are robust to the inclusion of these random slopes. The only *t* value with a change > ± 0.02 was that for pre-emption itself, which decreased from 8.22 to 7.72 in the random-slopes model (still significant if *p* is estimated using the *t* distribution).

Finally, we explored the effect of adding interaction terms to the model (returning to the simpler version of the model with no random slopes, in order to allow for *p* values to be estimated using the MCMC procedure). Given the existence of nine predictor variables, including all possible interaction terms would be both prohibitively complex, and theoretically unmotivated. We therefore selected a number of two-way interaction terms for inclusion, based on theoretical considerations. To investigate whether pre-emption plays a more important role for some verb types than others, we included the interactions of pre-emption by (a) the three broad-range predictors and (b) the five narrow-range/morphophonological predictors (8 two-way interaction terms). To investigate whether narrow-range classes are more important for some broad-range verb types than others, we included the interactions of each of the five semantic/morphophonological predictors by each of the three broad-range rule predictors (a further 15 two-way interaction terms for a total of 23).

Perhaps unsurprisingly, given that the AIC metric strictly penalizes models with a large number of predictors, the interaction model did not yield improved fit on this measure (AIC=29687 vs 29685). However, the interaction did yield improved coverage by Log Likelihood test (-14808 vs -14830, χ*2*[23]=44.22, *p*=0.005), which is less conservative when correcting for the number of predictors. Thus, including the interactions improves coverage, but at the expense of parsimony (i.e., it over-fits the data). For reasons of space, this model is not presented in detail. The only significant main effects were for pre-emption (*M*=0.20, *SE*=0.03, *t*=5.69, *p*<0.001) and the narrow-range class of motion (*M*=0.09, *SE*=0.04, *t*=2.24, *p*=0.03), both in the predicted (positive) direction, indicating a preference for PO- over DO-datives. The broad range rule for the PO-dative was involved in significant negative interactions with the narrow-range predictors of speech (*B*= -0.11, *SE*=0.04, *t*=-2.40, *p*=0.008) and motion (*B*=-0.12, *SE*=0.04, *t*=2.99, *p*=0.002). Thus, the magnitude of preference for PO over DO uses that a verb displays by virtue of its consistency with the broad-range rule for the PO-dative is reduced by consistency with the speech and motion classes (e.g., errors such as \**Bart whispered Lisa the secret* and *\*Lisa pulled Marge the parcel* are less unacceptable than would be predicted on the basis of the broad-range rule alone).

**Section D: Model comparison procedure for analysis of core verb set (*N*=44) with age interactions.**

Collapsing across all ages, the optimal model (see Table 2d), yielded significant effects of two narrow-range semantic predictors (*Mailing* and *Bequeathing*) and of pre-emption/entrenchment. For this core set, whichever of these predictors is entered first explains a significant proportion of variance, with the other adding no improvement (χ*2*=2.18, *p*=0.14, when adding the residualized pre-emption predictor to an entrenchment-only model). Thus, here we report the version including pre-emption, purely for consistency with the previous (extended set) analysis. Adding random by-participant slopes for the significant effects yielded no significant improvement to the model's coverage (all χ*2*<2.0, *p*=n.s.). Adding the same interactions as for the extended set yielded a significant improvement to model fit by both the AIC (7590 vs 7607) and Log Likelihood measures (-3759 vs -3790, χ*2*[23]=62.42, *p*<0.0001). Although eleven significant interactions were observed, we reserve discussion of these interactions for the subsequent by-age analyses (see main text).

Adding age and its interactions to the simple core-set model shown in Table 2d (right hand column) yielded significantly improved coverage of the data, even by the AIC measure, which more strictly penalizes the model for having a high number of predictors (see the final row of Table 2). For reasons of space, this model (which includes 29 predictors) is not shown in detail. However, significant interactions with age were observed for two of the three broad-range predictors (DO-1 and DO-2), three of the four narrow-range predictors (*Speech, Mailing* and *Bequeathing*) and pre-emption.

**Section E: Further details of by-age analysis (core set, *N*=44 verbs)**

**Adults.**

Adding by-participant random slopes did not significantly affect the model's coverage (all χ*2*<3.3, *p*=n.s.), though adding interactions (as for the main analysis) yielded an improved fit by both the AIC (3483 vs 3489) and Log Likelihood meaures (-1705 vs 1733, χ*2*[24]=54.52, *p*<0.001). This model is shown in Table A4 (left hand column). The pre-emption predictor was associated with a significant effect in the predicted (positive) direction, indicating a preference for PO- over DO- verb uses. However, it was also involved in a significant negative interaction with the broad-range rule for the PO-dative. This indicates that the (non-significant) preference for PO- over DO-dative uses of verbs semantically consistent with the PO-only class (*M*=0.25, *SE*=0.19, *p*=0.19, n.s.) flips into a DO-preference (*M*= -0.54, *SE*=0.14 *p*<0.001) with the presence of pre-empting alternatives (i.e., DO-uses). Similarly, verbs consistent with the (PO-/alternating) narrow-range class of mailing showed an increased DO-preference as factor of pre-empting alternatives (*M*=-0.68, *SE*=0.19, *p*<0.001). Verbs semantically consistent with the first broad-range rule for DO-datives showed a decreased DO-preference (i.e., a positive PO-preference, as reflected by the positive direction of the interaction) as a function of pre-empting (PO-dative) alternatives (*M*=0.74, *SE*=0.16, *p*<0.001). A surprising finding, however, was that for verbs consistent with the second broad-range rule for the DO-dative, the opposite pattern was observed: The availability of pre-empting (PO) alternatives *decreased* the preference for PO- over DO-dative uses (as reflected by the negative interaction: *M*=-0.54, *SE*=0.17, *p*=0.002). It is not easy to understand why this should be the case, although it is important to note that this broad-range DO predictor captures much less of the variance in participants' semantic judgments than the other (Eigenvalue=1.65 vs 4.68), which did interact with the pre-emption predictor in the expected direction.

Four further interactions involved the broad-range rules. The first broad-range predictor for the DO-dative was involved in a significant positive interaction with the narrow-range predictor speech (*B*= 0.16, *SE*=0.07, *t*=2.33, *p*=0.02). Thus, the magnitude of preference for DO over PO uses that a verb displays by virtue of its consistency with the broad-range rule for the DO-dative is reduced if it is also consistent with the speech class (PO-only/alternating). Similarly, the second broad-range predictor for the DO-dative was involved in significant positive interactions with the narrow-range predictors bequeathing (*B*= 0.21, *SE*=0.08, *t*=2.57, *p*=0.001) and motion (*B*= 0.24, *SE*=0.10, *t*=2.39, *p*=0.02). Thus, the magnitude of preference for DO over PO uses that a verb displays by virtue of its consistency with the broad-range rule for the DO-dative is reduced if it is also consistent with these PO-only/alternating classes. Surprisingly, the narrow-range predictor mailing - notionally a PO-only/alternating class, seemed to have the effect of pushing verbs consistent with the second broad range rule for the DO-dative even further in the direction of DO > PO preference (*M*=-0.33, *SE*=0.12, *t*=-2.61, *p*=0.01). This is consistent with the finding of the main (extended set) analysis that this predictor seems to be associated with DO-preference. One possibility is that although the majority of semantic predictors that were combined using PCA to yield this factor were associated with PO-only/alternating classes, the highest-loading predictor "Transfer is mediated by a separation in time and space" - whilst notionally alternating - is in fact associated with DO-preference. Intuitively, it seems more natural to say (for example) *Marge threw Homer the Ball* or *Marge Sent Homer the package* than *Marge threw the Ball to Homer* or *Marge sent the package to Homer*, and this is borne out by the adult ratings obtained in the present study (see Figure 2).

**Age 9-10.**

As for adults, adding by-participant random slopes did not significantly affect the model's coverage (all χ*2*<1.5, *p*=n.s.). Adding interactions (to the simpler model with no random slopes) significantly improved the model's coverage by both AIC (1888 vs 1899) and Log Likelihood tests (χ*2*[19]=48.94, p<0.001). These interactions are shown in Table A4 (left hand columns). Only two interactions were significant, both also significant for adults.

As for adults, the pre-emption predictor was associated with a significant effect in the predicted (positive) direction, indicating a preference for PO- over DO- verb uses, but was also involved in a significant negative interaction with the broad-range rule for the PO-dative. This indicates that the (non-significant) preference for PO- over DO-dative uses of verbs semantically consistent with the PO-only class (*M*=0.45, *SE*=0.25, *t*=1.81 *p*=0.07, n.s.) flips in the direction of a DO-preference (*M*= -0.47, *SE*=0.19, *t*=-2.44, *p*<0.001) with the presence of pre-empting alternatives (i.e., DO-uses). Finally, the first broad-range predictor for the DO-dative was involved in a significant positive interaction with the narrow-range predictor speech (*B*= 0.35, *SE*=0.00, *t*=3.84, *p*<0.01). Thus, again, as for adults, the magnitude of preference for DO- over PO- uses that a verb displays by virtue of its consistency with the broad-range rule for the DO-dative is reduced if it is also consistent with the speech class (PO-only/alternating).

**Age 5-6**

As for the two older groups, adding by-participant random slopes did not significantly affect the model's coverage (all χ*2*<1.5, *p*=n.s.). Unlike for the two older groups, adding interactions (to the simpler model with no random slopes) did not yield significantly improved fit by either AIC (2160 vs 2135) or Log Likelihood test (-1049 vs 1056, χ*2*[19]=13.21, p=0.82, n.s.). Thus, the younger children show effects of pre-emption (or entrenchment) and of the broad-range rules for the DO-dative, but neither interacts with other factors.

*Supplementary Table S1.* Interactions observed in the by-age analysis

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*Supplementary Table S2.* Residuals for model including only semantic and morphophonology predictors

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Extent to which adults' **preference** | |  | Extent to which adults' **preference** | |
| **for PO- over DO- dative uses** is | |  | **for DO- over PO- dative uses** is | |
| greater than that predicted by the | |  | greater than that predicted by the | |
| semantic+morphophonological | |  | semantic+morphophonological | |
| ratings. |  |  | ratings. |  |
|  |  |  |  |  |
| **VERB** | **Residual (SD)** |  | **VERB** | **Residual (SD)** |
| Claim | 0.147 |  | Ask | -0.254 |
| Reveal | 0.135 |  | Cost | -0.218 |
| Shift | 0.130 |  | Save | -0.201 |
| Chatter | 0.125 |  | Begrudge | -0.106 |
| Signal | 0.119 |  | Fine | -0.104 |
| Donate | 0.117 |  | Bequeath | -0.103 |
| Cast | 0.117 |  | Forgive | -0.100 |
| Contribute | 0.114 |  | Spare | -0.095 |
| Announce | 0.113 |  | Chuck | -0.091 |
| Rent | 0.112 |  | Overcharge | -0.088 |
| Refund | 0.112 |  | Deny | -0.088 |
| Transport | 0.110 |  | Fling | -0.084 |
| Blurt | 0.110 |  | Permit | -0.084 |
| Explain | 0.102 |  | Sing | -0.083 |
| Say | 0.098 |  | Remark | -0.082 |
| Deliver | 0.095 |  | Refuse | -0.081 |
| Confess | 0.093 |  | Catapult | -0.074 |
| Yelp | 0.087 |  | Shunt | -0.072 |
| Note | 0.087 |  | Bill | -0.072 |
| Port | 0.085 |  | Propel | -0.072 |
| Recommend | 0.084 |  | Guarantee | -0.071 |
| Admit | 0.081 |  | Carol | -0.071 |
| Squeal | 0.075 |  | Burble | -0.071 |
| Declare | 0.072 |  | Slip | -0.068 |
| Repeat | 0.071 |  | Render | -0.068 |
| Repay | 0.069 |  | Croak | -0.067 |
| Murmur | 0.068 |  | Mail | -0.066 |
| Tote | 0.066 |  | Undercharge | -0.065 |
| Tow | 0.065 |  | Wireless | -0.064 |
| UPS | 0.065 |  | Allocate | -0.064 |
| Howl | 0.065 |  | Envy | -0.062 |
| Jabber | 0.064 |  | Wager | -0.062 |
| Observe | 0.061 |  | Warble | -0.061 |
| Gabble | 0.059 |  | Tax | -0.060 |
| Reiterate | 0.059 |  | Teach | -0.060 |
| Tug | 0.058 |  | Vote | -0.060 |
| Loan | 0.058 |  | Tell | -0.055 |
| Modem | 0.057 |  | Advance | -0.053 |
| Twitter | 0.056 |  | Concede | -0.053 |
| Snuffle | 0.056 |  | Promise | -0.048 |
| Move | 0.055 |  | Lilt | -0.047 |
| Alley-oop | 0.054 |  | Hurl | -0.045 |
| Squawk | 0.050 |  | Bet | -0.044 |
| Roar | 0.050 |  | Drone | -0.043 |
| Report | 0.050 |  | Sneak | -0.043 |
| Heft | 0.049 |  | Purr | -0.043 |
| Satellite | 0.049 |  | Shriek | -0.043 |
| Blab | 0.049 |  | Stammer | -0.043 |
| Mutter | 0.048 |  | Reward | -0.043 |
| Pull | 0.048 |  | Serve | -0.042 |
| Float | 0.047 |  | Charge | -0.042 |
| Recount | 0.047 |  | Punt | -0.041 |
| Release | 0.045 |  | Assign | -0.040 |
| Yammer | 0.045 |  | Assert | -0.038 |
| Screech | 0.044 |  | Telegraph | -0.037 |
| Pose | 0.042 |  | Shoot | -0.037 |
| Lug | 0.042 |  | Bawl | -0.036 |
| Trust | 0.042 |  | Grant | -0.036 |
| Loft | 0.041 |  | Holler | -0.035 |
| State | 0.041 |  | Flick | -0.035 |
| Extend | 0.041 |  | Tisk | -0.034 |
| Courier | 0.040 |  | Throw | -0.034 |
| Furnish | 0.039 |  | Whimper | -0.033 |
| Schlep | 0.038 |  | Spin | -0.033 |
| Relate | 0.037 |  | Give | -0.032 |
| Cackle | 0.037 |  | Lend | -0.031 |
| Bash | 0.037 |  | Bark | -0.030 |
| Credit | 0.035 |  | Cede | -0.029 |
| Netmail | 0.035 |  | Trill | -0.029 |
| Whoop | 0.035 |  | Stutter | -0.029 |
| Raise | 0.034 |  | Write | -0.028 |
| Describe | 0.034 |  | Whisper | -0.028 |
| Bleat | 0.032 |  | Allot | -0.027 |
| Yield | 0.032 |  | Peddle | -0.027 |
| Mention | 0.031 |  | Cluck | -0.026 |
| Crow | 0.031 |  | Articulate | -0.026 |
| Telecast | 0.031 |  | Preach | -0.025 |
| Moan | 0.030 |  | Bellow | -0.025 |
| Tap | 0.029 |  | Telephone | -0.025 |
| Whine | 0.029 |  | Forward | -0.025 |
| Supply | 0.027 |  | Email | -0.024 |
| Proclaim | 0.026 |  | Smuggle | -0.024 |
| Squeak | 0.025 |  | Mulct | -0.024 |
| Will | 0.024 |  | Leave | -0.023 |
| Fire | 0.024 |  | Lob | -0.023 |
| Radio | 0.024 |  | Slam | -0.023 |
| Bat | 0.023 |  | Trade | -0.023 |
| Drawl | 0.022 |  | Issue | -0.022 |
| Cry | 0.022 |  | Chirp | -0.022 |
| Push | 0.021 |  | Grunt | -0.022 |
| Yap | 0.020 |  | Wire | -0.021 |
| Growl | 0.019 |  | Gibber | -0.020 |
| Ship | 0.019 |  | Messenger | -0.020 |
| Hit | 0.018 |  | FedEx | -0.020 |
| Rasp | 0.018 |  | Show | -0.020 |
| Nudge | 0.018 |  | Pitch | -0.020 |
| Doubt | 0.017 |  | Shout | -0.018 |
| Kick | 0.017 |  | Tip | -0.018 |
| Squal | 0.016 |  | Wheeze | -0.018 |
| Suggest | 0.016 |  | Propose | -0.017 |
| Boom | 0.016 |  | Mumble | -0.017 |
| Sell | 0.016 |  | Phone | -0.016 |
| Award | 0.015 |  | Babble | -0.014 |
| Grumble | 0.015 |  | Whistle | -0.013 |
| Thunder | 0.015 |  | Slap | -0.012 |
| Hoot | 0.015 |  | Bestow | -0.012 |
| Airfreight | 0.014 |  | Lisp | -0.011 |
| Croon | 0.014 |  | Lob-pass | -0.010 |
| Carry | 0.014 |  | Read | -0.010 |
| Roll | 0.013 |  | Offer | -0.010 |
| Scream | 0.013 |  | Toss | -0.010 |
| Heave | 0.013 |  | Send | -0.009 |
| Snap | 0.013 |  | Hand | -0.008 |
| Bunt | 0.013 |  | Hiss | -0.008 |
| Telex | 0.013 |  | Groan | -0.008 |
| Splutter | 0.012 |  | Bray | -0.008 |
| Refer | 0.012 |  | Confide | -0.008 |
| Pay | 0.011 |  | Chant | -0.007 |
| Sling | 0.010 |  | Honour | -0.007 |
| Communicate | 0.010 |  | Drop | -0.007 |
| Lease | 0.008 |  | Bring | -0.007 |
| Sign | 0.007 |  | Semaphore | -0.007 |
| Cable | 0.007 |  | Question | -0.007 |
| Haul | 0.007 |  | Blast | -0.007 |
| Provide | 0.006 |  | Coo | -0.007 |
| Poke | 0.004 |  | Hoist | -0.005 |
| Entrust | 0.004 |  | Call | -0.005 |
| Lower | 0.004 |  | Allege | -0.005 |
| Smash | 0.004 |  | Wail | -0.004 |
| Post | 0.004 |  | Present | -0.004 |
| Bounce | 0.003 |  | Take | -0.003 |
| Yodel | 0.003 |  | Drag | -0.003 |
| Reserve | 0.003 |  | Shove | -0.003 |
| Cite | 0.002 |  | Owe | -0.002 |
| Trumpet | 0.002 |  | Relay | -0.002 |
| Rage | 0.002 |  | Convey | -0.002 |
| Feed | 0.001 |  | Flip | -0.002 |
| Yell | 0.001 |  | Quote | -0.001 |
| Slide | 0.001 |  | Pass | -0.001 |
| Snarl | 0.001 |  | Fax | -0.001 |
|  |  |  | Lift | 0.000 |