Linguistic Relativity and Second Language Acquisition

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Introduction

The principle of linguistic relativity was formulated by Benjamin Lee Whorf (1940/1956), but it is also often referred to as the Sapir–Whorf hypothesis in reference to Whorf's mentor at Yale University, Edward Sapir. Whorf contended that while we all see the same objective reality, we nonetheless interpret and classify it differently, based on the categories made available in our language. Therefore, according to Whorf, speakers of different languages think and reason about the perceived world differently. For example, speakers of a language that uses one term to refer to the colors blue and green (a so-called grue term) evaluate the perceptual difference between blue and green stimuli as less significant than speakers of a language with distinct terms for blue and green (Kay & Kempton, 1984).

The past fifteen years have witnessed a surge of empirical research on linguistic relativity. Arguably, this surge of interest was kick-started by integrating methods used in experimental psychology with insights from anthropological and cognitive linguistics. Scholars such as John Lucy, Steven Levinson, Debi Roberson, and Dan Slobin have placed the experimental approach at the heart of the language and thought debate, emphasizing the need to measure both linguistic and, crucially, nonlinguistic performance in a range of linguistic and cognitive tasks. An increasing number of studies demonstrate effects of specific lexical and grammatical categories on specific cognitive processes such as remembering, thinking, and reasoning about the perceptual relationships of physical entities like colors, objects, and events (see Gentner & Goldin-Meadow, 2003; Roberson, 2005; Casasanto, 2008; Regier & Kay, 2009, for reviews).

Recently, this investigation has expanded to the field of second language acquisition, and researchers have begun to explore the possible effects of learning a second or foreign language on thinking and reasoning. One reason for this is that evidence from first language acquisition is accumulating, which shows that very early in life cognition is influenced by prelinguistic, possibly universal, predispositions to perceptual attributes of reality. However, later on, after experience with language, cognitive patterns are restructured according to language-specific partitions of reality (Levinson, 2001). Naturally the question arises as to whether cognitive patterns are permanently fixed by the L1, or whether additional language learning may also have an impact on those patterns.

In addition, Whorf considered knowledge of other languages crucial in understanding the thoughts and beliefs of speakers of those languages, and firmly believed "that those who envision a future world speaking only one tongue, whether English, German, Russian, or any other, hold a misguided ideal and would do the evolution of the human mind the greatest disservice" (Whorf, 1941/1956, p. 244). This statement resonates with scholars in the field of multilingualism itself, who emphasize the need to study L2 users in their own right rather than as imperfect versions of a monolingual native speaker ideal. For example, Cook's (1991, 1992, 1999, 2003) multicompetence hypothesis views the person who speaks more than one language as an independent speaker/hearer/thinker, with linguistic and cognitive representations and abilities which are qualitatively distinct from

those of a monolingual person. Heeding the calls of Cook (2002), Pavlenko (1999), and others, researchers have begun empirically investigating the effects of second language acquisition on cognition in a variety of domains.

Domains of Enquiry

Grammatical Number and Object Classification

A number of studies have focused on categorization of objects and substances in noun class and classifier languages. Noun class languages like English distinguish between count and mass nouns grammatically. Count nouns refer to discrete entities that are marked for number (e.g., apple—apples). In classifier languages like Japanese or Chinese, there is no count/mass distinction. Nouns in these languages refer to substances and are accompanied by numeral classifiers (e.g., three small-piece-of apple [= 3 apples]). Speakers of the two types of languages were shown to perform differently on a similarity judgment task that required participants to match objects based on their common shape or material. Speakers of English favored shape and speakers of Japanese favored material, presumably because noun class languages draw speakers' attention to discreteness of entities and classifier languages to material (Lucy, 1992; Imai & Gentner, 1997). Cook, Bassetti, Kasai, Sasaki, and Takahashi (2006) found that Japanese speakers of L2 English who had stayed in the United Kingdom for more than three years tended to make shape-based similarity judgments significantly more that those L2 speakers who had stayed in the United Kingdom for less than three years. Athanasopoulos (2007), using a similar task with two groups of Japanese and English monolinguals and two groups of Japanese speakers of L2 English, one given task instructions in English, and one given task instructions in Japanese, found that both L2 groups displayed behavior that was "in-between" the two monolingual groups, with language of task instruction playing a nonsignificant role.

Athanasopoulos and Kasai (2008) extended the design of the two previous studies by implementing a similarity judgment task using artificial novel two-dimensional objects. They asked two groups of Japanese and English monolinguals and two groups of Japanese speakers of L2 English (one intermediate and one advanced) to match the objects based on either common shape or common color. Results showed that overall, all participant groups made primarily shape-based classifications. However, the degree to which they did so differed, with Japanese monolinguals favoring shape significantly less than English monolinguals. The intermediate L2 group exhibited primarily L1-based behavior, resembling Japanese monolinguals, while the advanced L2 group exhibited primarily L2-based behavior, displaying similar patterns to the English monolinguals.

Athanasopoulos (2006) adapted a picture-matching task used by Lucy (1992) that requires participants to judge the similarity between pictures based on the number of countable and noncountable entities. The task was given to Japanese and English monolinguals, and two groups of Japanese speakers of L2 English, one with intermediate and one with advanced English proficiency, as measured by the Quick Oxford Placement Test and a grammaticality judgment task. English monolinguals showed increased sensitivity to changes in the number of countable objects than to changes in the amount of noncountable substances, thus reflecting the count/mass distinction in their native language. Japanese monolinguals treated both types of entities equally, reflecting the lack of a grammatical count/mass distinction in their language's quantification system. Intermediate L2 speakers were heavily influenced by their L1 in their similarity judgments, resembling Japanese monolinguals. Advanced L2 speakers on the other hand resembled more English monolingual speakers, tending to differentiate between countable and noncountable entities in their judgments.

Color Categorization

Studies have focused on both semantic representation and cognitive categorization. In studies of the first kind, participants may be asked to name separate color chips or to indicate the best example (prototype) of particular color terms on a color chart. Andrews (1994) and Athanasopoulos (2009), replicating and extending earlier studies by Ervin (1961) and Caskey-Sirmons and Hickerson (1977), gave such tasks to Russian and Greek speakers who were speakers of L2 English. Russian and Greek make an obligatory lexical distinction between light and dark blue (*ghalazio* and *ble* in Greek, *goluboj* and *sinij* in Russian). Results showed that L2 speakers shifted the prototypes of their native blue categories under the influence of English. This effect was more pronounced in L2 speakers who had spent a significant amount of time in an English-speaking country (since childhood and adolescence in the case of Andrews, 1994, and for at least two years in the case of Athanasopoulos, 2009). In a cognitive task, Athanasopoulos (2009) further demonstrated that the longer Greek speakers of L2 English had lived in the UK, the more likely they were to judge light and dark blue color chips as more similar to each other, suggesting a weakening of the distinction between *ble* and *ghalazio* in their cognitive representation of those categories. Japanese also uses different terms to distinguish two shades of blue. Athanasopoulos, Damjanovic, Krajciova, and Sasaki (2011) found that Japanese L2 speakers of English who used the L2 more frequently did not distinguish between light and dark blue color stimuli as much as Japanese L2 speakers of English who used the L1 more frequently (both groups were living in the UK and were of comparable L2 proficiency).

Grammatical Gender

Kurinski and Sera (2011) carried out a longitudinal investigation of whether learning Spanish grammatical gender changes object categorization patterns of English native speakers of beginner level Spanish L2. A group of advanced learners and a group of Spanish native speakers were also tested. The authors present converging evidence from a test specifically measuring acquisition of Spanish grammatical gender, and from a task measuring voice attribution patterns to pictures of objects. In this task, participants are typically shown pictures of objects and asked to assign a male or female voice to them if they were to come to life. Previous studies have shown that speakers of languages that mark grammatical gender on nouns tend to assign voices to objects consistent with the objects' grammatical gender in their native language (Sera, Berge, & del Castillo Pintado, 1994). Results from the Kurinski and Sera (2011) study showed that learning a second language with grammatical gender does make voice attribution patterns more consonant with that language's grammatical gender, and this shift in cognition increases with the level of proficiency in the L2. However, results also showed that patterns of advanced L2 speakers in their study did not become identically similar to the patterns exhibited by native speakers of the L2.

Kousta, Vinson, and Vigliocco (2008) showed that ItalianEnglish bilingual speakers' semantic representation of grammatical gender was similar to that of Italian monolinguals only when the task was performed in Italian, but not in English. Contrary to Sera et al. (1994), Kousta et al. (2008) found no effects of grammatical gender on nonlinguistic cognition.

Time

Boroditsky (2001) conducted a study on the conceptualization of time in Mandarin Chinese and English speakers. In English, reference to time is made using horizontal spatial metaphors (e.g., there are good times ahead of us/let's push the meeting back/forward, etc.).

In Mandarin, reference to time can also be made using vertical spatial language (using "up" to refer to the earlier events and "down" to refer to later events). Boroditsky (2001) asked participants to verify target statements about time (e.g., March comes before April), preceded by prime pictures displaying either horizontal or vertical spatial scenarios (e.g., two fish one on top of the other or two fish one next to each other). Results showed that the extent to which Mandarin users of L2 English think about time vertically was related to how old they were when they first began to learn English. The younger the L2 users were when they started learning English, the less likely they were to follow the Mandarin pattern of thinking about time. In a follow-up experiment, native English speakers were trained to talk about time using vertical spatial terms in a similar way to Mandarin. Upon testing, these English speakers showed a bias to think about time vertically, approximating Mandarin native speakers. Subsequent studies however failed to replicate Boroditsky's (2001) results in similar experiments (Chen, 2007; January & Kako, 2007), casting doubt on the validity of Boroditsky's results as evidence for linguistic relativity.

More recently a study by Miles, Tan, Noble, Lumsden, and Macrae (in press) demonstrated that Mandarin–English bilinguals do indeed employ both horizontal and vertical representations of time, while cultural context seemed to affect the way these time lines were deployed.

Action Events

Boroditsky, Ham, and Ramscar (2002) investigated event perception in English and Indonesian monolingual speakers and Indonesian L2 users of English in a range of similarity judgment and memory tasks. English uses tense markers to distinguish grammatically between past, present, and future. In Indonesian there is no obligatory grammatical distinction of temporality. Instead, speakers of Indonesian use contextual information, coupled with temporal words (e.g., "just now," "soon," etc.) to infer the tense of an action. In one experiment, participants were asked to rate the similarity between pictures that show either two different actors performing the same action in the same tense, or the same actor performing the same action in two different tenses. Results showed that English speakers rated same-tense pictures as more similar than Indonesian speakers did, and different-tense pictures as less similar than Indonesian speakers did. Indonesian users of L2 English rated same-tense pictures more similar when they were given task instructions in English than when the task instructions were given in Indonesian. Conversely, they also rated different-tense pictures less similar when they were tested in English than when tested in Indonesian. The Indonesian L2 English users that were tested in Indonesian showed a pattern that was somewhere in-between the pattern shown by monolingual Indonesian speakers and the pattern shown by English speakers.

In another experiment, Boroditsky et al. (2002) tested Indonesian and English monolinguals' and Indonesian L2 English users' ability to remember action events. Participants were shown pictures of people performing actions (these were the same pictures used in the similarity judgment experiment described earlier). During the learning phase, each participant saw a person performing an action in one of three tenses. During the test phase, subjects were shown pictures of that person performing the action in all three tenses and asked to choose which one they had seen previously. English speakers were better than Indonesian speakers at remembering the tense in which they witnessed an action.

The L2 users were better able to remember the tense of actions when they were given task instructions in English than when they were given task instructions in Indonesian.

Conclusion

Recent research has begun to investigate the question of whether someone who learns a second language may also acquire new concepts and gain a different perspective of the world. The research is still in its very early stages, but some studies do suggest that acquiring a second language may transform the thinking of the individual. This new line of research has focused on specific domains of enquiry and on specific cognitive processes, including sorting, matching, and remembering. The application of the Whorfian hypothesis to second language acquisition has the potential to reveal invaluable information about how the mind of the L2 user views the world as a result of speaking specific languages; yet research is still at a very early stage, and the precise role of specific linguistic and sociocultural factors, as well as the extent of the effects in different perceptual domains, remains elusive for the time being (see Jarvis & Pavlenko, 2008; Athanasopoulos, 2011; and Pavlenko, 2011, for detailed discussions). All information correct at the time of first submission in March 2010.

SEE ALSO: Cook, Vivian; Levinson, Stephen C.; Multicompetence; Pavlenko, Aneta; Sapir, Edward; Thinking for Speaking in Second Language Acquisition

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Suggested Reading

Whorf, B. L. (1956). *Language, thought, and reality: Selected writings of Benjamin Lee Whorf* (J. B. Carroll, Ed.). Cambridge, MA: MIT Press.