There's many a slip 'twixt the cup and the lip

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Abstract

The retiring academic may look back upon, *inter alia*, years of conference attendance. Speech error researchers are uniquely fortunate because they can collect data in any situation involving communication; accordingly, the retiring speech error researcher will have collected data at those conferences. We here address the issue of whether error data collected in situations involving conviviality (such as at conferences) is representative of error data in general. Our approach involved a comparison, across three levels of linguistic processing, between a specially constructed Conviviality Sample and the largest existing source of speech error data, the newly available Fromkin Speech Error Database. The results indicate that there are grounds for regarding the data in the Conviviality Sample as a better than average reflection of the true population of all errors committed. These findings encourage us to recommend further data collection in collaboration with like-minded colleagues.

1 Life just fings through your slippers

A long lifetime in academia translates to a long history of convivial occasions. As David Lodge so accurately portrayed in *Small World* (Lodge, 1984), the successful academic life is not passed exclusively in the laboratory, library, or university classroom. Academics travel, above all to attend conferences; at conferences they meet colleagues whom they have not seen since the last such occasion, and the pleasure of these reunions naturally warrants the raising of a celebratory glass. The retiring academic can therefore look back not only on armies of past students, compendia of experimental results, and stacks of published papers, but also on a rich array of memories of happy conviviality, sharing with old friends a select Sancerre in Stockholm, a parade of Pinots in Philadelphia, or a superlative Sebastiani in San Francisco.

Conferences count as work time - academic CVs list conference attendance - and so these agreeable happenstances can be reckoned a perk of the job. All academics enjoy this fortune. But some academics possess a further advantage: their research field is one that can be pursued outside the lab, for instance during a conference, just as well as it can in the normal work setting. Speech researchers are among these happy few. Speaking is a necessary component of conference communication. Thus whatever the communicative occasion, and most especially at conferences, speech researchers find themselves surrounded by a flow of speech — that is, by a flow of research data. Not only are speech researchers at conferences working by making professional contacts, presenting their newest results, and learning about developments in the field, but they may also be working in amassing the very material on which a future presentation will be based.

Most fortunate of all, even among speech researchers, are those who study slips of the tongue. Where there is speech, there are slips. But some occasions produce more slips than others. Factors known to induce an increase in error frequency include, for instance, anxiety and stress — the stress which might accompany an oral presentation at a major conference, for example. Thus a speech researcher with an interest in slips of the tongue might be even more likely to be presented with data at a conference than at home in the lab! Yet another factor exhibiting a very strong causal relationship with speech error frequency is alcohol. Consider, then, the uniquely blessed situation of the speech error researcher: the wines in Stockholm, Philadelphia, and San Francisco not only contribute to wonderful memories of conferences past, they generate wonderful data! Who would choose any other field?

2   Through a glass darkly?

The only cloud hanging over this idyllic prospect is the possibility that errors produced under conditions of conviviality might constitute a seriously biased set, quite unlike errors produced in less lively circumstances. 'Drunk', as *Webster's Unafraid Dictionary* (Levinson, 1967) reminds us, is the future tense of 'drink'. The wine might generate intoxication, in short, and the intoxication might generate speech errors that tell us much about the difficulty of articulating after drinking, but nothing about the speech error researcher's main focus of interest, i.e. the process of speech production in general. We consulted the literature on this question, in an attempt to determine the degree to which speech errors perpetrated by talkers who have consumed alcohol are representative of speech errors in general.

The principal difference between errors in alcohol-affected speech and errors in sober speech is to be found, as we forecast above, in their quantity: the former are far more numerous. Stemberger, Pisoni and Hathaway (1985) conducted an experiment to quantify this, using a laboratory method for error induction developed by Motley and Baars (1975). In this method, participants read aloud visually presented word pairs under time pressure. If several pairs sharing an aspect of phonological structure (e.g., *big dog*, *bad deal*, *both days*) are followed by a pair with a contrasting structure (e.g., *dim bar*), an error is quite likely to result (in this example, a phoneme exchange in word-initial position between the two words of the pair). Stemberger et al.'s subjects undertook this task twice, once when they were sober and once when they were intoxicated (with blood alcohol levels of 0.1 promille or higher); they made nearly twice as many errors in the latter condition.

The articulatory differences between intoxicated and sober speech have been extensively studied, despite the repeated finding that these differences show great individual variability (Klingholz, Penning & Liebhardt, 1988; Hollien & Martin, 1996). All researchers report that the most noticeable difference is a slower rate of speech in the intoxicated (Lester & Skousen, 1974; Johnson, Pisoni & Bernacki, 1990; Behne, Rivera & Pisoni, 1991; Hollien & Martin, 1996; Chin, Large & Pisoni, 1997). Fundamental frequency has been reported to rise with intoxication (Hollien & Martin, 1996), but also simply to become more variable (Behne & Rivera, 1990; Chin, Large & Pisoni, 1997). Differences in voice quality after drinking are also noticeable to trained observers (Künzel, Braun & Eysholdt, 1992); but again, individual differences are so great that it is not possible to predict the specific effects of alcohol on phonation. Place of articulation may be affected, with more posterior articulations being favored (Behne & Rivera, 1990), presumably because opening the mouth and articulating clearly demands more energy than an intoxicated talker can muster.

None of these observations, however, can provide definitive evidence on the issue of whether speech errors under intoxication are merely quantitatively, or also qualitatively different from

speech errors perpetrated by sober talkers. Some relevant evidence emerged from Stemberger et al.'s (1985) error induction study. Although all the subjects in this study made errors of the predicted, i.e. 'induced', kind, they also made other errors, and the greater part of the increase in error rate under intoxication occurred in this latter category. In particular, Stemberger et al. observed many cases of perseveration, with certain phoneme sequences persisting (erroneously) across a sequence of trials. Stemberger et al. related these findings to several aphasic syndromes resulting from brain damage, suggesting that intoxication may be viewed as induced cortical dysfunction. However, they did not report any types of error that do occur under intoxication but are not observed under other circumstances. This suggests that there are no qualitative differences between errors that occur in intoxicated versus sober speech.

There are, of course, some ways in which a percipient speech error researcher may distinguish informative from uninformative errors. It has often been lamented (see, e.g., Cutler, 1981, 1988) that many speech errors are ambiguous as to how they should be classified. Thus a speaker who utters the word *dignify* when the intended word was *signify* may be making a word substitution error, but might just as well be making a phoneme substitution error. In the case of intoxicated speech, ambiguity may arise between a phoneme substitution versus an inability to articulate a (correct) target; did the utterance *shlip* arise because of a substitution of the phoneme / / for /s/, or because the speaker simply could not achieve an [s]? Such ambiguity makes statistical study of error types difficult, and it leads further to theoretical complication. For instance, it has been argued (e.g., by Dell and Reich, 1981) that phonemic slips are more likely than would be expected by chance to lead to real words, and that this is evidence for interaction between levels of processing in speech production. This argument cannot be put to the test at all unless there is some way of ascertaining for a slip like *dignify* for *signify* whether it arose at the lexical or phonemic level of the production process. Shattuck-Hufnagel and Cutler (1999) pointed out that one potential way to distinguish between these two alternative source levels is to look at error correction patterns, which have long been known as a source of useful insights (Nooteboom, 1981). The prosodic characteristics of corrections of word-level and phoneme-level errors differ, in that speakers apply greater contrastive accent to corrections of the former type of error. In an analysis of a small corpus of errors which were ambiguous between these two levels, together with errors unambiguously arising from each level, Shattuck-Hufnagel and Cutler found that their ambiguous set strongly resembled the phoneme-level set and differed from the word-level set. This approach to distinguishing the source level of ambiguous errors has been continued more recently by Nooteboom (in press).

Of course, such analyses require that sound files of the errors in question be available. When this is the case, there are also analogous criteria by which researchers can distinguish phonemic from articulatory sources of errors made under intoxication. (An extended discussion of potential criteria for making this distinction is to be found in Chin and Pisoni, 1997: Chapter 4.) Lester and Skousen (1974) showed that word-final devoicing errors were common in English spoken by the intoxicated. However, one of the main correlates of voicing distinctions in word-final position in English is preceding vowel duration. As Lester and Skousen showed, the vowel duration of, for example, *tease* spoken as *teace* by an intoxicated talker more closely resembled that speaker's other finally-voiced syllables than the finally-voiceless syllables, suggesting that the devoicing did not indicate a phonemic substitution (/s/ for /z/) but rather arose from difficulty of articulation. In a similar manner, one could use detailed phonetic analysis to clear up multiply ambiguous cases, such as an English speaker's pronunciation of *sip* as [si:p], which allows the potential interpretations that

it is a word substitution (*seep* for *sip*), a phoneme substitution (/i/ for /I/), or a contextually prompted intrusion of the name of the drinking partner (*Sieb*).

3   Sips and slips

There's many a slip 'twixt the cup and the lip; but the cup is in fact not the serious researchers' instrument of choice when conducting research into alcohol-induced behaviour. A cup, be it finest bone china, delicate finger-crooking punchbowl variety, cheap party plastic, or a silver-plated and double-handled trophy (the capacity is attractive but the metal taints the taste), is in fact our least favourite vessel. We prefer a glass, bottle, flagon, magnum, Jeroboam, Rehoboam, Methusulem, Salmanazar, Balthazar, case, Nebuchadnezzar, firkin, barrel, or hogshead; or, best of all, a butt (108 imperial gallons) from which to obtain as many sips, and as many slips of the tongue, as we can. Nor, of course, is the lip the only organ involved in slips of the tongue. For that matter, neither is the tongue. Slips of the tongue are by no means simply lingual: they are made with many other places and organs of articulation. It is possible to have many a slip 'twixt the cup and the lip(s), upper teeth, the tongue tip, the tongue blade, the alveolar ridge, the tongue front, the post-alveolar region, the tongue dorsum, the hard palate, the tongue back, the velum, the uvula, the pharynx, and even as far down the vocal tract as the glottis. (It is, of course, hardly coincidental that Les Chevaliers du Vin and master sommeliers world-wide use most of the lingual landmarks above when classifying the initial burst of flavours and the after-taste in a wine-tasting.) Others might wish to add further exotica such as the tongue root, and the epiglottis; although all things being equal, slips involving the epiglottis would be quite hard to swallow.

Phonetic and phonological slips can further involve substitutions of airstream mechanisms and manners of articulation. It would be fascinating to find documented speech errors involving Sindhi implosives, Amharic ejectives, or Bantu clicks — e.g. the production of a velaric airstream bilabial click / / instead of an alveolar lateral click / /. To our knowledge, no such data is available — yet. But we can posit that were an ejective error made while sipping, the results could be quite messy.

The consumption of alcohol can lead to what Trojan and Kryspin-Exner (1968) aptly termed "general lingual dissolution". Instrumental analysis of dissolute speech has shown that lay terms for drunken speech, such as 'thick', 'drawn out', 'drawled', and 'slurred' correlate well with articulatory abnormalities, partial articulations, and maladjustments. 'Slurred' speech is slower, weakened (lenided), palatalized, and segmentally longer and imprecise. In the next section we examine phonetic misfits more closely, with particular regard for the phonetic features of the most common phonological errors.

4   The pH value of slips

Phonetic and phonological analyses (jointly known as the 'Ph' disciplines within linguistics) yield many examples of speech errors; the Ph domains also yield the most widely-studied speech errors. By far the most frequent Ph error unit is the single segment, which often corresponds to a phoneme; the error may also be attributed to a feature switch. Although recent research (Mowrer & Mackay, 1990; Nooteboom, 2004) has cast doubt on the integrity of phonemes as units in erroneous performance, many oft-reported patterns are established. Nooteboom (1967, 1973) and Shattuck (1975) reported early in the study of segmental errors that consonant slips are 33-66% more common than vowel slips. Errors involving consonant clusters are less frequent than those involving single consonants, largely because the syllable

structure of languages favours CVC rather than CC(C)VC(CCC). Clusters are nevertheless often split. VC errors occur more frequently than CV slips; feature errors (such as tranposing voicing in stops) are quite rare. Dispute has raged for 30 years about the syllable as an error unit. Syllables may be lost, or repeated, but only rarely are they reversed.

Phonetic similarity between the affected elements characterizes speech errors in all languages for which there is substantial data. The frequency hierarchy for errors is place of articulation (most errors), manner of articulation, voice (fewest). Among the manners of articulation, errors in stops are most frequent, followed by fricatives. The lower the frequency of occurrence of a unit, the more likely will it be error-prone. The liquids /l/ and /r/ interact in a particularly facile way (Nooteboom, 1967; we note that no study has yet investigated whether the liquids are disproportionately affected by liquid intake).

Like beer and wine, vowels and consonants rarely mix. If vowels are substituted for one another, then monophthongs replace monophthongs, and diphthongs replace diphthongs. Seldom do diphthongs disintegrate into their vocalic parts. The most productive region (the 'hautes côtes') for all Ph slips is the word- or syllable-initial position, where 70–80% of all errors can be found. Identical syllable position in exchanges is another powerful factor: Nooteboom (1967) and others have found this to hold for 80–100% of exchange cases.

So in trying to select an error with an optimal Ph value, the speech researcher should look for single consonants in initial position. These will yield the best, the oldest, and the most representative varietals, er, variants. As a sommelier would say, they are the most rewarding 'in the mouth'.

5   I'm not as thunk as people drink I am

Dr. William Spooner, 'founding slipper' of the speech error field, is said to have raised his glass and proclaimed the toast "Let us drink to the queer old Dean." This error has not gone into the literature marked "drunk" — who would dare assume that of the venerable Reverend Doctor? But some speech error collections do contain errors marked "drunk". And all speech error collections contain errors that occur in utterances having to do with eating, drinking, and general conviviality. Rudolf Meringer (Meringer & Mayer, 1895/1978), for example, reports a similar example involving the proposing of a toast: *Ich fordere Sie auf, auf das Wohl unseres Chefs aufzustossen!* ('I call on you to belch to the health of our boss'; the target verb was *anzustossen,* 'raise your glasses'). We have conducted a search in the collection of the first author and compiled a list of as many such errors as we could find. We included all errors that involved an eating or drinking topic, plus all errors marked to indicate that the speaker was drunk at the time (or at least on the way to becoming so). In this section we attempt to compare the characteristics of this list (which we will refer to henceforth as the Conviviality Sample) with characteristics of a much larger collection taken to be the standard for the field.

Our work in this section drew on the publicly available web version of the Fromkin Speech Error Database (and was thus the first study to make use of this version of the Fromkin corpus). The database contains over 7500 slips of various kinds collated from collections made by many of the leading speech error researchers, most notably Vicki Fromkin's collection of errors. It is possible to search in this database using a number of search criteria. For instance, one can search by speaker name; Table 1 lists the complete output which the database currently produces for a random three-name sample which we chose to input. (The sample consisted of two native English speakers and one non-native speaker, whose native language is Dutch. All errors found in this search were in English. We note that a study by

Poulisse [1999] found that non-native speakers' errors outnumbered native speakers' errors by 14.5 to 1; on the basis of this comparison, we may conclude that the speech of Table 1's non-native speaker is atypically low in errors).

Table 1. Sample output from the Fromkin Speech Error Database.

Speaker	Target	Error
Nooteboom	EVERYTHING you hear	EVERYHING you hear
Nooteboom	to CUT him SHORT	to SHUT him COURT
Nooteboom	I prefer to RESERVE	I prefer to PRESERVE
Nooteboom	what does that SIGNIFY	what does that DIGNIFY
Cutler	In the form of three CRIPPLED human beings	In the form of three KIPPLED human beings
Henton	and peter said, caroline, couldn't you find something yellow in your WARDROBE?	and peter said, caroline, couldn't you find something yellow in your AUDIENCE?

It is also possible to search on error type, and we used this latter function in comparing the contents of our Conviviality Sample with those of the database as a whole. We tallied the number of errors in English (plus a very few in German) in the database which were labelled as unambiguously phonological, morphological, lexical or supralexical (the latter category being an amalgam of several categories involving phenomena above the word level). Because the morphological category contained (both in the database and in our Conviviality Sample) relatively few members, we collapsed it together with the phonological category into a new category, sublexical, giving a three-way split corresponding to phenomena arising below, at, and above the level of the word.

The size of the sample which we extracted from the Fromkin Speech Error Database was 3601 errors, of which 3588 were in English and 13 in German (this does not mean that all the rest of the errors in the database are ambiguous; some are ambiguous, but some are not classified; further, quite a large number are in other languages such as French or Italian, and quite a number also fall into categories which we excluded here, such as Tip of the Tongue). The size of our Conviviality Sample was 98 errors (95 in English and three in German). Table 2 shows the proportions of errors in each sample falling into the three broad categories we used in our comparison.

It can readily be seen that while the proportion of lexical-level errors in the two samples is quite comparable, the samples differ in that the Conviviality Sample contains relatively fewer sublexical errors and relatively more supralexical errors than the sample we extracted from the database. What does this pattern imply regarding the representativeness of errors made under conditions of conviviality?

Table 2. Proportions of errors in the Fromkin Speech Error Database and in the Conviviality Sample categorized as sublexical, lexical, or supralexical.

	Sublexical	Lexical	Supralexical
Fromkin Speech Error Database	62.6	27.7	9.7
Conviviality Sample	55.1	29.6	15.3

First, it suggests that the pH value of convivial slips is *not* higher than desirable. Just as a wine's stability and colour are dependent on its pH value (ideally in the range 3.0–3.5), so is our analysis critically affected by the balance of sublexical (Ph) errors compared with the other types of errors. The overall Ph proportion in our sample is lower than in the database; as a result, we can rest assured that the errors will keep well, and that no 'acid tongue' will result from over-indulgence in liquid pleasures. It is also noteworthy that the ratio of sublexical to supralexical errors in the Conviviality Sample is roughly 3.6:1; a number that equates with a near-ideal pH value for wine! If the Ph value were too high, then greater oxidation, undesirable bacterial fermentation, and poor colour might occur. Whether these effects would be detectable in the convivial slips, or in the speakers themselves, we can only conjecture. We are however certain that convivial speech may disintegrate phonetically just as badly as a wine with too high a pH value.

Second, the pattern we have observed prompts a very interesting conclusion. Note that there is always an element of reporter bias in collections of slips of the tongue. Speech error researchers write down the errors that they hear, but not necessarily all the errors they hear — speech error researchers are only human, and they write down only the errors they notice. An attempt to compare the patterns of errors which are noticed by researchers with the patterns which actually occur, and thus to quantify the extent of the reporter bias, was made by Ferber (1993). She had collected a quite substantial corpus (roughly 1000 errors) by the usual means of jotting down everything that had come to her and her colleagues' attention over a period of approximately a year. She compared this corpus with another corpus of closely comparable size created from a painstaking transcription of recorded radio discussions. Her results, analysed according to the three broad categories which we have used here, showed that the distributions in her two samples differed. The proportion of lexical errors exhibited the least difference across the samples; but the proportion of sublexical errors was significantly lower, and the proportion of supralexical errors significantly higher in the 'true' corpus (based on the recorded material) than in the corpus collected by traditional methods.

This is exactly the asymmetry that our Conviviality Sample displays in comparison to the sample from the larger database. We therefore propose that errors collected under conditions of conviviality are actually *better* than average reflections of the true population of all errors committed. Speech error researchers may thus justifiably devote particular care and attention to the collection and evaluation of such corpora. In consequence, it is with undiluted pleasure that we recommend further empirical investigation of this kind, in the firm anticipation that the preliminary findings reported here will be corroborated. Future studies should include sampling from a larger population of bibulous utterances, and extending the international, cross-linguistic, and cordial sources of the database. Cheers!

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there was no longer support for the software format used to convert it. As described above, the database is now publicly available (www.mpi.nl/world/corpus/sedb), thanks to a grant from the Max Planck Society enabling its further conversion to XML format. The work was carried out by Hansje Braam under the supervision of Sieb Nooteboom.

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