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In School vs. at School: Corpora and Confidence

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Many Japanese teachers of English (JTEs), although possessing generally high levels of English, may lack intuitions with regard to certain phraseologies and in which situations they are typically used. This paper presents an example of how a corpus can be used to supplement this lack of intuition by using empirical data to answer a JTE's doubts about the typical usages of the prepositional phrases *in school* and *at school*. It is argued that effective use of corpora can not only answer linguistic questions, but also improve teacher confidence and create a more equal relationship in team-teaching classrooms.

多くの日本人英語教師は、一般に高い英語能力を所持しているにもかかわらず、ある特定の言い回しや、それらが使われるのに適切な場面についての知識に欠けることがある。本研究は、日本人の英語教師がしばしば疑問を持つ「in school」と「at school」の違いや使い分けについてコーパスを用いて分析することにより、英語教師の知識を補うためにコーパスがどのように使われるかの事例を示す。コーパスの使用は単に言語学的疑問に答えるためだけではなく、教師に自信を与えチームティーチングにおいてALTとより平等な関係を築くためにも効果的であると、本研究では議論する。

For Japanese teachers of English in junior high schools, teaching prepositions so that their students will be able to apply them with confidence can be a daunting task. Although there is no paucity of resources to help explain the various usages of prepositions (e.g., Lindstromberg, 2010; Onishi & McVay, 1996, 1998), the lack of clear Japanese equivalents can be problematic (Pavlenko, 2009), and their sheer number and polysemy can be overwhelming. Critically, nonnative teachers of English may lack intuition with regard to which preposition is used in which situation. This can have obvious negative effects not only on the actual quality of what is being taught but also on the general learning envi-

ronment as nonnative teachers struggle to maintain credibility as qualified instructors (Thomas, 1999). This lack of intuition with regards to common usage is probably a key reason why many teachers who are otherwise competent lexically and grammatically are said to lack sufficient English ability to teach classes in English (Koby, 2015; Sato, 2015). Tools that help supplement teachers' intuitions about language can therefore not only help with education outcomes directly but also can help to combat "native speakerist" (Holliday, 2006) attitudes that can contribute to less-qualified and less-effective instructors being given higher status simply by nature of their birthright (Jenkins, 2006, p. 172).

This study is a response to a plea for help from an EFL teacher who needed to explain to his class the difference between the sentences *I played basketball in school* and *I played basketball at school*. This question posed a particular difficulty for this teacher because not only can both sentences translate to the same Japanese (using the particle *de*), but even when considering the semantics of the English prepositions both appear to be equally acceptable. In situations such as this, what might persuade a native speaker to choose one preposition over the other?

Corpora in Education
Starting with approaches such as data-driven learning (Johns & King, 1991), the use of corpora to investigate questions like this in educational settings has over 30 years' history (Kettemann & Marko, 2002; McEnery & Xiao, 2011). However, although there is a consensus that corpora are invaluable tools for second language education, actual implementation into classroom work is fraught with difficulties. Pragmatic issues include a lack of equipment, the time it takes to train a generation of teachers that can use the new tools, and the fact that most existing corpora are designed for linguistic research and the data they produce are liable to be too complicated for students to successfully analyze (Braun, 2007; O'Keeffe & Farr, 2003). Theoretical issues have also been raised: (a) that corpora can only present decontextualized language, (b) that corpus evidence should be used

in tandem with other sources of linguistic information such as introspection, (c) that most corpora are comprised of native speaker language that might not be suitable for the learners' needs, and (d) that language is a creative enterprise and therefore learners should not be taught to use only the most common phraseology (Hunston, 2002).

The difficulties with using corpora in classroom activities, however, need not be an impediment to teachers who wish to augment their own intuitions and understanding of language with evidence from a corpus. The results of an investigation can be recontextualized by the instructor when presenting them to students, and any examples that are shown to the class can be carefully selected to ensure that the data educate rather than confuse.

Research Question

This pilot study was designed as a demonstration of how a corpus can be used to investigate frequent patterns of use in language and to extract a large number of examples of a specific linguistic feature. The research was conducted with the aim of answering the following research question: Are there any linguistic factors that can be used to predict, in any given situation, whether a native speaker of English is more likely to use the preposition *in* or *at* in conjunction with the head noun *school*?

Method

In order to investigate this, the corpus techniques described in Hunston (2002) for investigating the most frequent meanings or collocates of an individual word or phrase (what Hunston refers to as the phrase's *typicality*) were adopted as a guideline. Hunston gave a thorough introduction to the use of corpora in language research and education, and the methods she presented were drawn from a wide range of existing literature on corpus research. Therefore, I considered her process to be well grounded and a good way to approach the problem of the *in* and *at* distinction. The process begins by selecting an appropriate corpus and then by interrogating the corpus with searches that ideally return a large number of examples of the linguistic feature in question.

Corpus Selection

Because junior high school students study both written and spoken English and their textbooks feature a variety of spoken and written registers, a general corpus of English featuring both written and spoken components was sought. The British National Corpus (BNC; http://www.natcorp.ox.ac.uk/) is a freely available static corpus of 100 million words (90% written, 10% spoken) with a varied mix of texts including both written and spoken modes, designed to be representative of late 20th century British English (Hoffmann, Evert, Smith, Lee, & Berglund Prytz, 2008). The schools where I teach generally prefer North American accents and dialects, but this is not an absolute requirement. The caveat that results from this study could not necessarily be extrapolated beyond the corpus itself, let alone beyond British English, was not considered an impediment.

Search Terms

Having selected the corpus, the BNC Web concordancing software was used to search the BNC for instances of the lemma *school* preceded by the prepositions *in* and *at*. In order to increase the recall four different proximity searches (proximity 2, 3, 4, and 5) were conducted so as to include instances where *school* was separated from its preposition by, for example, articles and adjectives. I then manually inspected 400 randomly selected instances from each search for unwanted results such as *kept him steadily at school work*, in which the preposition is clearly not functioning in the spatial sense and *school* is functioning as a modifier. Finally, the number of rejected hits for each search was subjected to a confidence interval test to assess each search's precision ratio.

The results for proximity 3 (11,540 total hits and an error ratio between 8.19% and 14.58% within the 95% confidence interval) showed the best balance of precision to total number of search results. Admittedly, this limited approach would be improved by the use of a parsing program to find all instances of *in* and *at* in the corpus where *school* is the head noun of the object of the preposition. However, because part of my objective was to introduce corpus tools to other teachers, I considered the simplicity of this method to be appropriate compensation for the likely decrease in precision. Thus, unless specifically stated, all references to *in school*, *at school*, and similar expressions in what follows will be referring to the preposition within three tokens' distance from the lemma *school*.

Quantitative Analysis

The first question that may be asked when investigating the typicality of *in school* vs. *at school* is simply which preposition is used most frequently. Within the BNC dataset, *in school* appears more frequently than *at school* (6,443 hits vs. 5,123 hits), but *in* is used much more frequently in the corpus as a whole. In order to account for the relative overall frequencies of both prepositions, statistical scores such as the log-likelihood value (LLV) and mutual information (MI) score can be calculated. Both these statistical meas-

ures return higher scores for *at* than for *in* (see Table 1), suggesting that despite the raw frequencies, *at* is more strongly connected to *school* than is *in*. Having established this, it is then possible to investigate whether any other factors influence the two prepositions' relative collocational strengths and frequencies.

Table 1. Collocates of *School* in the L1-L3 Range

Word	Total no. in BNC	OCF	LLV	MI score
at	521,694	5,123	11,868.53	2.88
in	1,937,819	6,443	4,249.15	1.32

Note. BNC = The British National Corpus; OCF = observed collocate frequency; LLV = log-likelihood value; MI score = mutual information score; L1-L3 range = search limited to words located between 1 and 3 tokens immediately to the left of *school*.

One possible factor is the type of text being considered (see Biber, Conrad, & Reppen, 1998, p. 94-95, 100; Hunston, 2002, p. 74, for examples of lexical items behaving differently across registers). Distribution data from the BNC showed that *in school* appears about equally often in written and spoken texts, but *at school* appears much more frequently in spoken texts than written ones (see Table 2).

Table 2. Distribution Data in BNC

Search	Written material		Spoken material	
	Hits	FPMW	Hits	FPMW
in >>3>> {school/N}*	5,791	65.88	657	63.11
at >>3>> {school/N}	4,373	49.75	744	71.47

* BNC Web search term used to find all instances of the preposition within 3 tokens of *school*, when *school* is functioning as a noun.

Note. BNC = The British National Corpus; FPMW = frequency per million words.

More detailed distribution figures showed that *in school* appeared far more frequently in academic prose (+101.28 frequency per million words), but other written texts such as fiction and newspapers were more balanced or slightly favored *at school*. On the other hand, *at school* was more common in spoken conversation (+57.16 frequency per million words), whereas other spoken material was much more balanced.

Given that nouns and verbs are known to behave differently in language, another factor affecting usage of the prepositions may be whether the preposition is attached to a noun or a verb. A rough method of looking for this might be to search for instances of *in school* or *at school* that are preceded by each of those grammatical categories. Indeed, limiting the search to instances where *in school* or *at school* was preceded by a noun (e.g., *a compulsory <u>subject</u> in the schools*) caused *in school* to have a higher log-likelihood score and saw the difference in MI scores drop by 28.8% (from 1.56 to 1.11). Prepositional phrases preceded by verbs (e.g., *I had been <u>encouraged</u> at my school*), on the other hand, showed a corresponding preference for *at*.

It might therefore be possible to hypothesize that if *in school* and *at school* were to collocate more strongly with nouns and verbs respectively, this could account for the differences in usage within the BNC subcorpora. One can look at the two subcorpora, academic prose and spoken conversation, with the biggest discrepancies and note that, as Halliday (2002) remarked, "Written language represents phenomena as if they were products. Spoken language represents phenomena as if they were processes" (p. 344). Thus, it is possible that the spoken conversation subcorpus features *at* more frequently simply because it uses verbs (or *processes*, in Halliday's terms) more frequently (see Table 3 for relevant numbers).

Table 3. Verb and Noun Frequencies in BNC Subcorpora

Subcorpus	Verbs PMW	Nouns PMW
Written texts	176,449	271,668
Spoken texts	225,973	150,227

Note. BNC = The British National Corpus; PMW = per million words.

However, the quantitative data do not support this conclusion. Regardless of whether *in school* or *at school* is preceded by a noun or verb, *in* remains the stronger collocation in the academic prose subcorpus of the BNC, and *at* remains the stronger collocation in the spoken conversation subcorpus. Therefore, there must be some more fundamental difference in the semantic context surrounding these expressions to explain these tendencies.

Qualitative Analysis

After looking at raw numbers based on token frequency, distribution, and POS tagging, the next step in the analysis was to manually inspect the search results and use my understanding of the meaning of the language to identify patterns in its usage. This requires an understanding of the semantics of the text and is in this sense a more qualitative analysis than that of the preceding section.

It was not practical to do this for all 11,540 instances of *in school* or *at school* in the BNC, but by making hypotheses based on a small sample and then performing follow-up searches to confirm or reject them, it was possible to cope with large amounts of data. This technique yielded two important findings about the behavior of the prepositions: (a) in conjunction with time expressions and (b) with two interpretations of the word *school*, which I will refer to as its *concrete* and *abstract* meanings.

Time Expressions

In situations in which the locative preposition follows a time noun (e.g., *their first 5 years at school*, *a good day at school*), 77% of all examples used *at* instead of *in*. This percentage is considerably higher than the baselines established in the quantitative analysis and suggests that *at school* is the more typical construction when expressing time.

Concrete and Abstract

Additionally, two different meanings of the word *school* were identified. These can be best seen through example sentences from the BNC dataset:

1.   . . . Where's Aunty Susan? She's at school . . .
2.   . . . Swap engineers for any other subject in school and we have the same . . .
3.   . . . it is the levels of indiscipline in school that are featured . . .

In example 1, the school is a building. It is a physical location that Aunty Susan has stepped into. The school grounds can be identified visually or even by touch. In this sense, the school functions as a physical location or entity where material (e.g., study), existential (e.g., is, are), and mental (e.g., think) events can occur. I shall therefore refer to this usage of *school* as its *concrete meaning*.

In example 2, however, the school is a more abstract object. Engineering can be said to be a subject *in* school, but no material object labeled *Engineering* is located within the walls of any school building. In this sense, the word *school* evokes associations with teaching and learning, the participants in those activities, and the various associated activities that also form a part of the institution (e.g., janitorial services, a PTA, homework). These activities, however, need not necessarily occur inside the school building itself. This more metaphorical use of the word *school* makes reference to the abstract institution rather than the material building, so I shall refer to this meaning of *school* as the *abstract meaning*.

It is not always obvious which meaning is intended, and some amount of overlap often exists between the two interpretations, as in example 3. However, when the distinction between physical and metaphorical meaning can be confidently made, manual inspection of the corpus data suggests that the concrete meaning of school most frequently takes the preposition *at*, and the abstract meaning takes the preposition *in*.

One possible method for probing this theory is by restricting the search to only instances of the word *schools,* the plural form. Close reading of 100 random concordance lines for the search [in,at] >>3>> schools_N** returned only seven instances of the unambiguous concrete meaning and more than double that number of unambiguous abstract meanings. This established that the abstract meaning is considerably more frequent when using the plural form of the word.

Given that fact, the statistical results with regards to its adjacent preposition are significant. Although singular *school* has *at* as its strongest collocate (log-likelihood value: 13,776.60; MI score 27.8) and *in* as number 17 (log-likelihood value: 1,001.56; MI score: 0.86), the plural *schools* has *in* as its third-strongest collocate (log-likelihood value: 4,397.75; MI score 2.07) and *at* appears in 249th place (log-likelihood value: 23.53; MI score: 0.44). These numbers are noticeably different from the baselines established previously, and thus it can be said that the plural vs. singular distinction is correlated with preposition selection. More importantly, it adds weight to the theory that the abstract meaning of *school* prefers the preposition *in* over *at*.

Testing

In order to test the predictability of the concrete vs. abstract meaning hypothesis, a short survey was designed and distributed via Google Forms to 33 native speakers of English (see Appendix). I created 15 questions by taking concordance lines from the BNC (occasionally slightly simplified for clarity) and removing the prepositions. The survey participants were asked to enter the preposition they thought the most appropriate: *in*,

at, or *cannot decide* (in the case that both or neither of the prepositions was appropriate). The survey was designed in this manner to try to elicit the answer that the respondents thought might be the most typical or appropriate semantic interpretation of the sentence, which is the sort of intuitive decision that speakers make almost instantaneously as they speak or write and precisely the question of typicality that I intended to address with this study.

The survey participants were all English teachers and translators working in Japanese schools or town halls. Additionally, all had completed some tertiary education but their countries of origin varied. The sentences chosen for the survey were selected because they contained numerous features that, according to the analysis above, should gear survey participants toward a particular preposition. What follows is a brief summary of the most salient points in the results.

Test Results

Four questions (items 2, 10, 12, and 13) were included in the survey because they were believed to unambiguously present *school* in its concrete meaning. The results for these questions (101 *at* out of 132 total responses) were compared with the overall results (247 *at* out of 495 responses) and found to be highly significant ($p < 0.001$) by means of the X^2 test. This means that, even though *at school* is a stronger collocation than *in school* overall, the concrete meaning of *school* is an even stronger factor in eliciting an *at* response from native speakers.

On the other hand, five questions (items 5, 9, 11, 14, and 15) were included in the survey because they were believed to unambiguously present *school* in its abstract meaning. The results of this subset of questions was 47 *at*, 104 *in*, and 14 *cannot decide*. Here again, the number of *in* responses was compared against the overall total (212 *in* out of 495 total responses) by using the X^2 test, and the result was highly significant ($p < 0.001$).

Thus, even though this test did not explicitly investigate which interpretation (concrete vs. abstract) of the word school was adopted by the respondents, it does appear that determining whether *school* is being used in its physical or metaphorical sense can help to predict the tendencies of native speakers as regards its preposition.

Discussion

This concrete and abstract meaning dichotomy helps to explain the previously observed distribution of *in school* or *at school* across the BNC subcorpora. Close reading of con-

cordance lines from the academic prose subcorpus of the BNC, like those in example 4, reveals that most of the sentences therein have the abstract meaning.

4.   . . . country gets a bee in its bonnet about some failing in schools . . .

        . . . a department in a secondary school reviews its curricular . . .

        . . . compounded by the gulf which has developed in many schools . . .

This makes sense based on an intuitive understanding of the nature of academic prose; these writers are more likely to be concerned with schools in general (abstract) than they are with the specific events unfolding inside of any particular building (concrete), and this may be the reason why *in* is the more prevalent preposition in this subcorpus.

In contrast, the spoken conversation subcorpus of the BNC, which was shown to contain a higher frequency of *at school* than *in school*, appears to favor the concrete meaning. Although the prepositional preferences here are not as pronounced as they are in the academic prose subcorpus, there is a preponderance of examples demonstrating how processes (*hardly ever did*, *manage your sums*, *doing very well*) connect with *at* to indicate the location where they occur.

5.   . . . I hardly ever did [pause] at one school . . .

        . . . you manage your sums at school today?

        why haven't you been doing very well at school this week?

The concrete and abstract meanings of *school* thus provide a reasonable method for answering the initial question of this study: whether there are any factors that can be used to predict native speaker tendencies with regard to preposition selection. Backed with quantitative and qualitative data gathered from thousands of native speakers, the nonnative teacher can approach the subject with improved confidence and with hundreds of examples with which to illustrate the point. Particularly in team-teaching situations, nonnative teachers armed with corpus evidence may not feel the need to defer to the native speaker's "patent authority" (Mahoney, 2004, p. 231). This is especially true because both the corpus data and survey conducted in this study showed that native speaker intuitions are rarely decisive. No search in the BNC yielded only *in* or *at* results, nor did any of the survey questions receive a unanimous response. This fact should come as

a welcome reminder for teachers and students alike that many issues of linguistic choice are really questions of typicality and frequency, and that multiple semantic interpretations are possible. If not even native speakers can agree that there is one right answer, then the confidence of teachers and learners may be bolstered by the understanding that they can never truly be "wrong."

Conclusion

In this study, I sought to answer a question about typicality between the prepositional phrases *in school* and *at school* using data from a corpus. The investigation revealed that the preposition choice may be highly influenced by whether the word *school* is meant as a physical location where events unfold or as a metaphorical institution that can house people and concepts in a more abstract manner. A second, smaller finding was that *at* is by far the more typical preposition when the locative adjunct is applied to time expressions. Used in this manner, corpora can be useful tools for understanding linguistic concepts and presenting evidence to students.

Of greater interest, however, is how corpora can be used to supplement the knowledge of nonnative language teachers, giving them access to thousands of examples of how a specific linguistic feature is used in native speech. This, I suggest, can contribute positively to the teacher's understanding of the language and to confidence levels in the classroom. It can also help to foster a more even relationship in team-teaching situations, where native English-speaking assistants are too often seen as the final word on linguistic matters simply by virtue of their mother tongue.

Bio Data

Daniel Liberatori worked for 5 years in elementary and junior high schools in Aomori prefecture. He is currently working as a translator and completing his MA in applied linguistics at the University of Birmingham. <daniel.liberatori@gmail.com>

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Appendix
Survey

This questionnaire will be used for linguistic research to help in the teaching of foreign languages. It should take you no longer than 5 to 10 minutes to complete. This survey is completely anonymous. No personal data will be collected.

This survey is meant for native speakers of English ONLY. If you are not a native speaker of English (any variety), please do not participate.

Directions: Read the sentences and select the preposition that you feel sounds the most natural. There are no correct answers or grammatical tricks. If you cannot decide which preposition is correct, or you feel that both are equally apt, select the "cannot decide" option.

* Required

1. Ken, the chemistry I did ____ school was full of test tubes and horrid smells. *
2. Do you want to know what I done ____ school today? *
3. We were taught how to use a pen ____ primary school. *
4. Language teaching ____ 2000 schools was surveyed. *
5. Swap engineers for any other subject ____ school and we have the same situation. *
6. You used to have free lunch ____ the schools, you know, then they wiped that out. *
7. I can vaguely remember my first day ____ school. *
8. This is a major problem ____ every school. *
9. Good job! I learnt my tables when I was ____ school! *
10. "Do you practice much?" "Most days. I used to practice ____ the school." *
11. There are not enough teachers ____ our schools. *
12. Mary was first seen ____ the school between 4pm and about 4:20.*
13. Stand out ____ school by being fat, tall, or tiny. *
14. As everybody was taught ____ school, "traveling broadens the mind." *
15. They said the essential three factors ____ a successful school were . . . *

Note. Although the questions appear in numbered form here, the order was randomized for each survey participant.

Table A1. Survey Results

Question	Preposition	Responses	Percentage
1. Ken, the chemistry I did ____ school was full of test tubes and horrid smells.	at	19	57.58
	in	11	33.33
	cannot decide	3	9.09
2. Do you want to know what I done ____ school today?	at	27	81.82
	in	4	12.12
	cannot decide	2	6.06
3. We were taught how to use a pen ____ primary school.	at	2	6.06
	in	29	87.88
	cannot decide	2	6.06
4. Language teaching ____ 2000 schools was surveyed.	at	18	54.55
	in	13	39.39
	cannot decide	2	6.06
5. Swap engineers for any other subject ____ school and we have the same situation.	at	12	36.36
	in	18	54.55
	cannot decide	3	9.09
6. You used to have free lunch ____ the schools, you know, then they wiped that out.	at	14	42.42
	in	14	42.42
	cannot decide	5	15.15
7. I can vaguely remember my first day ____ school.	at	31	93.94
	in	2	6.06
	cannot decide	0	0.00
8. This is a major problem ____ every school.	at	15	45.45
	in	15	45.45
	cannot decide	3	9.09
9. Good job! I learnt my tables when I was ____ school!	at	10	30.30
	in	22	66.67
	cannot decide	1	3.03
10. "Do you practice much?" "Most days. I used to practice ____ the school."	at	25	75.76
	in	7	21.21
	cannot decide	1	3.03

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Question	Preposition	Responses	Percentage
11. There are not enough teachers ____ our schools.	at	13	39.39
	in	20	60.61
	cannot decide	0	0.00
12. Mary was first seen ____ the school between 4 pm and about 4:20.	at	25	75.76
	in	4	12.12
	cannot decide	4	12.12
13. Stand out ____ school by being fat, tall, or tiny.	at	24	72.73
	in	9	27.27
	cannot decide	0	0.00
14. As everybody was taught ____ school, "Traveling broadens the mind."	at	7	21.21
	in	26	78.79
	cannot decide	0	0.00
15. They said the essential three factors ____ a successful school were . . .	at	5	15.15
	in	18	54.55
	cannot decide	10	30.30

Table A2. Survey Results Summary

	at	in	cannot decide	Total
BNC	521,623	1,781,659	n/a	2,303,280
Survey (all items)	247	212	36	495
Medium				
Spoken (items 1, 2, 6, 9, 10)	95	58	12	165
Indeterminate (all other items)	152	154	24	330
Preceding word class				
Verb (1, 2, 9, 10, 12, 13, 14)	137	83	11	231
Noun (3, 4, 5, 6, 8, 11, 15)	79	127	25	231
Sense				
Concrete (2, 10, 12, 13)	101	24	7	132
Abstract (5, 9, 11, 14, 15)	47	104	14	165
Form				
Singular (1-3, 5, 7-10, 12-15)	202	165	29	396
Plural (4, 6, 11)	45	47	7	99

Note. Determination of whether the word *school* appeared in its concrete or abstract sense was based on the researcher's judgment.