

Facilitation of cognitive frames to support language learning*

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Abstract

The idea that every learner shares the cognitive frames improves the quality of the learning environment by helping prevent discrimination against the learners' language proficiency when both first and second language learners are learning together. I first discuss such cognitive frames are relevant to the development of language learning. This casts some doubt on the dichotomy between native and non-native language. I use examples to show the similarity between the developmental processes of first and second language learners. Then I discuss how to facilitate cognitive frames, mentioning the importance of "refinement" and "triggering" in teaching and learning activities no matter what instructional environment is provided. In conclusion, I propose some pedagogical implications that follow from the theory of cognitive frames in second language learning.

Keywords: facilitation, cognitive frames, scaffolding, language development

1. Introduction

As has been widely discussed elsewhere, the number of second language learners (L2Ls) in elementary and secondary schools is increasing throughout the world. Attending school itself invites pedagogical difficulties for these learners. Such difficulties include high dropout rates, poor academic achievement, first language loss, racism in and out of schools, and cultural impediments to adapting to school (Gunderson, 2000; Suárez-Orozco & Suárez-Orozco, 2003). Teachers are attempting to find supports for these learners and that is the reason behind activities such as "scaffolding," or gradually promoting learners' independence, which have developed during the last two decades (e.g., Mohan, 1986; Richard-Amato & Snow, 1992; Cummins, 1996; Mohan, Leung & Davison, 2001; Gibbons, 2002).

This article discusses, from a cognitive linguistic standpoint, some prerequisites for enhancing scaffolding intended to inform researchers, practitioners, and policy makers concerned with the language aspects of L2Ls. The purpose is to offer theoretical support for the view by Cook that the non-standard patterns of speech used in the second language may be viewed, not as errors, but as evidences of development (Cook, 1971: 103). An additional purpose is to provide an

affirmative value for the language that L2Ls use. An analysis of their language clarifies a mechanism linking language with the cognitive proficiency of learners and brings us valuable information in linguistic investigation. The findings from my analysis explain the background of scaffolding and offer teachers more effective approaches that promote L2Ls' language development.

2. Cognitive frames

Researchers and educators in the last two decades have come to believe that language proficiency in total consists of more than just knowing language meaning and form. The latent psychological mechanisms of language, such as attention, memory, and interpretive processing, have been analyzed in a number of ways (e.g., Robinson, 2001). In the field of second language pedagogy, the term "cognitive proficiency" has been used to describe a language learner's behaviors, learning strategies, or academic knowledge in the course of acquisition of a target language.¹ This is, however, not to say that the term is uniquely defined and that there is a unified view of what the cognitive correlates and components of learning are.

One solution to such an ambiguous definition of cognitive proficiency is to regard language as a reflection of how a situation is conceptualized by our experience and corporality. Cognitive linguistics has been particularly focused on the correlation between interpretation of language and our conceptualized knowledge (e.g., Lakoff, 1987; Langacker, 1987; Lakoff & Johnson, 1999; Talmy, 2000). One view is that when they produce or interpret language, human beings have latent mechanisms in their minds called cognitive frames.² Among these cognitive frames, prototypes and schemas³ may be particularly relevant when it comes to second language development. What seems certain is that language learners can activate or access these structures as they develop their second language proficiency.

It is important to note here that not all of the prototypes and schemas are language universal; there is a continuum from general frames to specific ones in each particular language (cf. Langacker, 1987: 45-47). In vocabulary development, language learners create a taxonomic hierarchy by "elaboration" where a word is categorized under a super-ordinate structure or schema, and by "extension" a word is tentatively grouped with pre-acquired terms (Langacker, 1987). The data in the field of language acquisition generally suggest that language learners manipulate such cognitive mechanisms in vocabulary development irrespective of their first language (e.g., Rosch, 1978; Matsumoto, 1993; de León, 2001).

In vocabulary/phrase classification, on the other hand, each member categorized under the same schema varies among languages. One example of this

relates to “embodiment schema,” which is a metaphorical structure expanding from a body part (Lakoff, 1980). This demonstrates that other languages do not always have expressions that are directly comparable to the English examples, although there may be a correspondent phrase in meaning.⁴

Even schemas *per se* are different among languages. Let us take a closer look at schemas with respect to quantification expressions in English and Japanese. Quantification expressions in general have an integrated schema composed of three types of units: a quantity, an entity, and a categorized marker. In both languages, a quantity may be described as a numeral or enumeration, and an entity as a nominal, which I will henceforth call a Q (quantity) E (ntity) schema. Each language, however, has a different way to express how to categorize entities, using a classifier (in case of Japanese), or plural inflection (in case of English). In English, *apple*, *card*, *pencil*, *bug*, *sparrow*, and *student* should be classified into discrete or countable entities, whereas *water*, *paper*, and *furniture* are classed as continuous or mass entities (e.g., Langacker, 1987). In Japanese, on the other hand, all those entities would be separated into different categories: *ringo* (apple) into *-ko* (three-dimensional objects), *kaado* (card) into *-mai* (two-dimensional objects), and *enpitsu* (pencil) into *-hon* (one-dimensional objects), etc. (see Matsumoto, 1987, 1993).

At first glance, English seems to have a less complicated grammatical system of quantificational expressions than Japanese. English is, however, more ambiguous with respect to interpretation of plurals. Some plural nouns such as *oats*, *guts*, *bowels*, *binoculars*, *woods* and so on do not have a referent that is divisible into clearly discrete components (Langacker, 1987: 77). This type of complexity, that is, internal complexity, seldom occurs in a classifier category in Japanese.⁵ Examples such as *waters*, *papers*, and even *diamonds* demonstrate that some terms occasionally shift from one category to another. This phenomenon of category transition rarely appears in Japanese.⁶ These data do not suggest that the count/mass distinction in English is more complicated than the equivalent Japanese classification schema. They only indicate that both schemas are language specific.

3. Schema development

In this section, I will particularly focus on the idea that schema development corresponds to a process of constructing cognitive frames. This process was once discussed with respect to organize categories around prototypical instances and under schematic structures. Rosch (1978) discussed how learners recognize basic level vocabularies as prototypes and use them to expand and refine their vocabulary knowledge. An earlier study by Kellerman (1979) on L2 acquisition

suggested that the prototypical meaning of a lexical item is acquired first, followed by its marginal meaning.

Let us consider the following developmental sequence in utterances from a ten-year-old L2L of English whose native tongue is Japanese.⁷ He spoke in response to picture card A (two bags), B (two entities, i.e. a cup and a glass), C (two drawing pictures). The data in (2) below are the responses of the same L2L one month after the utterances in (1):

- (1) A. "bag...big bag and little bag."
 B. "ice?...ice café and hot café."
 (the term pronounced as 'café' in this case means 'coffee')
 C. "pictures."
 (2) A. "bag...small bag and little."
 B. "coffee an-...no...hot n hot and hot and co-...cold."
 C. "p-...picture...no...pictures...two picture."

As a beginning learner of English, this child vaguely names what he sees with/without an article or a plural marker. Thus, it does not seem to be possible for him to make a distinction between count and mass at this stage. This phenomenon, however, indicates that quantity-entity relationship is firmly recognized because two entities are expressed individually with *and* in a phrase (i.e. enumeration). Moreover, the numeral *two* appears without a plural marker as in (2C) above. This could be predicted that the attributive use of numerals is prior to the count/mass schema refinement.

The following data from two L2Ls of Japanese who are both twenty-one-year-old English native learners (indicated by the serial number (3) and (4) respectively) also supports the idea that it is equally difficult for them to use language specific schemas despite their proper usage of numeral modification based on a QE schema. The learner in (3) responded to the same picture card C, and the one in (4) responded to card D (two people talking on a windy day).⁸

- (3) "kono kaado no naka ni futa ri e ga arimasu."
 this card GEN inside in two CL picture NOM be (inanimate)
 (There are two pictures in this card.)
 (4) "hitobito ga futa tsu...futa ri arimasu... imasu."
 people NOM two CL two CL be (inanimate) be (animate)
 (There are two people.)

Both the learners equally recognize quantity-entity relationships, but they do not

properly categorize entities. In (3), *e* (picture) is counted by the classifier *-ri*, which is used to mean human beings in general. The classifier *-ri* in this case should be replaced by the classifier *-mai* or *-tsu* as in *futa tsu no e*, or *ni mai no e* (two pictures). Likewise, the confusion between *-ri* and *-tsu* occurs in the learner (4). This learner's restatement of *arimasu* also illustrates the difficulty of categorization.

Given that such a QE schema is language universal rather than language specific, it should be relatively easy for learners to construct as long as they have understood it in their first language. As a result, learners first acquire the general structure such as the QE construction, followed by categorization (i.e. count/mass distinction in the case of English learners, or classifier distinction in the case of Japanese learners). It would take some time for language learners to refine a general schema into a specific one. This refinement process would be equivalent to a trial-and-error category-making process in the acquisition of the first language (Clark, 2001; Bowerman & Choi, 2001). As Clark (2001) pointed out, such temporal categories (i.e. emergent categories) should offer information about universal conceptual categories that underlie languages. They are general or unrefined categories. Because these categories may not receive overt linguistic expressions in every language, the initial productions of learners are different from language-specific conventions of expression.⁹ Actually, they “reveal part of the discovery process in acquisition” (Clark, 2001; 381).

4. Sharing schemas among learners

After general-to-specific refining their schemas, learners know not only how to express themselves properly based on conventional usage, but also how to have constructed schemas (i.e. history) in the process of their own schema development. This explains why learners (including first language learners or L1Ls) understand the meaning of the expressions of other learners, who are in the process of refining their own schemas, even though the expressions of the other learners may not be “perfect” or native-like. This is the case in the following examples by two nine-year-old L2Ls of Japanese (indicated by the number (5) and (6) respectively) whose native tongue is Portuguese. The learner in (5) uttered in response to card E (a person looking outside from the window in a house), and the one in (6) to card F (people getting on and off a bus).

- (5) “hito ga mado ni deru.”
 person NOM window to exit
 (To mean, a person shows his nose at the window.)

- (6) "kono hito ga basu ni oriru."
this person NOM bus to get-off
(To mean, this person gets off the bus.)

All the other colleagues (i.e. L1Ls of Japanese), who listened to the utterances above, perfectly understood what they wanted to say (indicated in the parentheses above), even if both the L2Ls of Japanese uttered un-conventional usage¹⁰ of the postposition *ni*. Note by comparison, if *kara* were used as in the following goal profiled situation (where goal oriented predicates such as *enter* or *get on* are used), L1Ls could never interpret those *karas* as *nis*.

- (7) Hito ga mado kara hairu.
person NOM window from enter
(A person enters from the window.)
(8) Kono hito ga basu kara noru.
this person NOM bus from get-on
(This person transfers from the bus to the other.)

These examples indicate that learners (regardless of what their native tongues are) had once been in the same process of overgeneralization of *ni*¹¹ instead of *kara*. It would be appropriate to say that *ni*-schemas develop first then *kara*-schemas, and that learners have never been in the learning process of overgeneralization of *kara*.

The same discussion can be applied to the examples in (3) and (4). While L1Ls of Japanese and L2Ls acquiring classification schemas notice that the classifiers in (3) and (4) should be replaced to the other classifiers, they would never recognize that those numerals (*two*) or entities (*pictures or people*) should be replaced to the other different things. Moreover, they understand what L2Ls want to say even if they utter a sentence without a classifier as in (9):

- (9) Kono kaado no naka ni futa/ni e ga arimasu.
this card GEN inside in two picture NOM be (inanimate)
(To mean, there are two pictures in this card.)

But if L2Ls used a sentence without a numeral as in (10), they would not understand properly what meaning the sentence has.

- (10) Kono kaado no naka ni tsu/mai e ga arimasu.
 this card GEN inside in CL picture NOM be (inanimate)
 (To mean, there are (two, or some) pictures in this card.)

This analysis also predicts that learners could share the same developmental process of QE-to-classifier schemas, not the other way round.

The discussion above suggests that it is possible for L1Ls to interpret what L2Ls want to say if they could share similar processes for the development of cognitive frames. Thus, it may be that interaction between L1Ls (including teachers) and L2Ls would always be possible through the course of language learning as long as they share the frames.

5. Facilitation of cognitive frames

Most language teachers can experientially access cognitive frames,¹² as Gibbons (1998) mentioned “the language of the teacher would be likely to be *comprehensible* because of the schematic knowledge of the learners” (Gibbons, 1998: 110). Teaching strategies like “simplification,” “expansion of ideas”, and “direct definition” as stated in Richard-Amato & Snow (1992: 151), are based on prototypes and schemas. As these authors point out, the strategies which teachers and learners use are not simply the replacement of difficult words with simpler forms, but are the way of adding new elements which are cognate and frequently-used vocabularies, i.e. prototypes. Furthermore, the new elements are shown together with the key or target vocabulary in the discourse within which they are included. This conveys the idea that the key vocabulary should be introduced under the schematic notion, which is exemplified by the subsequent argument of Gibbons (2002). It indicates how learners develop their familiar words like *stick* or *push away* into the scientific terms *attract* or *repel*. They have the ability to know that these new words can be used in scientific discourse because they re-create a new schema of *magnetic field* under which these two words are categorized. Through appropriate instruction (i.e. scaffolding), they come to understand that these words are antonyms in terms of magnetic force. Those ways of approach can be called facilitation of cognitive frames.

It should be noted that to facilitate a cognitive frame does not suggest a particular instructional approach, nor does it force a choice between grammar-centered and communicative teaching methodologies. Pica (2000) points out that learners can receive benefits even from instructions purely about grammar if they are “able to focus attention on L2 form in relation to message meaning” (Pica, 2000: 8). One of Pica's examples is the “garden path approach”, in which learners are first taught regular forms of verb structures, and then they do exercises to

develop both regular and irregular structures. He proposes that the general-to-particular order of instruction is necessary for a learners' rapid progress. In this case, the learners are first motivated to construct the new general schema of verbal structure and then are led to refine it.

In contrast to such grammar instruction, one instructional technique from the communicative teaching methodology, peer or group work, has important advantages, in that learners receive repeated samples of information which enables them to interpret the utterances of other learners. They also have ample opportunities to produce their own sentences. This has been described by several authors (McGroarty, 1993; Richard-Amato & Snow, 1992; Gibbons, 2002). The activity, however, is said to be less effective when it is carried out over a long period "because the input they receive from peer learners reinforces their own errors and misanalyses of the target language" (Pica, 2000: 12). The important point here is that peer work *per se* does not work effectively without guidance by teachers or others who model or directly describe the patterns to be learned. For most effective learning both peer-negotiated and teacher-guided segments must be used during the course of the lesson (Gibbons, 1998, 2002). These two curriculum segments can be considered as corresponding to the developmental processes of cognitive frames; the first segment is the trial-and-error stage which is necessary to refine a schema, and the latter is the set-up stage which creates a new schema or triggers the direction of the schema development.

Therefore, no matter what way instruction may be conducted in a classroom, it would make an effective contribution to the promotion of a learner's language proficiency if it emphasizes the cognitive dimension of learning.

Consider again a quantificational schema in Japanese. In order to produce an appropriate expression using the classifier *-hon*, a learner must understand what kind of objects are categorized under the classifier and which objects are to be considered as prototypes. With respect to *-hon*, the learner notices the longitudinal dimension of objects in the process of language refinement, and so he or she will try to collect and classify objects like pencils, trees, sticks, strings, lines, etc. In contrast, unless the learner is encouraged to pay specific attention to the usage beyond that classification, the marginal or atypical objects could not be categorized (Matsumoto, 1993). These might include such things as teeth, cassettes, letters, telephone calls, medical injections, and even home runs (Lakoff, 1987), which all represent conventional but marginal usage for *-hon*. Thus, both refinement and triggering processes should be included in the facilitation of cognitive frames.

In the course of learning, there should be no difference in priority between the use of refinement and the use of triggering. Triggering fixes the direction of

refinement, while refinement provokes the next stage of triggering. Both processes should be repeated so that learners can stabilize their cognitive frames. The further elaboration of this issue, however, will rest on future research.

6. Concluding remarks

L1Ls' mature language has been considered as an integral part of the language, while L2Ls' immature language has been recognized as harmful "errors." This dichotomy induces L2Ls to be a position of inferiority with respect to L1Ls. It prevents them from collaborative learning with L1Ls because teachers and fellow students attempt to correct their "errors" throughout their instruction and advice. To help solve this problem, I suggested that we use instruction that emphasizes the development of cognitive frames. I have shown that there are parallel developmental processes between L2Ls with L1Ls and that both language learners may have these cognitive frames in common. This is the reason why scaffolding, which is based on negotiation between L2Ls and L1Ls, is effective as a means of language development in most classroom activities.

It is more difficult for learners to acquire a language specific schema, such as a classification schema in Japanese, than for them to develop a universal schema, as in a QE schema. The difficulty of developing a language specific schema, however, could be decreased by facilitation of cognitive frames where general and specific gaps in language knowledge are bridged by repeated processes of refinement and triggering.

Notes

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¹ Most of the related studies used techniques that investigated correlations between language and cognition (Utsunomiya, 2004).

² In this article, "cognitive frame" is used as a general term to indicate cognitive components such as prototypes, schemas, or profiles as discussed in cognitive linguistics (e.g., Langacker, 1987).

³ A prototype is the cognitive concept which is applied to the unit which is most

salient, most often thought of, most likely to be chosen as representative of, sets of entities. A schema is characterized as a less specific structure relative to another representation of the same entity (cf. Langacker, 1987: 492).

- ⁴ For example, a body part “foot” as in “foot of the mountain” can be used in Vietnamese as in “chân núi (foot-mountain),” or in Mandarin as in “shān jiǎo (mountain-foot),” but not in Japanese or Hindi. Likewise, “neck” as in “neck of the sea” can not be used in the three other languages to indicate a long narrow part of the sea.
- ⁵ Some classifiers, *-tsu* for example, show internal complexity in that they can be used for most references except animate objects (Matsumoto, 1987). Some of the data mentioning frequencies of Japanese classifiers (e.g., Kokuritsu Kokugo Kenkyusho, 1982; Downing, 1984) suggest that *-tsu* is acquired prior to all the other classifiers. Given this, *-tsu* should be based on a similar general schema as the count/mass schema in English in terms of its necessity of elaboration for perfect acquisition.
- ⁶ Category transition of Japanese classifiers might be possible for pragmatic reasons (Matsumoto, 1993). This issue, however, must be left aside in this article. Note here that it is possible to provide a cognitive account of classifier choice (Utsunomiya, 2001). With respect to count/mass distinction, Ikegami (2000) also argues the countable usage of mass nouns and the mass usage of countable nouns from a cognitive point of view.
- ⁷ All the learners' utterances in this article are from research data gathered under my research project conducted at the University of British Columbia and Shizuoka University in 2002-2003. Subjects were grouped by age (6-21), mother tongue (Japanese, English, Portuguese, Chinese), and second language (Japanese, English). They expressed orally in their L2 what they saw in a flash card picture. Double quotation marks are used for an utterance of the learners, a question mark refers to a rising tone, and a dot represents approximately a half-second pause.
- ⁸ The following abbreviations are used throughout this article: GEN = genitive, NOM = nominative, CL = classifier. English translations are provided with parentheses at the bottom of each example.
- ⁹ This is the reason why early expressions have been regarded as “errors,” in that “these [L1Ls] ‘errors’ are not generally thought of as errors in the same sense as those produced by L2 learners,” as pointed out by Ellis (1994: 47).
- ¹⁰ In this situation (where source oriented predicates such as *exit* or *get off* are used), *ni* must be replaced by *kara*.
- ¹¹ Ikegami (1981) proposed that *ni* (goal) schemas are more unmarked or general than *kara* (source) schemas.

- ¹² Utsunomiya (2003) presents what a skillful second language teacher did during her instruction. The method of her instruction was to engage a learner's cognitive proficiency or association based on schemas. This way of teaching corresponds to facilitation of cognitive frames.

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要旨

言語学習を支える認知機構の活性化

学習者全てに認知機構が備わることを裏付ける試みは、言語能力による学習者の不当な区分を回避し、学習（環境）の質を高める上で重要な視座である。特に、多文化共存状況における問題を解決し、母語話者と第二言語学習者との協働による学習を進める上では必要不可欠な観点となる。まず、代表的な認知機構であるスキーマを取り上げ、言語普遍のものと同別言語固有のものとの差を提示し、差が生じる要因と連続性について議論した。次に、母語と第二言語の機構の発達過程を取り上げ、普遍的なスキーマから固有スキーマへの発達の様相を記述した。そして、これらスキーマの活性化方法を「方向づけ（抽象化）」と「精緻化（具体化）」という促進法に帰し、教育環境の差を乗り越える方策を提案した。終章で正用の教授といった同化的扱いを脱した「介添法（足場法）」の意義を、言語観の変容からも支持していくべきことを確認した。