

The Implications of Linguistic Relativity for Language Learning

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In recent years there has been increasing interest in the relationship between second language learning and linguistic relativity (Cook & Bassetti, 2011; Han & Cadierno, 2010; Jarvis & Pavlenko, 2008; Pavlenko, 2011). In some ways this is a natural development since both lines of inquiry concern themselves with how meaning systems in language affect behavior. But the two traditions differ in the behaviors they attend to. In the case of language learning, the interest is in how the meaning systems in a first language might affect speakers' learning of and ultimate attainment in a second language. In the case of linguistic relativity, the interest is in how the meaning systems in a language might affect thought about reality more generally, that is, speakers' cognitive processes and views of reality. Thus bringing the two lines of inquiry into dialogue requires not only attending to how they treat meaning systems, but also articulating the relation between second language learning and how speakers think about reality.

The current paper focuses on how the emergence of linguistic relativity during middle childhood holds implications for the ability to learn a second language. The first section will characterize linguistic relativity and highlight a few important theoretical distinctions. The second section will describe the emergence of linguistic relativity during child development, including the associated changes in first language acquisition. Finally, the third section will outline the implications of these developmental changes for second language learning, including the challenges of distinguishing relativity effects from other effects on language learning.

Linguistic relativity characterized

Linguistic relativity can be characterized in several distinct ways. First, it can be distinguished externally from other types of language influences on thought. Second, it can be defined internally in terms of the formal elements it brings together into a proposed relationship so as to distinguish it from closely related, but distinct proposals.

Types of language influence on thought

The potential influences of language on thought can be classed into three types or levels (Lucy, 1996).

The first, or semiotic, level concerns how speaking any natural language at all may influence thinking. The question is whether having a code with a symbolic component (versus one confined to iconic and indexical elements) transforms thinking in certain ways. If so, we can speak of a *semiotic relativity* of those aspects of thought with respect to other species or individuals lacking such a code. For example, here we would include not only animal comparisons, but also studies showing cognitive deficits arising from lack of access to verbal input during early periods of life (e.g. among the deaf) as well as the cognitive advantages for classification and memory abilities arising from the mere presence of a verbal or other symbolic label. The influence of language on thought at this level has long been recognized, although much remains to be learned about the specific mechanisms.

The second, or structural, level concerns how speaking one or more particular natural languages (e.g., Hopi versus English) may influence thinking. The question is whether quite different morphosyntactic configurations of meaning affect some aspects of thinking about reality. If so, we can speak of a *structural relativity* of thought with respect to speakers using different language codes. This has been the level traditionally associated with the term *linguistic*

relativity and will be the focus here. Long controversial, the existence of cognitive effects is now widely recognized although controversies still exist over how profound they are in terms of process type or behavioral impact (Lucy, 2014). But the overall trend of the evidence is clear.

The third, or functional, level concerns whether using language in a particular way (e.g. schooled, scientific) may influence thinking. The question is whether verbal discursive practices affect some aspects of thinking either by modulating structural influences or by directly influencing the interpretation of interactional context. If so, we can speak of a *functional relativity* of thought with respect to speakers using language differently. This level can be conveniently referred to as *discursive relativity*. Although there is an abundance of evidence that training in these functional regimes has effects, there is much disagreement as to whether the effects are due to social or cognitive factors, especially in the context of schooling. Claims about discursive relativity assert that in addition to any social factors, some functional practices actually enhance the cognitive power of language with regard to certain goals.

So when we consider whether linguistic relativity has an influence on second language learning, we are asking specifically about structural relativity, that is, whether general cognitive effects arising from first language structure are affecting second language learning. Do speakers see language and its referents as aspects of reality like any other aspect, that is, through the lens of cognitive categories engendered by the morphosyntactic structure of their first language? It is also true that the other two levels of relativity can also be relevant to second language learning. For example, semiotic relativity may emerge when we entertain the possibility of age of onset effects and functional relativity may emerge when second language learning occurs in school and other social contexts. Indeed, the three types of language influences on thought are not functionally independent and always interact in important ways. Thus the emergence of symbolic

signs enables the complex and diverse morphosyntactic systems based on them, which provide in turn the essential means for the discursive interactions central to all cultures. Or inversely, thinking functionally, the impetus to engage in discourse drives linguistic development, which in turn drives the development of the symbolic capacity. Ultimately, then, investigation of structural relativity leads to a consideration of the other two levels. Likewise, the implications of linguistic relativity for second language learning will raise questions as to whether second language issues at other levels (e.g., age of onset, schooling effects), might also be mediated by relativity effects.

Formal aspects of linguistic relativity

Linguistic relativity proposals claim that each language embodies interpretations of reality and that these interpretations can influence thought about that reality (Lucy, 1992a, 1997). The interpretations arise from the selection of substantive aspects of experience and their formal arrangement into systems of referential meaning in the verbal code. Such selection and arrangement is, of course, necessary for language, so the crucial emphasis here is that each language involves a particular interpretation, not a common, universal one. Influences on thought ensue when the particular interpretations guide or support cognitive activity and hence the beliefs and behaviors dependent on it. Accounts vary in the specificity of the proposed mechanisms of influence and the degree of power attributed to them, but in all cases, claims for linguistic relativity require a demonstration that speaking a specific language influences thinking generally.

We now have evidence for such general effects on thought from grammatical categories such as tense, number, gender, complement constructions, and causal forms; from referential domains such as color, object construal, causation, space, and motion, counterfactuals; and from constructions such as metaphors in the areas of music and time, terminology in mathematics, co-

speech gesture, etc. (e.g. Boroditsky, 2003; Casasanto 2008; Levinson 2003; Lucy 1996, 1997, 2011; Neirmeier & Dirven 2000; Wolff & Holmes 2011). The patterns of thinking affected include attention and perception, similarity judgments and classification, short and long term memory, and learning and reasoning. And these effects are evidenced in everyday experiences, specialized contexts, or ideational traditions.

We can illustrate this type of finding with an example from my own work comparing the speakers of American English and Yucatec Maya (Lucy, 1992b; Lucy & Gaskins, 2003). The two languages differ in the way they mark number for nouns referring to a stable object (e.g. *candle*) in comparison to a malleable object (e.g. *clay*): English requires plural marking for multiple stable object referents whereas Yucatec does not, and Yucatec requires numeral unitizers for them whereas English does not. Thus in acts of referring, English speakers attend more to the number and unit (or shape) of referent, whereas Yucatec speakers ignore number and unit (or shape) and focus instead on material. These differences yield reliable cognitive differences: English speakers reliably attend more to number and shape in nonverbal classification and memory tasks than do Maya speakers. But where the two languages are the same in their number marking, that is, in the treatment of malleable objects, they show no cognitive differences. Thus the specific number marking patterns both across and within languages predict the specific cognitive responses. And this particular pattern recurs in a wide range of languages of similar types (Lucy, 2014).

The concept of “thinking for speaking” is often confused with linguistic relativity, but is analytically distinct. This distinction was made clear in the original formulation where “thinking for speaking” meant “a special form of thought that is mobilized for communication” in one’s native language “while we are speaking” and which may therefore affect “one’s mastery of the

grammatical categories of a foreign language” (Slobin, 1987: 436). So in the first instance, the concept was confined to language effects on language learning, rather than language effects on cognition more generally as in the relativity case. Second, even in considering second language effects, special emphasis was put on categories that “cannot be experienced directly in our perceptual, sensorimotor, and practical dealings with the world” but which language alone requires us to make (Slobin, 1996: 91). By distancing possible effects from our conceptual or practical dealings with the world, it is clear that the concept does not refer to a general impact of language on experience. Eventually evidence has emerged (e.g. Slobin, 2006) showing that thinking for speaking can in fact lead to broader cognitive effects, that is, to linguistic relativity. Nonetheless it remains important to keep the two concepts distinct because it remains highly likely that some thought associated with speaking remains confined to language use. More generally, similar arguments about cross-linguistic influence, transfer, or interference (Jarvis & Pavlenko, 2008) typically need not appeal to category effects beyond language use itself. By contrast linguistic relativity proposals claim that the referential categories of language affect our cognitive engagement with the world generally and it is this broader pattern of engagement that has its own implications for second language learning.

Linguistic relativity and first language acquisition

One key question in linguistic relativity research is when and how cognitive effects emerge in development. Knowing this developmental trajectory can confirm that the language patterns precede the cognitive ones, an important step in establishing the causal priority of language in the association of language and thought. And it can also illuminate the general process of child development by revealing when and how language-specific categories become important in cognition. In terms of the levels outlined in the first section, we are using semiotic

developments to inform our analysis of structural relativity and our analysis of structural relativity to inform our understanding of semiotic developments. In the present context we are concerned with the second aspect, that is, what the onset of linguistic relativity can tell us about the child's language development. The main issues are the age of onset of cognitive effects, the co-occurring language developments, and the possible mechanisms linking the two.

Emergence of linguistic relativity in childhood

Language-specific effects on general cognition first appear in middle childhood, around age eight (Lucy & Gaskins, 2001, 2003). Before age seven children speaking different languages perform in very similar ways on the cognitive measures used with adults. By age nine they have shifted such that each group performs more like adult speakers of their language. That is, where the adult groups differ, so do the older children, and where the adult groups are the same, so are the older children. So children go from being more like each other across language communities to being more like adults in their own language community.

Again, an example can clarify the pattern here. Returning to the contrast of American English versus Yucatec Maya discussed above, the Figure 1 presents the results of a nonverbal sorting task involving stable objects that assesses preference for shape versus material by age.

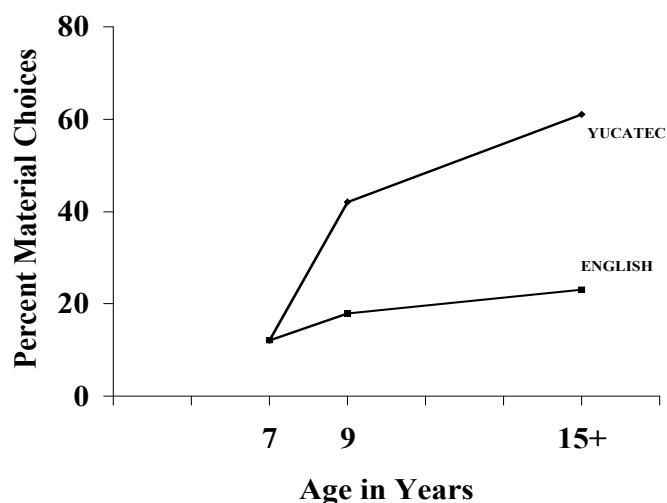


Figure 1. Developmental pattern for English and Yucatec nonverbal classification preferences with stable objects: material versus shape (from Lucy, 2004: 13)

As the figure makes clear, at age seven, both groups favor classifying stable objects on the basis of shape. Yet by age nine the two groups have diverged as the Maya move toward favoring classification on the basis of material, in line with the adult pattern. There is no change in the English preference in this case because the adult preference accords with the childhood preference. (In other cases, as in the development of memory for stable objects, it is the English children who change their behavior.)

Continuing this example, Figure 2 shows the results of a nonverbal sorting task involving malleable objects, where the two languages agree in their referential patterns. As the figure makes clear, in sorting these malleable objects, both groups favor material at about the same rate at all ages and there is no reliable difference in sorting preference by age, despite the slight drift toward more shape preferences by adult English speakers. In short, the childhood preference pattern fits both languages and thus requires no cognitive reorganization during development.

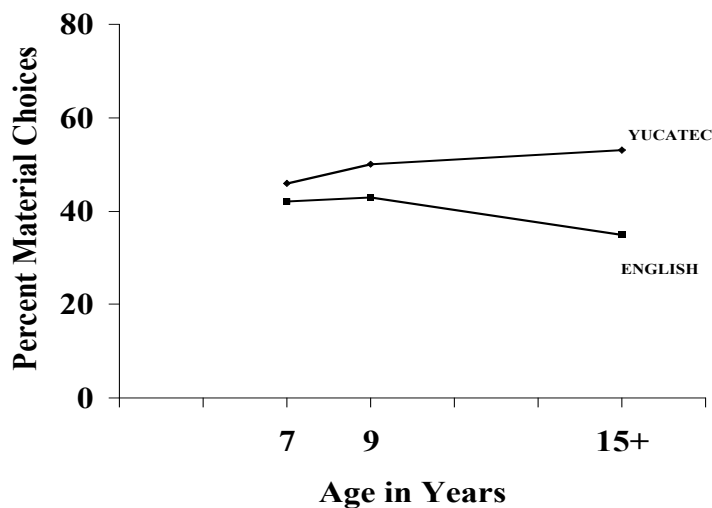


Figure 2. Developmental pattern for English and Yucatec classification preferences with malleable objects: material versus shape (from Lucy, 2004: 15)

Before this period, there are language-specific effects on the language learning process itself, but not on the general cognitive measures used with adults. Such language-internal effects appear throughout the period between two and eight in comprehension and production, in the ability to keep two languages separate, in the treatment of novel forms, etc. For example, to continue with our number marking example, children start show sensitivity to number marking patterns in novel word learning tasks by age four, but not in their nonverbal sorting behavior (e.g. Imai, 2000; see also Imai & Gentner, 1997; Li *et al.*, 2009). Such patterns confirm the importance of recognizing that there may be effects on language learning that operate independently of linguistic relativity.

Clearly, early language learning in itself is not sufficient to create relativity effects. Indeed, children already speak quite well by age seven and have been applying and extending the basic categories in their languages for years. In the case of number marking, for example, English-speaking children have substantial command of plurals by age seven and Yucatec-speaking children have substantial command of numeral classifiers by this age. Children in both groups reliably comprehend and use the appropriate forms and will judge constructions misusing them as faulty. Although they have yet to master all the details, there is no question whatsoever that the basic structural characteristics of each number marking system are firmly in place and have been in routine habitual use for many years. So something more is required for relativity to emerge. This late emergence of linguistic relativity thus directs our attention to the later language development in relation to cognitive changes during the middle childhood period.

First language developments in middle childhood

During middle childhood (ages six to twelve) there are substantial changes in the structure and use of a child's first language (Romaine, 1984; Nippold, 1998). These changes appear in measures of verbal comprehension and production and they collectively strengthen and exploit language-internal structural relationships to support new narrative and discursive effects.

The structural changes occur at several levels. The lexicon expands rapidly and the child becomes more sensitive to the system-structural values of these forms (Lucy 2010; Vygotsky, 1987). Likewise grammatical categories achieve fuller functionality and the child becomes increasingly sensitive to argument tracking (e.g. case marking) (Chomsky, 1969) and predicate coordination (e.g. time marking) (Berman & Slobin, 1994). Of course children are sensitive to structural effects well before this age (Bowerman, 1982). What seems to change is their willingness and ability to attend to a structural entailment and then merge it with the concrete world knowledge embodied in denotational regularities. That is, an existing awareness is recruited in such a way as to reconcile conflicts between what interlocutors say and what the child knows or to create and express a novel stance on events.

Building on these structural changes, various functional transformations appear as well, that is, the functional level mentioned above becomes relevant to the discussion. Narratives become more textually cohesive and discursive interaction becomes more interactionally appropriate and pragmatically effective (e.g., Berman & Slobin, 1994). Again, the child has been narrating and interacting for years, so the change again is one of recruiting existing devices to achieve new capabilities. Since the changes often operate across larger segments of speech in interaction, the difference can be difficult to detect with simplified sentence-based situations focused on a single speaker (Karmiloff-Smith, 1980). As a consequence, these changes have

been much less studied, with the exception of studies concerned with school instruction.

Mediating many of these functional changes are a set of indexical forms, or “shifters” (Jakobson, 1971 [1957]), such as pronouns and tense markers that change from mostly indexing aspects of the surrounding context to also indexing aspects of the discourse itself.

To illustrate the operation of these developments, we can look at the acquisition of definite and indefinite articles (e.g. English *a* and *the*), which sit at the intersection of lexical number (e.g., count/mass status), grammatical number (singular/plural status), and discourse presupposition (e.g. pronominal/definiteness systems). Children begin using these forms in the second year of life and some would thus say they have been acquired by that age. But their use of the forms remains heavily confined to the immediate denotational context. When asked to respond to more complex questions requiring appropriate consideration of the communicative context, they continue to make errors well into middle childhood. Thus, for example, Karmiloff-Smith (1979) presented the following sort of probe to children at different ages:

Experimenter: In the forest lots of squirrels and cats were chasing each other. There were lots and lots of them. Suddenly one of the animals ran up a tree. Guess who it was.

Child: **A squirrel/cat /or/ one of the squirrels/cats (expected response)**

On this probe, young children tend to give responses using the definite article (e.g. **The** squirrel) and only give up this sort of response at age ten, and even then about ten percent of them still do not correctly use the indefinite article. The same pattern recurs in the reverse contexts where the definite article would be preferred and across a variety of probe types. Likewise, Berman and Slobin (1994) track the slow emergence of appropriate narrative uses of these forms in a task that has a child narrate a picture book for a listener. Here is a sample narrative from a five-year old:

When **the** boy and **the** dog were asleep **the** frog jumped out of **the** jar. And then **the** boy and **the** dog woke up. **The** frog was gone. Then **the** boy got dressed, and **the** dog stuck **his** head in **the** jar. (Example 25; bold added)

This child does not recognize that newly introduced referents need to be marked as such, since listeners who hear the definite article will expect some prior reference in the discourse. Contrast this with a sample narrative from a nine-year old where this context is correctly acknowledged:

There's a boy who has **a** pet frog and **a** pet dog, and **one** night after **he** goes to bed **the** frog sneaks out. And **he** wakes up and **it's** gone. So **he** and **his** dog look all over **the** place for **it**. (Example 29; bold added)

The mere possession of a form, whether lexical or grammatical, does not indicate that the child has mastered the full structural range of its use. And some of these critical uses are arising only during middle childhood. Similar developments have been noted in other indexical forms (e.g. Hickmann, 1993, 2002; Berman & Slobin 1994). Collectively they enable a set of new functions: higher levels of narrative organization (e.g. temporal sequencing), metalanguage (e.g. definitions), source marking (e.g. reported speech), and stance taking (e.g., humor, sarcasm).

Linking mechanisms

This growth in structural sensitivity brings to the fore fundamental tensions in language between those aspects of meaning derived from denotational regularities associated with language-external realities and those based on sense relations associated with language internal structural patterns (Lyons, 1977). When the two sources of meaning conflict, the children can reconcile them by reshaping their understanding of either their language external realities or their language internal patterns. When they reshape their view of external reality, we have the source

of linguistic relativity. When they reshape their view of internal patterns, we have the source of language change. It is the relativity effects that concern us here.

Again, some examples can help clarify how the tensions can be reconciled. The seven-year-old Yucatec-speaking child is cognitively distinguishing stable and malleable objects but grammatically treating them alike. This potentially creates analogical pressure either to draw a corresponding distinction in the language so it matches cognition or to refigure their cognition so as to see the two types of objects as alike in some way. The cognitive evidence suggests that this pressure is indeed felt and that it is the reality that is reshaped in this case: children realize that those lexical items in their language referring to stable objects actually denote in the same way as those referring to malleable objects, and so they also start sorting the stable objects by their material rather than their shape. The developmental data on word extension mentioned above suggests that sensitivity to the structural entailments of the language emerges earlier, but the altered cognitive performance in nonverbal contexts suggests that the structural implications later become much more powerfully felt, prompting a realignment of language and cognition. The English-speaking child faces similar pressures. Correct use of the indefinite article, which increases after age seven, requires the child to distinguish stable and malleable objects (*a chair* versus *some clay*) and to mark plural reliably for the stable objects. It is in this context that their relative memory for number of stable objects increases even in nonverbal contexts. The Yucatec child need not draw any such distinction in the world. In both cases then, the socially shared meaning system in the language becomes more salient for the child at this age and induces a shift in the cognitive system in the child.

A similar transformation characterizes cognitive development in general. During this period, children complete a shift from dependence on more spontaneous, perceptual strategies to

reliance on more systematically organized, conceptual ones. This shift too can be difficult to detect in naturalistic settings but reveals itself when assessed carefully (Piaget & Inhelder, 1969; Vygotsky, 1987 [1934]). Given that cognitive development during this period also exhibits language-specific influences, it seems likely this broader cognitive shift depends on the associated language changes in some intimate way. But even if this proves not to be the case, the more general point would hold: not only does a first language change during this period but so also does cognition. It is this dual shift in that also holds implications for second language learning.

Implications for second language learning

Since relativity effects appear in middle childhood, it is to this period that we must look for any effects of them on second language learning. Language learning before this may of course show influences from another language through such processes as transfer, interference, entrainment, thinking for speaking, etc. And there may well be maturational factors, both linguistic and cognitive, that govern when and how these effects operate (Newport, 1990). But to call any second language learning effect a linguistic relativity effect, it should be mediated by a general cognitive orientation associated with first language development. Inversely, after the onset of linguistic relativity, we need to ask whether maturational or interference effects on second language learning might better be accounted for in terms of linguistic relativity. And finally we can ask whether second language learning might alter first language relativity effects.

Language learning and understandings of reality

With the rise of linguistic relativity around age eight comes a cognitive or ontological commitment to certain aspects of reality. Once such a commitment is made, it can conflict with acquisition of a second language because it makes denotation awkward and violates structural

expectations. The categories of the new language just do not seem to fit well with one's reality, making it difficult to understand or accept the proper meaning and use of a form. Elsewhere I have used the term *semantic accent* (in contrast to "thinking for speaking") to capture these relativity effects that arise when working with a second language in order to emphasize the referential entailments for experienced reality, the continuities across verbal and nonverbal modalities, and the evaluative component (Lucy, 2003, 2004, 2010, 2011).

One gets a sense of the power and vitality of these commitments when language learners regard the category meanings of the second language as illogical, arbitrary, unnecessary, clumsy, or crazy. These are not judgments about what the category means or how it is used, or even that it is different, but rather judgments about its very appropriateness to the world. And such judgments have long operated to evaluate other languages as inferior, less capable of full and adequate reference, less suitable to science and advanced thought, substandard, etc. (Lucy 2011; Whorf, 1956). Basically the conventional treatment of the world found in such a speaker's first language has been given ontological status. The language fits ideally with the world precisely because the world has been reimagined to accord with the language.

The practical difficulties of altering one's view of reality during second language learning can be profound. To take another number marking example, Han (2010) conducted a longitudinal case study of an adult Chinese speaker's difficulty with plurals and articles. Despite years of experience with English and a high level of attainment before the study and increased exposure and use over the eight years of the study, these difficulties persisted. Chinese number marking resembles Yucatec, exhibiting almost no pluralization and requiring obligatory unitizers when counting objects; and adult speakers of Chinese show relativity effects similar to those of Yucatec speakers (Li *et al.*, 2009). In this case, the speaker's errors stemmed from applying

English number marking forms using a heuristic based on marking of “specificity” in Chinese, which diverges from English number and definiteness marking. Thus, English noun phrases that contained an explicit quantifying expression (e.g. *two, several, much*, etc.) were regarded as specific and hence pluralized. Utterances lacking such an expression, for example, generic constructions, were systematically left unmarked. Likewise, when Chinese would include a demonstrative or number word, the construction was construed as specific, and the appropriate article applied, but not otherwise. This Chinese-based heuristic allowed the speaker to approximate the correct patterns yet fell short of genuine mastery of English. In Han’s (2010:178) view, overcoming his difficulties would require a “conceptual *restructuring*” that “entails not just mapping individual forms onto individual meanings, but rather, integrated mapping of a cohort of forms.” This seems right, but actually undertaking such a remapping of forms would also involve understanding how the English lexicon itself is structured with respect to quantification, including how it construes objects in the world (e.g. distinct individuation of stable versus malleable objects), and then how both lexicon and world interact with the requirements of grammatical number marking and discourse definiteness. Such an “integrated mapping” thus entails a full grasp of the worldview embodied in the English lexicon. It remains an interesting question as to which contexts or interventions can promote such a fundamental remapping.

Language analysis and understandings of reality

These difficulties in understanding a second language can emerge unwittingly even among linguists when they rely on translation equivalents to characterize the forms of another language carrying their own ontological commitments with them (Lucy, 2000). In such cases, the

second language itself has been taken as an aspect of reality and subject to the same judgments about what is natural, appropriate, etc.

The unitizers discussed above for languages like Yucatec provide a good example. These unitizers provide a necessary unit when one wants to count a referent. Such a form is needed when the lexical form does not contain any unit as part of its inherent lexical meaning. The application of such a unitizer seems natural to an English speaker with a lexeme denoting a malleable object like *clay*, where one cannot say *two clays* but requires something like *two sticks of clay*, *two balls of clay*, etc. But its application seems anomalous for a lexeme denoting a stable object like *candle* where one can simply say *two candles* without any need to specify a unit. But the Maya requires a unitizer to count ‘candles’ in this way. Since candles clearly have a unit (‘long thin’ or ‘stick’ or ‘cylindrical’) as part of their very being as objects, the unitizer appears to be referentially superfluous. Here for example is a typical English definition from *Webster's Seventh New Collegiate Dictionary* (1965, p. 121): "1: a long slender cylindrical mass of tallow or wax containing a loosely twisted linen or cotton wick that is burned to give light. 2: something resembling a candle in shape or use." This rendering of what a candle *is* focuses on its “slender cylindrical mass” and on its function. In this context, adding unit or shape information seems redundant. This then leads to the view that rather than adding meaning, the unitizer merely agrees with a meaning value already in the lexeme. Thus the numeral unitizers in such contexts are called numeral classifiers to indicate that they classify lexemes (or their referents) in terms of their inherent shape, rather than add any real meaning value. In this way, the unitizers are divided into two classes – mensural and sortal – those that truly unitize or measure (as with ‘clay’) and those that merely sort (as with ‘candle’).

But deeper analysis of Yucatec reveals the lexeme *kib'*, which is routinely used to refer to candles, actually means 'wax' and can be used equally well for wax in any of the various shapes it comes in: candles, honey combs, drips, blocks, etc. To count candles then, an appropriate unitizer must be added (e.g. *ká'a ts'íit kib'* 'two long-thin wax'). So the imagined translation equivalence between *k'ib* and *candle* is only half right: there is indeed denotational overlap but there is no sense equivalence. In Yucatec the unit is required and not merely agreeing or redundant with the noun. In this way, an inappropriate analysis of the language form has ensued because analysts took for granted that the lexeme that Yucatec uses to refer to something has the same ontological alignment as a denotationally similar lexeme in English.

This type of error is surprisingly common among linguists, especially when they rely on translation equivalents in trying to compare languages. And it reaches its apogee in efforts to apply the categories of standard language, highly elaborated so as to match closely the base language's construal of reality, in the description and evaluation of other languages, whether vernacular or standard.

Language learning and effects on first language relativity

In seeking to establish the causal role of language in relativity effects, another line of research has looked at second language learners to see whether learning of a new language alters the cognitive responses. The argument is that if learning a second language shifts speakers' cognition in accordance with its categories, then we would have direct evidence that language-specific categories can affect cognition. And such effects have indeed been found (see below), providing clear evidence of language as the driving force in the cognitive change. However, in the present context, we are interested in two other aspects of such work. First, to the extent that the second language affects cognition, it suggests that first language linguistic relativity effects

are neither so strong nor so durable as to preclude effective second language learning. And second, such work may help us distinguish whether relativity effects arise from simple repeated exposure to alternatives or from the development of a more fundamental structural understanding. To date, we only have evidence on the first of these two issues.

The cognitive effects of learning a second language with a contrasting structure can again be illustrated in the area of number marking. Athanasopoulos (2006, 2007, 2011) studied Japanese speakers learning English. Japanese is similar to Yucatec in the ways it treats number marking. Overall, Japanese bilingual responses moved in the direction of monolingual English speakers on both attentiveness to number as a function of object type and in attentiveness to shape versus material. And more advanced learners, especially in immersion contexts, showed stronger effects than intermediate learners. Athanasopoulos concludes that the results clearly “support the view that language influences cognitive dispositions by directing speakers’ attention to specific features of stimuli” (2006: 95). And these results from increasing proficiency were not dependent on the language used in the assessment or on general cultural exposure.

What remains unclear in such work is whether the cognitive patterns of the more proficient language learners simply reflected increasing levels of exposure or whether they evidenced discrete structural reorganization. Nor does it seem likely that this question can be answered only by cross-sectional comparisons of groups at different proficiency levels since it can be difficult to create groups that are equivalent at the outset and, in any event, the aggregate patterns tend to obscure individual discontinuities. What will likely be needed then will be longitudinal studies where it is possible to identify individual moments of reorganization and link them with concurrent cognitive shifts. Something like this sort of longitudinal analysis, following of individual learner’s patterns of structural organization, been achieved with second

language learning (e.g., Perdue & Klein, 1992), but it has not been attempted with studies of linguistic relativity. What is clear is that studies of second language acquisition can not only be informed by linguistic relativity but that the study of second language learning can contribute to our understanding of linguistic relativity.

Summary and conclusions

The study of linguistic relativity is one aspect of the study of the relation of language and thought, one that concerns the effects of language-specific structures on general cognition. The evidence for such effects is now abundant, though questions remain about their broader significance. One such question about the broader significance of linguistic relativity is its relationship to language learning. In first language development, relativity effects arise in middle childhood and are associated with an array of changes in language form and function during that period that likely give rise to them. In particular, it seems that young children become increasingly attentive to the structural meaning values latent in the language, elaborating and drawing on them to organize their speech and ultimately their understandings of reality. These changes in turn seem to enable the child to undertake an array of new function activities that depend on exploiting these meanings and shared view of the world. These meanings and the associated cognitive construals they entail may play a role in the learning and understanding of a second language. Characteristic of such effects would be their impact on general cognition and on learner appeals to reality in order to understand and evaluate categories in the second language. Such linguistic relativity effects mediated by ontological commitments should be understood as distinct from other forms of influence such as transfer and interference that are confined largely to the process of speaking. That said, relativity effects likely work in tandem with these other forces. And it remains to be seen whether some other first language influences

on second language learning can be better understood as relativity effects or vice versa. A major task will be to develop measures capable of distinguishing these factors. Finally, it seems that second language learning can create relativity effects as well, suggesting both the potency of verbal communication for cognition and the possibility that first language effects are not immutable. And, of course, there remains the intriguing question of what happens in terms of relativity when two languages are acquired simultaneously in early childhood, something about which we know almost nothing at this point.

It remains to comment briefly on the larger significance of these developments in middle childhood. Children are essentially drawing together into a unified package their language categories, their cognitive categories, their ontological commitments, and their discursive understandings. Insofar as these are all adjusted to harmonize with each other, the totality becomes a durable psychological organization. Learning a second language involves alteration in the whole package. That such alteration is possible no doubt stems from the fact that the child retains some access to the various individual elements before their integration. But breaking apart the whole and constructing another reality, another way of being, will always be a challenging task. In the end, it may be that the threads cannot ever be entirely unwoven and hence our feeling that our own language categories are natural, even inevitable. From this vantage the categories of other languages acquired later in life can look impoverished or enriched, illogical or poetic, but they do not look natural. And the root source of that sense of naturalness lies in the linguistic relativity effect when a first language is knit together with thought and reality by the young child. Understanding this process will be central to our understandings of language learning in all its aspects.

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