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THREE DIMENSIONS OF VOCABULARY DEVELOPMENT

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Progress toward establishing a model of lexical development to guide vocabulary acquisition research requires more precise specification of the various dimensions of lexical competence, the interrelationships among them, and how they interface with processes of word learning and use. Three dimensions of lexical competence are proposed: (a) partial to precise knowledge, (b) depth of knowledge, and (c) receptive to productive use ability. The relationship between the two knowledge dimensions and the acquisition of word meaning is considered, with emphasis on the complexity of the semantization[1] process and on the need for redefining lexical development as both item-learning and system-changing. The adequacy of the three-dimensional description as a reflection of the process of vocabulary development is then discussed. Consideration of the nature of the developmental interrelationships among the dimensions raises two further questions: (a) Is depth of knowledge a prerequisite for developing precise comprehension? and (b) Are precise knowledge and depth of knowledge prerequisites for a word to become productive?

The 1980s and 1990s have experienced a growing interest in vocabulary learning and teaching. New insights in a range of different research fields have all added to our understanding of vocabulary development. Vocabulary acquisition research has established itself as a central research focus for language acquisition researchers. A point has been reached where there is a need for more clarity and standardization in relation to describing central processes in vocabulary learning and use. In the research literature the same terms may be

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used by researchers for different processes or subprocesses. Teichroew (1982), for example, emphasized the range of terminology used to describe the dichotomy between receptive versus productive vocabulary. The terms *breadth* and *depth* of vocabulary knowledge are also used in a number of different ways (Harley, 1995; Meara, 1996a; Read, 1988; Wesche & Paribakht, 1996).

In some of the most quoted overviews of vocabulary knowledge (e.g., Nation, 1990; Richards, 1976), a number of very different knowledge components as well as learning and production and reception processes have been grouped together in a more general description of lexical competence. In an overview of aspects of knowledge of the lexicon, Gass (1988) noted the many definitions and distinctions made in the research literature. The random grouping of knowledge components and learning processes in these lists is an indication of the need to discuss the nature of and interrelationships among various aspects of lexical competence and learning and production processes. Because of the complexity of the processes involved, it may be difficult or even impossible to delineate these processes and knowledge components, but if we want to take the first tentative steps in the direction of developing a unified theoretical construct of lexical competence and a model of vocabulary development, it is necessary to strive for more precision and standardization.

THE CONSTRUCT OF LEXICAL COMPETENCE

When describing *lexical competence,* one may choose either a global description (with one or two dimensions) or a description of many separate traits including all aspects of word knowledge (e.g., the numerous aspects included in the lists mentioned above; Nation, 1990; Richards, 1976). Meara (1996a) argued that the latter is impracticable because more traits are continually added, and he therefore proposed a model of lexical competence with only two dimensions: *size* and *organization*. I see a need for being more specific and suggest three dimensions as a balanced position between the global and the separate trait view. I propose that we distinguish among three separate but related vocabulary dimensions: (a) a "partial-precise knowledge" dimension, (b) a "depth of knowledge" dimension, and (c) a "receptive-productive" dimension.

One way of getting an indication of how researchers understand the construct of lexical competence is by examining the focus of research in various studies and the types of vocabulary assessment instruments used in the research. The following section briefly surveys some of the different test formats used in vocabulary research and explores their underlying assumptions about lexical competence.

Dimension 1: The Partial-Precise Knowledge Dimension

Numerous quantitative studies—for example, reading studies that measure vocabulary size or breadth (e.g., Hazenberg & Hulstijn, 1996) and various types

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of achievement tests—define vocabulary knowledge as precise comprehension. Knowledge of a lexical item is operationalized as the ability to translate the lexical item into the L1, to find the right definition in a multiple-choice task, or to paraphrase in the target language. In a comparative study of teaching methods, Merry (1980), for example, asked his informants to match L1 words with L2 words. This understanding of vocabulary breadth corresponds with the dimension of *size* proposed by Meara (1996a).

Word-recognition tasks or checklist formats have also been used as quick and very simple formats for measuring vocabulary size in the L2 (Palmberg, 1989), for making comparisons between individuals' vocabularies (Beauvillan & Grainger, 1987), and as pretests in learning studies (Herman, Andersen, & Nagy, 1987; Nagy, Herman, & Andersen, 1985). Lexical-decision tasks of this kind can, however, only give an indication of whether or not a certain item is recognized as being part of the learner's vocabulary. Word recognition only demands the ability to recognize formal features; the learner may or may not reflect on meaning. Moreover, formats of this kind will not distinguish between items of which the learner has a vague versus a fairly precise knowledge.

Some researchers have used a combination of tasks in order to tap distinct levels of understanding along the partial-precise knowledge dimension (e.g., Joe, Nation, & Newton, 1997). In a comparative study of vocabulary acquisition through reading and through input from television, Neuman and Koskinen (1992) measured differences in acquisition outcomes through the use of a battery of tasks tapping different levels of comprehension: a word recognition task, a sentence anomaly task, and a multiple-choice task. Moreover, a written test was included as a productive task.

Read (1988) proposed the use of an interview procedure in which the informant was asked to pronounce the word, explain the meaning, identify the domain, provide word associations, and suggest other forms of the word. The first stages in the procedure reflect distinct levels of knowledge along the partial to precise knowledge dimension, where levels of word understanding are being operationalized.

Dimension 2: The Depth of Knowledge Dimension

The second dimension is the depth of knowledge dimension. Read (1993, p. 357) defined the concept of *depth* in very general terms as "the quality of the learner's vocabulary knowledge." Numerous researchers (e.g., N. Ellis, 1995; R. Ellis, 1995; Harley, 1995; Nation, 1990; Richards, 1976) have stressed the complexity of vocabulary knowledge and the many types of knowledge that comprise full understanding or a rich meaning representation of a word.

Cronbach (1942), for example, spoke of a multidimensional model of word knowledge. Rich meaning representation entails not only knowledge of a word's referential meaning (i.e., the extensional relations between concept and referent) but also its different intensional or sense relations to other words in the vocabulary, such as paradigmatic (antonymy, synonymy, hypo-

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nymy, gradation) and syntagmatic relations (collocational restrictions). Furthermore, the learner must acquire knowledge of the syntactic and morphological restrictions and features of a lexical item.

As early as 1953, Dolch and Leeds stressed the dynamic and complex nature of word knowledge, pointing out that "meaning is a growth" (p. 189). In light of this understanding of word meaning, they discussed the limitations of existing vocabulary tests and emphasized the need for developing new types of tests (e.g., a depth of meaning test that incorporates knowledge of synonyms). The early association tests developed by Meara (1982) are a means of tapping intensional aspects of a learner's meaning representation. This early work has inspired other researchers (e.g., Hasselgren, 1994; Read, 1988, 1993; Schmitt, 1996) to develop new test formats (e.g., the word-associates format) in order to find a practical way of assessing the quality of a learner's lexical knowledge. Erdmenger (1985) used a multiword association test to study the structure of the mental lexicon of German learners of English. Verhallen and Schoonen (1993) studied L2 learners' knowledge of paradigmatic relations through the use of a word definition task. In an investigation of learners' vocabulary use, Ghadessy (1989) looked at Chinese learners' use of collocations in a written task. Schmitt (1996) also stressed the importance of learners' knowledge of syntagmatic relations and argued for the use of a new type of interview procedure that includes a collocation test.

Wesche and Paribakht (1996) advocated the use of a "vocabulary knowledge scale" to measure different levels of lexical knowledge, ranging from "complete unfamiliarity, through recognition of the word and some idea of its meaning, to the ability to use the word with grammatical and semantic accuracy in a sentence" (p. 29). The test format suggested by Wesche and Paribakht does not exclusively measure depth of vocabulary knowledge in the sense I would like to propose here, but also measures the learners' command of a target lexical item in relation to receptive versus productive control. I propose that the term *depth of knowledge* be used exclusively to describe knowledge aspects of lexical competence, whereas questions in relation to the control or accessibility aspect should be viewed as part of the receptive-productive dimension discussed below.

In order to be able to describe a learner's lexical competence in relation to the aspects of knowledge that may be described as quality or depth of vocabulary knowledge, researchers must ideally use a combination of test formats that tap different aspects of knowledge. Read (1998) developed a new version of the word-associates format, which measures both paradigmatic and syntagmatic knowledge of the test items. The interview procedure developed by Schmitt (1996) also incorporates different tasks (word class specification, collocation questions, word association tests, and questions about word meaning).

Dimension 3: The Receptive-Productive Dimension

The third dimension is the receptive-productive dimension. Most researchers accept the division between receptive and productive vocabulary and agree

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that there is a substantial difference in how well different lexical items are mastered in relation to ability to use the words in comprehension and production. As stressed by Melka (1997), however, a clear and adequate definition of what is actually meant by reception and production is still needed.

Most standard vocabulary tests focus primarily on either receptive vocabulary (e.g., the multiple-choice test of vocabulary in the TOEFL) or productive vocabulary (e.g., the Peabody Picture Vocabulary Test). A number of different test formats measuring learners' receptive knowledge have been mentioned above. The most frequent tasks for assessing productive skills are oral interview tasks, picture-description tasks, retell tasks, and translation exercises. Retrieval tasks often include a time element that measures the informants' reaction time as an indication of level of accessibility.

In order to be able to describe aspects of a learner's lexical competence along the receptive-productive dimension, test batteries must naturally include both productive and receptive tasks focusing on the same lexical items. Melka (1997, p. 97) argues that it may be extremely difficult to find tasks that are adequately suited for testing both reception and production. Takala (1985) used translation from L1 to L2 and from L2 to L1 to measure differences in the size of learners' productive and receptive vocabulary. Bahrick and Phelps (1987) and Levenston (1989) also combined tasks (e.g., a translation task from L1 to L2) with a recognition task (selection of the correct translation from a list) or a recognition task (selection of the correct definition) combined with production of a sentence containing the test item. Joe et al. (1997) also advocated use of a range of tests that differ in their sensitivity in order to trace interlanguage development more accurately.

FOCUS ON BOTH MAPPING MEANING ONTO FORM AND NETWORK BUILDING

The relationship between the two knowledge dimensions (dimensions 1 and 2) and the acquisition of word meaning is itself an important aspect of the semantization process. Preoccupation with measuring learners' vocabulary size or describing production and comprehension procedures for accessing vocabulary at a given point in time has meant that the importance of in-depth study of L2 learners' acquisition of word meaning has to some extent been played down in the research literature.

Vocabulary learning is often seen as a mere "memorization chore" (Beheydt, 1987, p. 55). Moreover, there has been a tendency to disregard the complexity of the process of semantization itself, which in more general terms has been described as "getting the word meaning" (Hatch & Brown, 1995, p. 374). Researchers have often focused on the initial process of mapping meaning onto form and have tended to disregard the learners' ongoing process of constructing and reorganizing their interlanguage semantic networks.

Acquiring word meaning is a complex process that involves both mapping meaning onto form and network building. I prefer the term *semantization process* to the rather vague and overly generic terminology such as *acquiring* or

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getting word meaning in order to stress that I am dealing with an ongoing and simultaneous process of developing semantic (i.e., definitional, referential, or extensional links) understanding of a word and working out its semantic relation to other lexical items in the complex structure of the mental lexicon or semantic network (i.e., intensional links).

Aitchison, in her description of L1 vocabulary learning (1994, p. 170), stressed the complexity of the process, arguing that the language learner is faced with three different but related tasks when acquiring word meaning: (a) labeling, (b) packaging, and (c) network building. The first term, *labeling,* refers to the process of discovering which sequence of sound can be used as a name for a thing or entity (i.e., creating a link between concept, sign, and referent). This process has also been referred to as *mapping* (e.g., Clark, 1993) or *acquiring referential meaning* (R. Ellis, 1995). N. Ellis (1995) talks about "learning to map I/O specifications to the semantic and conceptual meanings" (p. 104).

The second term, *packaging,* refers to the process of discovering which things can be packaged together under one label. The learner also learns to transfer or apply the same label to other instances—that is, to discover the range of meanings for the same word (e.g., derived and figurative meanings). The learner here typically goes through phases of using the same word for too many concepts (overextension) or too few (underextension) in attempts to narrow down and expand the range of meaning or reference of a lexical item. If we take as an example the adjective *hot,* the learner will have to discover that the word cannot be used as a general label indicating any temperature but is restricted to a range of high temperatures. The learner may also find out that a salient aspect of this more central meaning can be activated in a more figurative sense—for example, in expressions such as a *hot date, hot news,* and so forth. It is clear that mature L2 learners do not experience the same mapping problems as young L1 learners who have to both develop concepts and learn to map words onto these concepts in the process of their cognitive development.

The third term, *network building,* refers to the process of discovering the sense relations or intensional links between words—that is, fitting the words together in semantic networks. As pointed out by Verhallen and Schoonen (1993, p. 346, following Vygotsky, 1962), development of word meaning involves handling "new meaning relations between words and concepts." In and out of school, young L1 learners gradually extend their knowledge of a word's meaning potential through exposure to the word in varying contexts and situations. In school, through processes of categorization, abstraction, and generalization, they also develop an understanding of hierarchical meaning relations (e.g., paradigmatic relations such as part-whole relations and hyponymic taxonomies).

Consider again the example *hot.* The learner in the process of network building discovers how this word relates to other lexical items, specifically within the same lexical field, such as possible antonyms (*cold*), synonyms, and

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near synonyms (*warm* or *scalding*). As pointed out by Miller and Fellbaum (1991), central sense relations differ for different word classes. For adjectives, central sense relations are synonymy, antonymy, and gradation (i.e., a range of lexical items varying in relation to degree or intensity). Lexical development within the subset of temperature terms may therefore involve the ability to differentiate between items such as *scalding, hot, lukewarm, warm, tepid, cold,* and *freezing.*

As association studies have shown, adult native speakers give fairly similar responses that reflect underlying similarities in the semantic networks developed, whereas responses from L2 learners show that these networks are somewhat different and have not yet been developed to the same degree (Read, 1993). In a study of monolingual and bilingual children's knowledge of word meaning, Verhallen and Schoonen (1993) found a significant difference in the number and range of meaning aspects given by the different groups of learners. The under-representation of responses involving paradigmatic relations found in the bilingual data seems to reflect "missing links, gaps, or fuzzy relations" in the immigrant children's lexical systems (p. 362).

Acquiring word meaning involves, as we have seen, two interrelated processes of (a) adding to the lexical store via a process of labeling and packaging (i.e., creating extensional links) and (b) reordering or changing the lexical store via a process of network building. There is a need for clarification in the research literature as to which process is being described, tested, and discussed. There has, in my view, been a tendency in L2 vocabulary acquisition research to focus on the first aspect (i.e., mapping meaning onto form) and to disregard the second aspect (i.e., network building). One can find a number of possible explanations for this tendency.

First of all, mapping meaning onto form is the first and most central phase in most vocabulary learning, whereas network building is a much later and much slower, almost "tortoise-like" (Aitchison, 1994, p. 179) process. Young children often very quickly, on the basis of only a few exposures to a lexical item, assign one particular meaning or only a limited aspect of meaning to a word. This initial process of fast mapping (e.g., Carey, 1978) is central for establishing a store of lexical entries in a short time.

The second reason may be the preoccupation in the research literature with the acquisition of nouns and verbs (i.e., lexical items describing concrete entities and actions), for which the development of the extensional relations is integral to the learning process.

Another important reason is the daunting methodological problem involved in describing lexical progression in terms of network building. In quantitative studies of vocabulary size (e.g., Hazenberg & Hulstijn, 1996), there has been a tendency to test learners' knowledge of the dictionary head word and not a range of meaning potentials. It is far more difficult to trace, test, and assess the nature and progression of the learners' interlanguage semantic network. Such descriptions require longitudinal studies (e.g., Henriksen & Haastrup, 1998; Viberg, 1993), involve the use of a battery of different test types,

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and require the development of new test formats (e.g., Read, 1993; Schmitt, 1996).

Finally, as pointed out by Johnson-Laird, Hermann, and Chaffin (1984), the problem may be that we need a model or psychological theory of meaning that can accommodate both extensional and intensional aspects of meaning. These researchers, interestingly enough, examined the strengths and weaknesses of different network theories in accounting for the mental representation of meaning and argued that the development of a new cognitive theory or model of meaning must incorporate different levels of representation, involving both intensional and extensional links. In the same way, we must develop a multidimensional theory or model of lexical acquisition that does not overemphasize one phase or aspect of learning but that can accommodate various processes of vocabulary development along different dimensions.

Item Learning and System Changing

The last point leads us to the question of how to define acquisition or intake for learning in relation to vocabulary. Quantitative studies of vocabulary size primarily measure vocabulary development in terms of item learning. What is needed, however, is to stress the complex nature of the vocabulary learning process as both item learning and system changing.

Karmiloff-Smith (1986) talked about stages in developing linguistic knowledge, in which restructuring plays an important role. As pointed out by Johnson-Laird (1987, p. 208), elements of lexical representation could consist of both (a) ineffable primitives that are used in constructing and manipulating mental models of the world (i.e., creating extensional links or mapping meaning onto form) and (b) relations to other words (i.e., intensional links in the semantic network).

The reorganization or restructuring of the lexicon has been described by researchers in terms of a process that goes through different transitional states or phases, such as (a) from a phonologically to a syntagmatically to a paradigmatically driven phase (Ellis, 1996, p. 93), (b) from a predominance for characteristic features to defining features in the representation of meaning of the individual items (Keil & Batterman, 1984, based on Vygotsky, 1962), or (c) from holistic to analytic features (Keil & Batterman, 1984).

There is considerable variability in the learning process, with each lexical item going through the stages at different times and at varying speeds. For given conceptual domains and the words mapped onto them, there seems to be variation in timing for the shift from one phase to another.

To describe the vocabulary-learning process in terms of network building and in an interlanguage perspective, however, it is necessary to place more emphasis on and find new ways of describing vocabulary acquisition as system changing. Moreover, it is necessary to emphasize monitoring the process itself (e.g., describing phenomena such as overgeneralization, backsliding, U-shaped development, and variability in learner output). As pointed out by

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Meara (1997), informed answers about the processes involved in lexical development can be given only if a model-driven approach is adopted, where predictions made on the basis of formal models are tested and compared.

VOCABULARY ACQUISITION DESCRIBED AS DEVELOPMENT ALONG THE THREE DIMENSIONS

It is striking that many vocabulary studies focus on learners' lexical competence at a given point in time. Fewer studies adopt a longitudinal perspective in which learner development is tapped at various stages. Moreover, little emphasis has been given to the description of the actual process of vocabulary acquisition and the factors that influence this process (Meara, 1997).

To take the first tentative steps toward establishing a model of lexical development to guide L2 vocabulary acquisition research, it is necessary to discuss the interrelationship between dimensions of lexical competence and processes of learning and use. A central question is whether the three dimensions of lexical competence discussed above reflect three separate, if related, developmental continua along which vocabulary learning proceeds. Beyond this, it is necessary to discuss the relationships among the three dimensions.

Development from Partial to Precise Comprehension

Many researchers have stressed that the learner must be allowed to be vague about meaning at first. Precision will come later and lexical development can be characterized as a move or progression from rough categorization or vagueness to more precision and mastery of finer shades of meaning. As expressed by Harley (1995, p. 3), "learners do not know a word on an 'all-or-nothing' basis, but go through phases of 'partial word knowledge.'" Moreover, many words may never come to be fully understood. Often total comprehension is not needed in order to grasp an utterance or text meaning. Language users employ a number of inferential strategies and communication can be quite successful despite these "gaps in lexical knowledge" (Johnson-Laird, 1987, pp. 199–200).

In the process of acquiring word meaning, the learner's knowledge of a certain lexical item moves from mere word recognition (i.e., acknowledging that the word exists in the target language) through different degrees of partial knowledge (Brown, 1994) toward precise comprehension. It is important to stress that no native speaker will ever develop an exhaustive knowledge of a word's meaning potential. Understanding is gradually changed and increased as experience both of the world and of language is expanded. Wesche (personal communication, August 1996) has suggested the term *mature lexical entry* to describe the type of mental representation that is beyond the initial knowledge gained through the process of fast mapping and reflects a more extended knowledge base of the kind an adult native speaker will have developed.

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In a longitudinal study on adjective development by Haastrup and Henriksen (Haastrup & Henriksen, 1998; Henriksen & Haastrup, 1998), young L2 learners' lexical development along the partial to precise knowledge dimension was tapped through the use of a number of tasks, ranging from word recognition, to various sorting tasks, to translation (from L1 to L2). Preliminary results have shown that two or even three levels of understanding can be identified (Haastrup & Henriksen, 1998). Future research on developmental data may reveal whether these levels of understanding in fact also reflect progress along the partial to precise knowledge dimension.

Development along the Depth of Knowledge Dimension

The semantization process involves a progression along both dimension 1 and dimension 2. I would like to suggest that development along dimension 1 is primarily associated with the mapping process (i.e., creating extensional links via both labeling and packaging), whereas dimension 2 is primarily associated with network building (i.e., creating intensional links). In this sense, dimension 2 (the depth of knowledge dimension) is identical to the organizational dimension described by Meara (1996a).

Beheydt (1987, p. 57) points out that "the learner has not really semantized a new word until he knows its morphological, syntactic, and collocational profile as well as its meaning potential." A crucial question is, however, how much and which type of meaning representation is the most important? This probably depends on task demands but also very much on word class (Miller & Fellbaum, 1991). For example, we know that knowledge of verb pattern distinctions is a crucial element in both knowing and being able to use a verb. For nouns, hyponymic relations are essential and, for adjectives, the semantic relation of gradation is an important element in acquiring word meaning.

Viberg (1993), in his study of L2 learners' acquisition of verbs, describes lexical progression as a process of gradual differentiation whereby the semantic field is acquired. By working with a narrow subset of words (e.g., verbs of motion or verbs of perception), he has been able to trace development in the learners' mastery of a corner of the semantic network.

The Relationship between Dimensions 1 and 2

In the process of acquiring the sense of a word and narrowing down the field of reference (i.e., labeling and packaging) the learner draws on and develops knowledge of paradigmatic relations (i.e., network building), creating both extensional and intensional relations. In this way, development along dimension 2 is seen as an important factor for lexical development along dimension 1.

While developing a general understanding of a word, the learner will primarily have to develop a link between sign and referent. To be able to distinguish between lexical items the learner will, however, have to both make a

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link between sign and referent and sort out the intensional relations between the items in the lexical set. In a lexical set such as verbs of motion (e.g., *walk, run, rush, race*) or emotional adjectives (e.g., *thrilled, excited, pleased, happy, overjoyed*) the differences between the lexical items are primarily of an intensional nature, and an understanding of the relations among the items is a prerequisite for a more precise understanding of each individual item.

Development from Receptive to Productive Control

As pointed out by Harley (1995, p. 2), "different kinds of receptive and productive vocabulary tasks place differing demands on the learner in terms of word knowledge and access or retrieval." It is a well-accepted fact that only a limited number of words that we know receptively will ever become productive. Moreover, it is assumed that most lexical items initially enter the learner's receptive vocabulary and may only subsequently become available for productive purposes. Nation (1990), for one, states that productive knowledge includes and extends receptive knowledge. (For a more extended discussion of this, see Melka, 1997.)

I would hesitate to draw a sharp and well-defined line between receptive and productive vocabularies in order to emphasize that I am not dealing with a dichotomy (i.e., completely distinct sets of vocabularies) but am operating on a continuum (e.g., Crow & Quigley, 1985; Færch, Haastrup, & Phillipson, 1984; Hatch & Brown, 1995). Furthermore, it is quite unclear where one would have to draw such a dividing line or threshold between reception and production (i.e., which level of comprehension or which type of meaning representation separates and is a prerequisite for receptive and productive control of a lexical item). In an attempt to define reception and production and the threshold between them, Melka (1997, p. 86) stressed the concept of word familiarity and argued for the need to establish "at what point familiarity is such that one could say that knowledge is no longer receptive, but is productive, or at which point receptive knowledge can be converted into productive knowledge." Moreover, she pointed out that linguists may be wrong in assuming that they are dealing with an either-or when they talk about reception and production. In relation to word knowledge "some aspects may have become productive, while others remain at the receptive level" (p. 87).

Meara (1996b) has argued for the need to focus on a hidden dimension of lexical competence (i.e., the dimension of automaticity). It is clear that automaticity is a vital aspect of developing both receptive and productive skills. Additionally, as pointed out by N. Ellis (1995), speakers must learn to master the input and output specifications of a given lexical item (learning to both encode and decode orthography and sound) as well as the mapping of these specifications to semantic and conceptual meanings (mapping meaning onto form). It is still unclear which of these criteria are the most significant in relation to defining the difference between receptive and productive competence of a specific lexical item: the difference between input and output specifica-

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tions and modules, the type and extent of automaticity that has been developed, or the type (i.e., quality) of meaning representation the lexical item has in the mental lexicon.

In the longitudinal study of Danish learners' acquisition of English adjectives mentioned above (Haastrup, 1996; Henriksen & Haastrup, 1998), we tried to trace our learners' L2 vocabulary development along all three dimensions by collecting a range of receptive and productive performances (e.g., by using the same types of tasks both in a receptive and a productive version). By comparing the results on the three dimensions, I hope to be able to examine which types of knowledge are important prerequisites for a lexical item to become productive. I hypothesize that depth of knowledge of a lexical item (as defined along dimension 2) is important for precise understanding (as defined along dimension 1). Moreover, rich meaning representation is seen as an important factor for a word to become productive (as defined along dimension 3).

RELATIONSHIPS AMONG THE DIFFERENT DIMENSIONS

Following the distinction between knowledge and control suggested by Bialystok and Sharwood Smith (1985), it might be argued that dimensions 1 and 2, which are related to acquiring word meaning (i.e., labeling and packaging) and developing an understanding of sense relations (network building) are basically knowledge continua, in which levels of declarative word knowledge may be tapped or operationalized as levels of word understanding or comprehension. Dimension 3 is essentially a control continuum that describes levels of access or use ability, which may be operationalized through different types of receptive and productive tasks.

The Relationship between Dimension 1 + 2 and Dimension 3

Research findings seem to indicate that declarative lexical knowledge is beneficial for both retention and accessibility. A crucial question is, of course, whether an increase in the range of accessibility of a lexical entry (operationalized as a development along dimension 3) is in fact due mainly to the quality of the semantization process (i.e., development along continua 1 and 2) or if it is to some measurable degree the result of repetition (automatization procedures and input factors). I am aware that in this paper it is primarily the quality of the semantization process that has been stressed.

Strong interrelationships among the three vocabulary-learning continua have been hypothesized, with an emphasis on the importance of network building. It is clear that this process is central in the acquisition of adjectives for which rich meaning representation, or deep understanding of the paradigmatic relations, is a crucial factor for developing precise understanding as well as productive control.

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CONCLUDING REMARKS

In this paper I have suggested a distinction among three dimensions of lexical competence. It has been argued that these dimensions may reflect three vocabulary-learning continua along which lexical development can be described. However, it is necessary to find methods of validating the model through empirical research. One way may be to proceed along the lines suggested by Henriksen and Haastrup (1998)—that is, setting up larger research programs that include a longitudinal perspective as well as a range of different task types that may enable us to tap the same learners' lexical competence at the same point in time in relation to all three dimensions.

I have focused on the complexity and quality of the semantization process, especially the crucial role of strengthening the organizational structure of the learner's lexicon, and have emphasized the need for viewing vocabulary learning as both item learning and system changing. If SLA research on syntax (e.g., studies on developmental sequences) is considered, the main aim has been to describe the ongoing process of change in learners' interlanguage systems. Vocabulary acquisition research should in the same way focus on the progression or development of the learners' interlanguage semantic networks. It is also necessary to clarify the relationships among the continua and find ways of operationalizing lexical development along these continua. It is important to stress that the description of lexical competence given in this paper is an attempt to define the construct in metaphorical terms such as dimensions or continua. As pointed out by Meara (1997), models of this kind can only be a first step, offering a description of the phenomena studied. In order to monitor the actual processes and factors that influence vocabulary acquisition, other types of formal models that make it possible to test predictions in a more informed way may be required.

NOTE

1. The term *semantization* has been used by Beheydt (1987) to describe the process of vocabulary learning in order to stress the semantic nature of this process that involves "a continuing process of getting acquainted with verbal forms in their polysemous diversity within varying contexts" (p. 55).

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