

Corpora and the concordancer in learning LSP: an experiment in a course of interpreters and translators

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0. Introduction

While Language for Specific Purposes (LSP) obviously plays a central role for students who are preparing to become professional interpreters and translators, it constitutes a major teaching/learning problem. Fanning (1993) notes that the concept of LSP has become standardized over the years, increasingly involving (would-be) professionals who need to learn a foreign language to deal with matters relevant for their (future) job. In this perspective, while translation students share the average LSP-students' need to be equipped with means to deal with specific subjects in the foreign language, they can be considered non-standard LSP students in a variety of ways. First, they are *language* experts, rather than experts in the scientific discipline that is being discussed, and compared with the public they translate for, they generally have relatively little background knowledge of the scientific or technical subject they are dealing with. Second, there are very few occasions in their curriculum where scientific subjects are taken into consideration *per se*; though some teaching in medicine, chemistry, law, etc. may be provided, these do not characterize translation students as medical, chemistry or law students. Third, insofar as they will be required to translate scientific conferences or publications, the degree of specificity of language required is very high, and a course in general medical English may not be that useful for a translator dealing with, say, polymerase chain reaction in the diagnosis of hepatic diseases. Fourth, the choice of the "specific subjects" to deal with in translation/interpreting courses varies, depending on market requirements in a particular geographical area and historical period, or on student or teacher preferences, and in any case it is impossible to predict exactly which subject/s students will deal with in their future jobs. As a consequence, translation students need not only to learn a specific language, they also need to "learn how to learn" it, as they are in constant need to update the range of domains they deal with.

In this paper I discuss a pedagogic experiment where concordance analysis of electronic text corpora was used in a course of medical English for students of interpreting and translation at the University of Bologna. The pedagogic perspective taken here is that described in Johns (1991, 1994a, 1994b). He

suggests that concordance material can be proposed to students for autonomous analysis to identify recurrent meanings and uses of words. In Johns' view, concordance analysis stimulates language learners to act as language researchers, using concordances to work out hypotheses about language regularities and checking them through discussion, and possibly other data. Such perspective seems particularly useful in the case of translation students, as these students *are* (or are training to become) "language experts", and need to achieve autonomous research procedures to improve their own professional expertise.

In the experiment described here, students were engaged in activities of corpus creation and analysis of concordance-generated materials. Concordances were used to observe typical language organizations and also to try and grasp specific medical concepts and procedures. Students used medical dictionaries and encyclopedias, but they did not have contacts with experts or attend courses in medicine during the period. After the end of the course, a medical doctor was invited to meet the students, to clarify specific concepts. An interesting pedagogic observation which emerged from this meeting was the students' willingness to ask questions and the competence they showed in posing them. In this paper, I take the perspective of the language teacher, rather than the translation teacher, and I deal with issues that have to do with the linguistic preparation of both interpreters and translators (cf. also Zanettin, this volume).

1. The Corpora

The corpora consist of two collections of research articles dealing with hepatitis C, in English and Italian. The English corpus collects about 34,000 words and the Italian one about 26,000, corresponding to 12 articles each. They constitute "bilingual comparable" corpora in Baker's (1995) terms, that is corpora in two languages created using very similar criteria. The choice of articles was based on similarity of form, content and source. The articles included in the corpora are all organized according to the IMRAD¹ structure, they all deal with hepatitis C and they were all published in accredited specialized journals. Hepatitis C was discovered quite recently, and the majority of the material was published between 1988 and 1994, with two English articles being published in 1983.

2. Organization of the activity

Students were first required to collaborate in the creation of the corpora. While the topic had been decided by the teacher and a part of the English corpus already

1 IMRAD stands for Introduction, Methods, Results And Discussion (Swales 1990, among others).

existed, students were asked to widen the English corpus a bit and to create a similar corpus in Italian. Students' research was carried out "manually" using a journal of abstracts and by looking at the bibliographical references in the papers they found. The selected material was scanned or typed out by the students and revised and organized by the teacher. It was then downloaded on to the local server so that it could be retrieved with any computer in the school.

Students were divided into groups, each dealing with a particular section of the research articles in the corpus (introduction, materials and methods, results, etc.). Lists of the 100-150 most frequent words occurring in each section in the English corpus were generated and analyzed by students to see whether the frequency of certain words could be accounted for in terms of the particular kinds of information or of particular organizational structures used in the section they were considering.

They were then asked to compare lists for different sections. They noticed that while words such as "hepatitis", "patient/ patients", "transfusion", "blood" and "liver" are very frequent in all four sections, and indeed the most frequent lexical words in the corpus as a whole, words such as "test/tests/tested/testing", "sample/samples" and "serum/sera" are frequent in the methods section, but not in the others. Other frequent words in the methods section are "antibody" and "antigen", given the fact that hepatitis C tests are often based on the detection of the presence of hepatitis C antigens and/or antibodies in the blood. Another frequently occurring word in the method section was "performed", possibly in relation to the fact that tests are generally "performed". See Table 1, below²:

	<i>introduction</i>	<i>methods</i>	<i>results</i>	<i>discussion</i>
test\tests\tested\testing	17	87	29	36
sample\s	1	46	20	8
serum\sera	13	50	33	25
antibody	12	24	11	15
antigen	6	18	2	2
performed	1	20	3	1

Table 1: Frequent words in the methods section

- 2 The words in the left column are to be intended as "words", not lemmas. While "performed" occurs 20 times in the methods section, other forms of this verb are not likewise frequent, and the form "perform" never occurs in this section. Similarly "antibody" seems to be frequently used in its singular (not plural) form. When various forms of a lemma are referred to, I have indicated them all (see e.g. "test\tests/tested/testing").

As shown in the literature (e.g. Myers 1989, Salager-Mayer 1994), also in this corpus, modal verbs such as "may" and "might" are particularly frequent in the discussion sections (see Table 2, below), occurring 49 and 20 times respectively. In introductions "may" occurs 8 times and "might" 4 times, and both "may" and "might" occur just once in the methods section. Other frequent words in the discussion section are "however" (29) and "although" (20), suggesting that contrast may be typical of this section.

	<i>introduction</i>	<i>methods</i>	<i>results</i>	<i>discussion</i>
may	8	1	5	49
might	4	1	0	20
however	5	0	10	29
although	6	1	7	20

Table 2: Words frequent only in the discussion section

The analysis of the frequency lists provided a basis for isolating "interesting" words to look at more in detail through concordances. Each group of students isolated 8-10 words to look at in the concordancer, and subsequently reported on their findings.

3. Two examples of concordance analysis

Following Miller (1994), "interesting" words were divided by students into "specialized terms", that is terms whose meaning is generally obscure to non-expert readers, and "general terms in a specialized context", that is terms whose use is familiar in other contexts but not in this one. The first category mainly included names of tests, viruses, acronyms used to indicate tests or diseases, and the like. The second category included contrastive markers, such as "however" and "although", modal verbs (mainly "may" and "might"), and what Salager-Mayer (1994) calls "tentative" verbs, such as "suggest" and "appear". Analyses were performed comparing concordances derived from the English corpus with concordances derived from the Italian corpus.

Here I look at two of the students' analyses; the first concerns a "specialized term", the acronym "RIBA", the second concerns the verb "suggest". For practical reasons I have chosen two words which are not unduly frequent: the acronym RIBA occurs 9 times in the English and 7 times in the Italian corpus, while the verb *suggest/suggerire* occurs 29 times in English and 8 times in Italian.

3.1. The acronym RIBA

The search for RIBA was initiated in the context of a more general search for acronyms, as it was noticed that abbreviation is quite frequent in these corpora. As acronyms are generally explained the first time they are introduced in a paper, it is easy to see what RIBA stands for from a concordance (see concordance 1 below):

(1)

1 ary tests, a LIA (Innogenetics) and a **RIBA** (Chiron). The results obtained by all
 2 eration recombinant immunoblot assay (**RIBA**) (Chiron) were used. <p> <p> HBV Mar
 3 as detected by PCR (Table I). LIA and **RIBA** could be performed in only 2 of these
 4 ith the recombinant immunoblot assay (**RIBA**-Chiron, Emeryville and Ortho, Raritan
 5 regions of the HCV sequence. PCR and **RIBA** II immunoblot assays were done on sel
 6 he multiple epitope immunoblot assay (**RIBA** II) is an attractive solution to the
 7). ELISA-II results were confirmed by **RIBA** in 48 out of 51 (94,1%) cases tested,
 8 . In 3 patients not tested by LIA and **RIBA**, serum samples drawn at earlier times
 9 esults, 2 confirmatory tests (LIA and **RIBA**) were carried out with a part of the

As can be seen in the second and fourth example RIBA stands for "recombinant immunoblot assay". While this might mean something to a student of medicine, it means absolutely nothing to a student of translation. A look at words occurring in the vicinity of RIBA however reveals that a form of the word "confirm" occurs twice: in example 7 ("results were confirmed by RIBA") and in example 9 ("two confirmatory tests, LIA and RIBA"), giving rise to the hypothesis that RIBA is not a routine test, but one used to confirm results derived from other tests or observations. A look at a larger context shows that words such as "supplementary" and "confirmatory" are found in the vicinity of "RIBA" also in other cases, see examples in concordance 2, below:

(2)

1 identified as antibody positive. Enough serum was available from 42
 2 patients to carry out 2 supplementary tests, a LIA (Innogenetics) and a
RIBA (Chiron). The results obtained by all the tests are shown in
 Table II. All 4 antibody detection systems yielded consistent results in
 28 (69%) o
 2 d in duplicate. As confirmatory tests, the INNO-line immunoassay
 (LIA) (Innogenetics) and a second-generation recombinant
 immunoblot assay (**RIBA**) (Chiron) were used. HBV Markers Hepatitis
 B surface and e antigens and their antibodies were measured using
 ELISA (Abbott Labs,
 3 n 6 patients. Of the 68 patients, 15 were antibody negative using
 both ELISAs. In 8 (53%) viral RNA was detected by PCR (Table I). LIA
 and **RIBA** could be performed in only 2 of these cases (Table II). In

one case both confirmatory tests yielded positive results, thus confirming HCV infecti

Example 6 (see extended context below) explicitly describes RIBA as a test generally used to confirm data from other tests:

The multiple epitope immunoblot assay (RIBA) is an attractive solution to the problem of multivalent testing; however this assay is too expensive for large scale research use and is also somewhat insensitive.

These examples also provide a variety of both technical and linguistic information about the RIBA, which students listed as follows:

"Linguistic" information

- RIBA can be done on sera carried out performed
- patients can be tested with or by RIBA

"Technical" information

- the RIBA is a test performed on blood serum
- it is used to confirm HCV (hepatitis c virus) infection
- RIBA is often found in conjunction with LIA, possibly a similar test
- RIBA is generally used to confirm results obtained with other tests called ELISA and PCR
- it is a convention in these texts to indicate the manufacturer of particular tests: RIBA is produced by Chiron

A concordance of RIBA in the Italian corpus was then generated to compare with this information. As can be seen in concordance 3 below, "conferma"/"confermato" are frequent right collocates of RIBA also in the Italian corpus (ex. 1, 2, 4, 5, 6). Prepositions in Italian are not exactly the same as those used in English: while in English, patients can be tested *by* or *with* RIBA, in Italian they are "confermati *al* RIBA" (ex. 6), and we also have "confermato *con* RIBA" (ex. 2 and 5) or "test di conferma *in* RIBA" (ex. 4).

(3)

1 HCVAb (determinazione e/o conferma in **RIBA**); d) "C+ pregressa B": ove è pr
2 CV EIA) e nei positivi confermato con **RIBA** di II generazione (Ortho-Chiron Riba
3 sui sieri conservati, lo screening in **RIBA-Ortho**. I controlli ematologici prev
4 i presentavano un test di conferma in **RIBA** indeterminato. Si trattava di una gio
5 sitività per anti-HCV, confermata con **RIBA**, nelle epatobiopsie con segni istolog
6 vi all'ELISA sono stati confermati al **RIBA**, tranne 2, che sono risultati indeter

While the Italian concordance supports the idea that RIBA is a test used to confirm results from other tests such as ELISA and PCR, it suggests that there might be a difference in "talking about RIBA" in the two languages. In particular the role of RIBA in the sentence seems to differ. While in English it typically occurs in a subject noun phrase, such as in:

PCR and RIBA II were done on selected sera

in Italian we generally find it as a complement in a prepositional phrase, see for instance the following:

- Parés e Ballardini hanno riscontrato negli alcolisti la positività per anti-HCV, confermata con RIBA, nelle epatobipsie con segni istologici di ECA

- Epatite C: ove è presente, l'HCV Ab (determinazione e/o conferma in RIBA)

In English, the first construction is the more frequent, but never occurs in Italian. These findings are schematized in Table 3, below.

POSITION OF RIBA IN THE SENTENCE	examples in English (n = 9)	examples in Italian (n =6)
RIBA = sentence subject ex: <i>PCR and RIBA were done on selected sera</i>	6	0
RIBA = complement ex: - <i>Elisa II results were confirmed by RIBA in 48 out of 51 patients</i> - <i>Gli anti-HCV positivi sono stati confermati al RIBA</i>	3	6

Table 3: different constructions of RIBA in English and Italian

While these results are clearly not conclusive given the numbers involved, they nonetheless suggest that there may be different ways of talking about medical methods (in this case confirming data by tests) in English and Italian. Students may be stimulated to carry out further research in the corpus, looking at other blood-tests, such as ELISA, LIA or PCR, found in the concordance above.

While the information provided by the concordance is obviously not exhaustive from a medical point of view, and other information from a medical expert and/or from medical books will be necessary to a translator/interpreter

dealing with this topic, the rough indications provided at least permit the students to understand what the RIBA is. Furthermore, students can identify a number of linguistic conventions, such as which verbs are used with RIBA ("performed", "carried out" and the like), and the position it generally occupies in the sentence in English and Italian, which experts may be less capable of providing. This information might then stimulate students to carry out further research about other tests to check or widen these findings.

3.2. The verb "suggest"/"suggerire"

The search for "suggest" was initiated by the observation that expressions of "tentativeness" or "hedging" seem to be quite frequent in medical research papers: we noticed the presence of "may"/"might" in the discussion section, but in the other sections too we have high frequencies of hedging expressions, such as "possible", "probable", "it is likely that/it is likely to be", etc. Both Myers (1989) and Salager-Mayer (1994) observe that verbs such as "appear" and "suggest" perform an "hedging" function in scientific discourse. A search for the pattern "sugge*"³ showed that English forms of "suggest" are much more frequent than Italian forms of "suggerire", occurring 29 times in English and only 8 times in Italian. A look at the English concordance of "sugge*" reveals that subjects used with this verb may be divided in 3 groups, each belonging to one of the following semantic fields: a) authors (we/other authors), b) statistics/data/results/studies/findings, c) symptoms / illness patterns / patients' history. Examples from the three groups are: "*We suggest* that the patient with chronic persistent hepatitis may represent the only case of chronic non-A non-B liver disease" (group a), "*Our results suggest* that if a safe and effective therapy were to become available [...], its use should be encouraged" (group b), "*The pattern of illness suggests* that more than one stereotype of non-A non-B hepatitis may be transmitted by factor VIII concentrate" (group c).

Comparing this concordance with the Italian one (see concordance 4 below), it can be noted that in all of the examples the subject is a set of symptoms or a "quadro clinico", which suggests a diagnosis; that is, all the Italian examples are similar to those in category C in English. In this concordance we have "il quadro sierologico" (ex. 3), "storia" (ex. 6), "comportamento" (ex. 7) or a description of symptoms or of the illness:

3 In most concordancers and retrieval systems the asterisk is a wildcard standing for "any character". So the pattern "sugge*" was searched to find the various forms "suggest" / "suggests" / "suggesting" / "suggerisce" / "suggerendo", etc.

(4)

1 La repentina reinfezione da parte di HDV, subito dopo trapianto (6 ore nel RETX 68) potrebbe inoltre *suggerire* anche per questo virus una presenza in sede extra-epatica.

2 immunitari (quali l'anemia perniciosa, la miastenia gravis, il morbo di Addison, la tiroidite di Hashimoto, il lupus eritematoso sistemico, ecc.) a *suggerire* che l'alterazione della sorveglianza immunologica non sia limitata al solo tessuto tiroideo, ma investa anche altri distretti dell'organismo.

3 E' interessante notare che nei pazienti coinfectati da HBV e HIV1 rispetto a quelli infettati solo dall'HBV, il quadro sierologico è *suggestivo* di una risposta immunitaria alterata.

4 Anche nell'uomo esisterebbe una variabilita' nella risposta al virus epatico, *suggerendo* l'esistenza di "high" e "low responder" e di "non responder" per la produzione di anticorpi anti- HBS-Ag; quindi anche nell'uomo

5 ci sembra poi l'osservazione che in Occidente forme epidemiche sono state descritte solo in viaggiatori provenienti da paesi africani ed orientali *suggerendo* la possibilità che il turismo sempre più diffuso verso queste aree geografiche, potrà costituire un vero e proprio veicolo di infezione

6 mentre 11 non erano tossicodipendenti e non avevano una storia *suggestiva* per altre eventuali esposizioni parenterali al virus C (trasfusioni, interventi chirurgici, punture accidentali con aghi, ecc.).

7 itterici le transaminasi, che sono fondamentali per la diagnosi di epatite acuta, possono presentare un comportamento che può essere considerato *suggestivo* per epatite non-A, non- B.

8 Questa osservazione, insieme all'elevata percentuale di cronicizzazione della malattia, pari ad oltre il 60 % dei casi *suggerisce* un'alta circolazione degli agenti NANB tra i TD, imputabile sia alla crescente diffusione della tossicodipendenza sia all'elevato numero di

Given this contrast, a search was initiated to see which verbs are used in Italian to carry out the first two functions of *suggest* in English. Students generated concordances of words belonging to either the semantic field of "authors" or of "data". A search for "studi \ studio \ autori \ dati \ ricerche \ ricerca" generated 69 occurrences, which were categorized as follows:

1. examples describing or summarizing this study's purpose, findings or research topic (24 examples);
2. examples underlining the limits of this or existing study/ies and or future perspectives (11 examples);
3. examples introducing suggestions provided by other studies or data (25 examples);
4. miscellanea (9 examples)

Here (see 5 below) I will show some random examples from the third category (examples introducing suggestions provided by studies or data) a category which seems to correspond to the English use of "suggest" with subjects such as "data", "authors", "reports" and the like. These examples indicate possible translations of the pattern "some authors suggest" or "data suggests" into Italian:

(5)

- 36 3 rcentuale di reinfezione epatitica, variabile dal 70% al 100%, è stata segnalata da diversi *Autori* in questi pazienti.
- 37 3 enza dell'HBeAg (antigene nen di HBV) è stata considerata fino a poco tempo fa, e da alcuni *autori* lo è tutt'ora, una controindicazione assoluta al trapianto di fegato per la quasi sicura
- 38 3 oggetti produttori di anticorpi. In un review dell'81 Kaslow e Shaw, dopo aver analizzato i *dati* fino ad allora ottenuti, giunsero alla conclusione che l'apparente contraddittorieta' di questi
- 39 3 Discussione Dai *dati* in esame è emerso: una preferenza dell'affezione per il sesso maschile ed un'elevata incidenza di cir
- 40 3 epatiti croniche classificate ad eziologia NANBV siano in realtà ad eziologia HCV. I *dati* presentati presentano quindi l'importanza della vaccinazione anti-epatite B come cardine della
- 41 3 un marcatore per il carattere "produttore" di anticorpi anti-HBS-Ag hanno dato fino ad oggi dati non significativi, ad eccezione di un lavoro di Forzani e coll. nel quale una aumentata
- 42 3 Discussione I *dati* sopraesposti confermano che il ricorso alla epatobiopsia e quindi al riscontro istologico è fondamentale
- 43 3 iva di ipertiroidismo dopo sospensione della terapia tireostatica. Negli ultimi anni questi *dati* sono stati ora confermati ora smentiti dai vari A.; le discordanze emerse possono essere imputate 44 3 ra il Basedow e un determinato aplotipo H.L.A. e' stato (?Gruce) che nel 1974, riporto' dei *dati* dai quali emergeva che il 47% dei pazienti ipertiroidi (?studiati) erano H.L.A. B8 positivi, in conf
- 45 3 ità a differenza della post-trasfusionale dove si ebbe in 16 su 38 pazienti : Analizzando i *dati* dell'epidemia oro-fecale di epatite NANB del 1982 a Rangoon (Birmania) sono stati descritti tre
- 46 3 mn. Non sembra quindi che l'associazione HBV ed alcol aggravi l'epatopatia. D'altra parte i *dati* della letteratura dimosterebbero che una moderata assunzione di etanolo no ritarda la
- 47 3 ($p < 0,05$) per l'infezione da HBV, almeno nei confronti degli anni più remoti. Questi *dati* semberebbero indicare, almeno nel nostro caso, come il virus B dell'epatite presenti una maggiore 48 48 3 virus epatotropi quali agenti causali di epatiti croniche. Significativa risulta, dai *dati* presentati, la leggera prevalenza dell'eziologia NANBV (45,7%), rispetto a quella HBV (40%).

- 49 3 tico di evoluzione sfavorevole per l'epatite. Concludendo possiamo dire che i nostri dati, concordano con quelli riportati in letteratura, testimoniano l'importanza dell'epatite B nella incid
- 50 3 tuiscono una categoria a rischio nei riguardi di infezioni da più virus epatitici. Numerosi studi condotti negli anni 60 e 70 depongono per la tendenza all'aumento proporzionale dei nuovi
- 51 3 iduare il più precocemente possibile i soggetti candidati al trattamento. Infine il nostro studio evidenzia quanto l'efficacia degli interferoni alfa e beta sia pressoché sovrapponibile, anche
- 52 3 to quella attorno alle radici terminali delle vene sovraepatiche (fibrosi pericentrale). Lo studio delle correlazioni tra alcolismo e virus epatici potrebbe portare nuova luce a questi interrogativi

To sum up, while the use of the verbs "suggest" and "suggerire" in English and Italian scientific papers on hepatitis C, corresponds in the case where the subject is a symptom or the pattern of the illness, this correspondence does not seem to hold where other subjects, such as authors, data, reports, findings and the like are used. More typically, in Italian we have conditional forms such as "dimostrerebbero" or "sembrerebbero indicare" or other forms such as the verbs "emergere", "deporre", "evidenziare" and the patterns "possiamo dire che", "potrebbe portare nuova luce", "significativa risulta".

4. Conclusion

Concordance analysis and comparison of concordances generated from corpora in different languages seem particularly useful for training interpreters and translators for at least two reasons. One is methodological. The experiment described here can be repeated with any homogeneous corpus containing one-topic, one-genre texts. Work similar to that described here has been carried out with small corpora of financial reports, abstracts of neurology, papers in economics. Students are stimulated to create small corpora of homogeneous texts according to their own interests and according to topics and text-types they have to translate in their translation/interpreting courses.

The second reason has to do with the amount of information students can get from a concordance. As shown above, the concordance of RIBA provided a series of information both linguistic and contextual. That is, students not only worked out ways in which sentences with RIBA are organized in English and Italian, they also understood what kind of test RIBA is (a blood test, a test used to confirm the presence of HCV infection, and also an expensive test, used only in certain cases, confirming results from other tests). In the training of interpreters/translators where it is often difficult to integrate students' LSP study with supportive study of the specific discipline in question, concordance analysis

offers students an opportunity to examine special uses of language and also some specific concepts. As Atkinson notes: "the formal aspects of scientific writing are inextricably bound up with the epistemology of science itself" (1992: 342). This is confirmed in this experiment in which specific concepts are grasped by students starting from a linguistic perspective rather than from the background of the discipline and in which they are placed in a position to "interact" with experts of the discipline.

While concordances of comparable corpora in two languages may or may not provide "good" translations for particular words or patterns from the translator's point of view, they seem to offer suggestions about how something is properly and conventionally said in each language. While there may be cases when expressions such as "some authors suggest" cannot be translated with any of the examples obtained through an Italian concordance of "autori" for example, such a concordance may nevertheless be helpful in suggesting that something different from "suggerire" should probably be looked for. Contrastive analyses of specific corpora reveal patterns of language use which are often unfamiliar even to native speakers of the language concerned. An example of this is the expression "confermato al RIBA" to translate "confirmed by RIBA", which neither I, nor my students would ever have thought of, as native speakers of Italian.

Using small corpora inevitably leads to findings which may be considered "suggestions" rather than "results" (see also Ma, 1994). This is interesting in a pedagogic perspective as students are stimulated to carry out further research to check and confirm their "guesses". This procedure is very similar to that adopted in linguistic research where hypotheses are raised and then confirmed through data. In the curriculum of interpreters and translators it seems important that students acquire procedures of linguistic research and are helped to develop their own means of analysis. In this sense and in this pedagogic setting (training interpreters and translators) I can confirm Johns' (1994a) hypothesis that concordance material can be seen as a source for enhancing students' autonomy in language research and analysis.

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