

EFFECT OF AN EXPERT AND CONTEXTUAL INSTRUCTION OF MODALS ON LEARNING

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ABSTRACT. *This paper deals with students' cognitive organization with regard to modal verbs in English. The purpose is to check the effect that an expert and contextual instruction has on learning. In a previous work we had established the differences between semantic networks from native and non-native speakers of English (Sánchez and Alonso 2004-2005). The information obtained in the previous research led us to postulate the difference that a contextual instruction with expert patterns (native-speaker patterns) would make. If students are taught how native speakers actually do tend to group modals they will learn these demonstrating learning through their changed perceptions of modal groupings. The results of the current investigation show that native speakers use groupings which fall into epistemic and deontic categories while students, although they are becoming more similar to experts, they still use a mix of formal, grammatical and semantic groupings.*

KEY WORDS. *Pathfinder, organization, English modal verbs, networks, EFL.*

RESUMEN. *Este trabajo trata con la organización cognitiva de los estudiantes en relación con los verbos modales ingleses. El propósito de esta investigación es comprobar el efecto de una instrucción contextual que tenga en cuenta los patrones expertos en el aprendizaje. En un trabajo previo establecimos las diferencias entre las redes semánticas de los hablantes nativos del inglés y las de los estudiantes de esta misma lengua (Sánchez y Alonso 2004-2005). La información obtenida en esa investigación nos llevó a postular la diferencia que supondría una enseñanza que tuviera en cuenta el contexto y los patrones expertos (los de los hablantes nativos del inglés). Si a los estudiantes se les enseña cómo agrupan los nativos los verbos modales captarán su organización mostrando aprendizaje a través del cambio en la percepción de los modales. Los resultados de esta investigación muestran que las agrupaciones de los nativos del inglés recaen dentro de la modalidad epistémica y deóntica mientras que las de los estudiantes, aunque han mejorado con respecto a la investigación previa que aquí se menciona, continúan mezclando rasgos formales, gramaticales y semánticos.*

PALABRAS CLAVE. *Pathfinder, organización, verbos modales ingleses, redes semánticas, inglés como lengua extranjera.*

1. INTRODUCTION

A lot of research has been done to check the influence of context on comprehension (Battig 1979; Shea and Morgan 1979; Mannes and Kintsch 1987; McNamara, Kintsch, Songer and Kintsch 1996; etc.) However, not much has been done about the effectiveness of classroom language instruction that uses context. This is the reason why in this paper an experiment that tests the benefits of this popular activity experimentally, together with native speaker patterns (Sánchez 2004), is carried out. It is based on a study (Sánchez and Alonso 2004-2005) whose main idea was that students of English as a foreign language (EFL) with an intermediate level differed from the most proficient subjects, in this case English native speakers (the experts), in the cognitive strategies used to represent and organize their knowledge (Egan and Schwartz 1979; Larkin, McDermott, Simon and Simon 1980; McKeithen, Reitman, Rueter and Hirtle 1981; Cohen 1996; Ericsson and Lehmann 1996; Smith and Johnson 1995; etc.) In the research by Sánchez and Alonso an experiment which intended to clarify the status and quality of the semantic relations which both groups of subjects presented in their conceptualization of modal verbal forms in English was done. All subjects participating in the experiment were students at the Universidad de Salamanca. The group of native speakers studied at the University International Program; the non-natives were first-year students of English Philology. In order to obtain a network representation of the students' conceptual organization of English modal verbs, we used the Pathfinder algorithm (See Appendix A for a full explanation. For technical details of the Pathfinder algorithm see Schvaneveldt, Durso, Goldsmith, Breen, Cooke, Tucker and De Maio 1985; Schvaneveldt, Durso and Dearholt 1989; Schvaneveldt 1990; Thompson, Gomez and Schvaneveldt 2000). The Pathfinder generated a network of relations between the standard modal forms showing significant differences in both groups of subjects, the main one being that native speakers organized the modal forms according to what could be considered semantic criteria, while the non-native showed a tendency to prioritize formal and grammatical relations over semantic relationships.

To illustrate the nature of this difference we may consider how *should* was treated by both groups of subjects. In the native network (Figure 1), *should* was directly linked to *ought to* (due to the fact that the two forms express weak obligation, Leech 2004); but the non-native group directly related *should* to *would* (Figure 2) and established a remarkable distance between *should* and *ought to*. Thus, in the non-native network, the connection started with *would* which was linked successively to *should—must—have to—had to* and then finally to *ought to*. This organization seemed to obey, first, a grammatical criterion as in formal teaching *should* and *would* are often presented as different persons of the same auxiliary verb; second, it seemed to respond to a graded temporal arrangement alternating forms marked for present and past, as in the string *must—have to—had to—ought to*. In this way, aspects related to the quality, degree and/or intensity of obligation expressed by each of these modal forms were disregarded by non-native speakers. Therefore, it was thought that the students' organization of English

modal verbs would change with an instruction different from the one received in previous years: It should bear in mind an appropriate context and experts' patterns.

Therefore, the organization of the information in the different stages of the learning of this language was considered to be critical to diagnose the command of a certain semantic field, in this case English modal verbs. It was expected that the native conceptual structures developed with these verbs would be different from those shown by subjects with a lower linguistic level, reflecting a different organization. With these ideas, and taking into account different forms and methods of measuring the students' cognitive structures (Diekhoff 1983; Cooke and Schvaneveldt 1988; Cooke 1992; Gomez and Schvaneveldt 1994; Gonzalvo, Cañas and Bajo 1994; Johnson, Goldsmith and Teague 1995; Gomez, Hadfield and Housner 1996; Cañas, Bajo, Navarro, Padilla and Puerta 1998; Pitarque and Ruiz 1997; etc.), the possibility of detecting changes in the different stages of the learning with a contextual and expert instruction was considered. As the students did not show an appropriate organization of isolated English modal verbs in Sánchez and Alonso's research (2004-2005), it was thought that it would be necessary to teach learners these verbs considering context (Nassaji 2003; Cain 2007; Webb 2007, 2008; Erten and Tekin 2008) and also the expert patterns we had extracted from the experts' semantic network (Sánchez and Alonso 2004-2005). The current research follows the procedures employed in previous research. In this way, the instruction of the concepts, following the hints provided by the data collected in the study we have already referred to, should be carried out with the features and links shown by native subjects and with a methodology which contemplates context.

In this study students will complete a relatedness rating task to test whether there are changes in the subjects' cognitive structure and, therefore, in the organization of the terms due to the effect of this instruction. At the same time, it will allow us to quantify the learning achieved. It is expected, and this is the hypothesis we want to confirm with this research, that learning can be detected in the new relationships established by subjects and in the change in their cognitive organization, since learning entails the incorporation of new knowledge to that which we already have (Cooke, Durso and Schvaneveldt 1986; Cooke and McDonald 1986; Goldsmith, Johnson and Acton 1991; Bajo and Cañas 1992; Bajo, Cañas, Navarro, Padilla and Puerta 1994; Gonzalvo *et al.* 1994; Johnson *et al.* 1995; Cañas *et al.* 1998; Thompson *et al.* 2000). Once the study is finished probably an answer may also be given to this important research question: Are learners' conceptual maps more congruent with those of native speakers after instruction?

2. METHOD

2.1. *Target concepts*

The target concepts consisted of every *pure* and *semi-modal* verb (Appendix B) that can be found in grammars addressed to different readers: functional, cognitive, communicative, referential, etc. (Quirk and Greenbaum 1973; Close 1975; Leech and

Svartvik 1975; Halliday 1985; Thomson and Martinet 1986; Freeborn 1987; Murphy and Altman 1989; Greenbaum and Quirk 1990; Langacker 1991; Downing and Locke 1992; Swan 1995; Bolton and Goody 1996; Parrott 2000). Given that this research is based on Sanchez and Alonso's research (2004-2005) we used the same terms as in that study to pick up changes in the students' cognitive structure with the instruction of these terms. Besides the target concepts these two investigations have in common the initial hypothesis and the procedure.

2.2. *Subjects*

Because we started from the assumption that it was possible to detect changes in the organization of knowledge in the different stages of learning of English modal verbs we first counted on a measure (a rating task) of the two groups participating in the experiment we based our research on (Sánchez and Alonso 2004-2005): 30 English native speakers and 30 EFL students at intermediate language proficiency level (first year students of English Philology) from the Universidad de Salamanca. All the subjects volunteered to participate in the experiment. The native speakers were used to establish comparisons with the cognitive structures of the students of EFL who did not receive instruction. Although there is evidence that semantic structures are not necessarily constant but change with age (Nievas and Justicia 2003), native speakers' patterns can be taken as criterial because they represent a target to be reached. We compared the average data of the expert subjects, obtained with the Pathfinder algorithm, with the students' average data (Sanchez and Alonso 2004-2005) also obtained with the Pathfinder algorithm. The semantic networks obtained with the data from these two groups in the research mentioned enabled us to design a methodology for teaching English modal verbs which was applied to a different group of EFL students at intermediate language proficiency also from the Universidad de Salamanca (N=30). In this methodology native speakers' patterns were specially considered, as shown in their average semantic network, and the context with authentic materials. Students received a 5-week period of instruction on English modal verbs and then we obtained a measure to detect the benefit of this instruction. The similar quantity of time devoted to the English language in both student groups (the group of students who did not receive instruction in Sánchez and Alonso 2004-2005 and the one who received instruction) suggests their initial linguistic homogeneity (average number of years studying English: 9.76 and 9.73).

2.3. *Procedure*

Each subject rated the relationship between each pair of concepts that appeared on the computer screen. They had to judge the relationship between all the possible pairs formed with the 19 English modal verbs (171 pairs of concepts) during the rating session. They were told that in making these types of judgements there were several ways to think about the items being judged (e.g. two concepts might be related because

they share common features or because they frequently occur together), also that our concern was to obtain their first impression of relatedness. To indicate their judgement on the relationship of each pair they had to press a numerical key ranging from 1 to 9, with higher numbers representing greater relatedness. This task had a mean length of 15 minutes. The subjects' ratings were submitted to the Pathfinder procedure (Schvaneveldt 1990; Schvaneveldt *et al.* 1985; Schvaneveldt *et al.* 1989) and they were analysed with the parameters $q=n-1$ ($n=19$) and $r=\infty$ in order to generate the least dense nets and thus perceive more clearly the relationships among the concepts. A mean matrix of 19×19 was made with the data provided by native-speaker subjects and another one was made with the data provided by EFL students. The visual information provided by the semantic networks allowed us to observe expert and student cognitive organization. This qualitative analysis, based on graphic information, was completed with a quantitative analysis in which we obtained the percentage of common links between the two averaged semantic networks: The experts' one (Sánchez and Alonso 2004-2005) and the one we obtained with the data from non-native participants who had received instruction.

2.4. Formal instruction

As the purpose of this research was to detect changes due to the sort of teaching we had planned to apply a period of class-time was used for the formal instruction of English modal verbs (a 5-week period). The instruction was provided by one of their regular teachers who had nothing to do with this research and therefore no interest in the outcome. She used four different teaching sessions (approximately 65 minutes altogether) for the instruction of this lexical field and two more sessions (approximately 30 minutes altogether) for its consolidation. Finally, she took a measure of the group who had received instruction and we submitted their data to the Pathfinder algorithm to be compared afterwards with native speakers' data and, to a lesser degree, with learners' data who had received no instruction (Sánchez and Alonso 2004-2005. See Appendix C for a further explanation).

Once learners received the instruction, a wait of approximately one month was established for the rating task. We let this amount of time elapse because the purpose of the research was to investigate the effect that the class explanations had over a long period of time. To avoid having any changes we might obtain being due to subject study instead of the instruction, subjects were told that this lexical material would not be included in their mid-term exam. Neither were they told, at any moment, that they would be tested on this material.

3. RESULTS

It has been shown in the investigations carried out by Sánchez and Alonso (2004-2005), Sánchez and Alonso (2003-2004) and by Alonso and Sánchez (2005) that EFL learners (intermediate level) and native speakers of this language organize English

modal verbs differently. Native speakers (Figure 1) follow mainly semantic criteria, while non-native speakers (Figure 2) seem to follow semantic but also formal and grammatical principles. This mixture in their cognitive structure is probably due to a poor comprehension of modal verbs that do not let students discriminate and organize them properly. In this way students established a link between *would* and *should* as a result of grammatical explanations in class dealing with the conditional tense. The link between *should* and *must* makes us also think that students do not fully understand these terms. Although both of them imply obligation the term *should* should be closer to *ought to*, and with a direct link, to express a light degree of obligation. The same thing happens with the semantic function of possibility (sequence *would* – *could* – *can* [*be able to*] – *may* [*might*] – *dare*) in which there is a link between *would* and *could* probably because of the past form they represent.

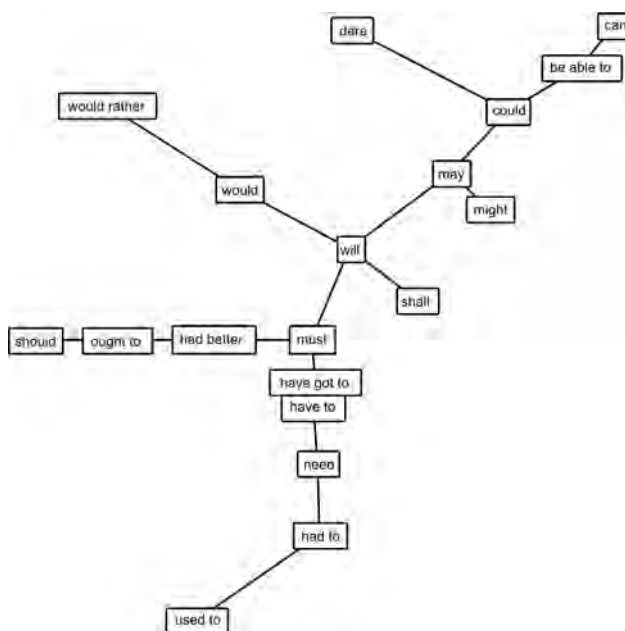


Figure 1. Mean net of the native speakers ($q=n-1$, $r=infinite$). The distance between the nodes indicates the greater or smaller distance between the concepts.

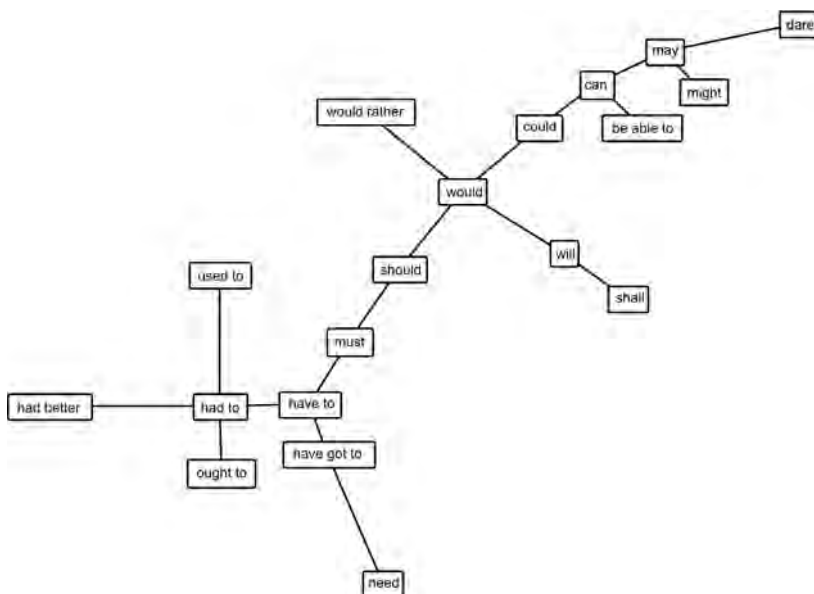


Figure 2. Mean net of the English language students ($q=n-1$, $r=infinite$). The distance between the nodes indicates the greater or smaller distance between the concepts.

However, in this research where we compare the average cognitive network of EFL students who received a contextual instruction with expert patterns (Figure 3) to the one obtained with the expert data (Figure 1) we observe that learners have become closer to native speakers as the literature in the field dealing with knowledge organization predicts (Egan and Schwartz 1979; Larkin *et al.* 1980; McKeithen *et al.* 1981; Schvaneveldt *et al.* 1985; Cooke *et al.* 1986; Cooke and McDonald 1986; Schvaneveldt *et al.* 1989; Schvaneveldt 1990; Goldsmith *et al.* 1991; Bajo and Cañas 1992; Bajo *et al.* 1994; Gonzalvo *et al.* 1994; Johnson *et al.* 1995; Smith and Johnson 1995; Cohen 1996; Ericsson and Lehmann 1996; Cañas *et al.* 1998; Thompson *et al.* 2000). Their conceptual maps are more congruent with those of native speakers after instruction.

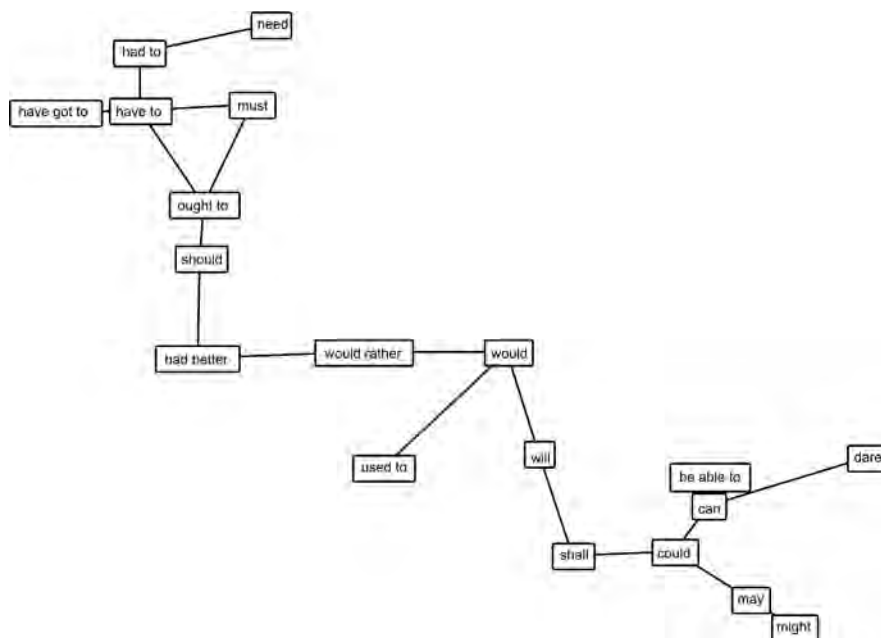


Figure 3. Mean net of English language students who have received instruction ($q=n-1$, $r=infinite$). The distance between the nodes indicates the greater or smaller distance between the concepts.

At this stage they have two more links in common (9, 50%) with the expert net than before receiving instruction (7, 38.8%). These two new links are established between: *ought to-should* and *could-may*. If we pay attention to whole semantic network and to these new shared links we can state that students now are following semantic and not grammatical or formal criteria, otherwise *ought to* would be directly linked to *shall* (not *should*) and *could* would appear directly linked to *might*. In some occasions they even exhibit the same sequence: *would rather-would-will-shall*. They even establish a similar grouping of verbs according to their meanings. In the student's net we can distinguish, as in the expert one, four basic meanings for modal verbs with different nuances:

1. Weak and strong obligation (the first one with: *had better, should, ought to* and the second one with: *must, have to, have got to, had to* and *need, etc.*)
2. Possibility, ability and permission (on one side: *could, can, be able to* and on the other side: *may* and *might*).
3. Intention (*will* and *shall*).
4. And finally, condition, advice and invitation (*would* and *would rather*).

All these similarities and the cognitive changes show that students have developed a better understanding of English modal verbs with this kind of instruction.

In the research by Sánchez and Alonso (2004-2005) it was found that *dare* and *used to* should be considered apart from the aforementioned verbs. This study also supports that idea since the longest distances –which indicate that the concepts are conceptually far from each other– were produced between the nodes containing those terms (*would -used to*: 0.5958, *can - dare*: 0.5917). We again find *dare* connected to the meaning expressed by *can* (in the native network it was directly linked to *could*). In the student's net, obtained with the data of non-native participants who had received instruction, *used to* is linked directly to *would*. In this case this was due to the influence of the formal instruction, since both terms were explained the same day when students were taught habitual actions.

4. CONCLUSIONS AND DISCUSSION

The comparison between the expert net and the one carried out with the data of the group that had received instruction allows us to easily visualize the similarity between the two nets and also draw, specially if we keep in mind the students' semantic network before instruction (Figure 2, Sánchez and Alonso 2004-2005), a conclusion: Existence of learning. The high percentage of common links between native speakers and students (50%) implies a better understanding of English modal verbs due to this type of instruction. It also points to a bigger similarity between these two groups of subjects. The learners' conceptual network obtained with the data of students who have received instruction shows that there was a change in the organization of the material. They mainly exhibit semantic criteria and their conceptual maps are more congruent with those of native speakers after instruction. The benefit produced in students with this type of instruction is detected qualitatively as well as quantitatively, thus confirming the experimental hypothesis.

It also provides evidence (Sánchez and Alonso 2004-2005; Sánchez and Alonso 2003-2004; Alonso and Sánchez 2005) in considering *dare* and *used to* apart from English modal verbs. This finding supports those grammars which do not introduce these two verbs as *pure* modals but as *semi-modals*. We think that the best methodology to teach these two verbs is in due course as the teaching situation requires and not with the rest of modal verbs, avoiding in this way an interfering effect (Erten and Tekin 2008). This result can be very important from a pedagogical point of view and should be considered in English language textbooks.

Although the methodology followed in this research has been proved to be useful for teaching English modal verbs there is still much to be done, the field is open and more research in this line is needed. The instruction did help move learners' semantic networks closer to that of native speakers, but there is no evidence that shows whether the particular type of instruction used in this study was more effective than other methods. This is an area of future research-along with the question of whether or not

instruction in modal verbs increases the accuracy in the use of modals by the students, which is what the ultimate aim has to be.

NOTES

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This paper has been carried out thanks to two research projects one granted by La Junta de Castilla y León (SA062/02) and the other one by El Ministerio de Ciencia y Tecnología (BFF2002-01315).

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APPENDIX A. THE PATHFINDER ALGORITHM

The Pathfinder algorithm "has been used to investigate knowledge structure in a number of domains, including adult memory (Cooke, 1992; Cooke *et al.*, 1986; Cooke and Schvaneveldt, 1988), learning (Gomez and Schvaneveldt, 1994), and assessment of knowledge growth (Goldsmith *et al.*, 1991; Gomez *et al.*, 1996). ... The Pathfinder network scaling algorithm generates empirically derived network representations of the associative structure among a set of concepts by taking psychological estimates of distance (e.g., relatedness ratings) as input and outputting a graphic representation of a person's semantic network (Schvaneveldt, 1990; Schvaneveldt *et al.*, 1989). Once produced, the networks for people in different age groups can be compared using a numerical index of structural similarity ... We assume that the resulting associative structures reflect knowledge of people, actions, or objects related to events." (Thompson *et al.*, 2000: 595–596).

Besides the references already mentioned it is also worth considering the research carried out by Gonzalvo *et al.* (1994) and by Pitarque and Ruiz (1997).

APPENDIX B. MATERIAL

Target concepts

Be able to	Have to	Should
Can	May	Used to
Could	Might	Will
Dare	Must	Would
Had better	Need	Would rather
Had to	Ought to	
Have got to	Shall	

APPENDIX C

Instruction

1. In the first session students spent about 20 minutes examining the contextual information and the modal verbs which appeared in a text extracted from the student's book (*The Regurgitator*. Haines and Stewart 1996: 10). As they were working on habitual actions the teacher mentioned differences related to *would* and *used to*.

2. In the following session (15 minutes) they discussed different meanings and possibilities to be used in the text *The Perfect Flatmate* (Haines and Stewart 1996: 15).
3. In the third session (20 minutes) they worked with two texts from *Time* (“A Devil’s Bargain”, Matt Rees and “Why Bush Isn’t a Shoo-In”, Joe Klein, February 9, 2004) and one from *Newsweek* (“Who Is the Bigger Threat”, Richard Wolffe, January 13, 2003). Before giving out these texts to students we underlined modal verbs and we printed in italics words or expressions leading to the use of a specific modal verb. This was a very good help for learners to pay attention to the context.
4. In the fourth, and last teaching session, each student was given a copy of the expert cognitive structure obtained with the native data (Sánchez and Alonso 2004-2005. Figure 1), because exposing students to the expert cognitive structure has been proved to be very useful with complex lexical groups (Sánchez 2004). With this visual aid they did an exhaustive analysis dealing with the relationships established by the expert subjects. They considered the indirect and direct links that came out from each node and, also, they took into account the closeness of the terms, since a smaller distance among them indicates a greater proximity. Every term was briefly explained in English and the targets were presented in contexts (multiple contextual encounters with words like *possibility*, *probably*, *maybe*, etc.) Sometimes the teacher also made use of example sentences in Spanish as a means of comparison. This elicited a good number of questions on the main concept, on the proximity or distance of a term, etc. The time of class devoted to this activity was 10 minutes.

Consolidation

1. The consolidation phase took place one week after finishing the teaching sessions. Students were given a sheet of paper containing a warming up text in which we had printed modal verbs in italics (Spratt and Obee 2001: 149, exercise 2) and two fill in exercises in which they had to complete the text with suitable modal verbs (Haines and Stewart 1996: 140, exercise 2A; Spratt and Obee, 2001: 140, exercise 3). It took students ten minutes to write and correct the texts. Corrections were done in pairs and when a grammatical problem arose the teacher gave a semantic explanation to the whole class.
2. The following day each student got a random card with a modal verb on it and a semantic function in brackets and they were asked to write a brief text containing the modal verb with a specific function. Three of the students wrote on the blackboard what they had written and the rest of them participated in the corrections. The task and the corrections were done in approximately 20 minutes.