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Shape and Function in Hmong Classifier Choices

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Abstract This study examined classifiers in the Hmong language with a particular focus on gaining insights into the underlying cognitive process of categorization. Forty-three Hmong speakers participated in three experiments. In the first experiment, designed to verify the previously postulated configurational (saliently one-dimensional, saliently two-dimensional, and saliently three-dimensional) characteristics of common Hmong classifiers, the participants were presented with pieces of wood in various shapes and were asked to select a classifier for each item. In the second experiment, designed to examine configurational and functional characteristics of two classifiers associated with saliently one-dimensional objects, the participants were asked to rate the acceptability of the two classifiers for different types of zippers. The interaction between the configurational and functional characteristics in the selection of a classifier was further examined in the third experiment, in which two target items—computer software and a computer processor—were respectively presented to the participants in three different manners with varying emphasis on their shapes and functions, and the participants rated the acceptability of different classifiers after each presentation. The results of these experiments indicate limitations of explaining common Hmong classifiers in terms of configurational characteristics and point to a need for greater attention to functional characteristics.

Keywords Classifiers · Hmong language · Categorization · Object categories

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Classifier research has been an important part of the remarkable development of cognitive linguistics for the past few decades. A growing number of researchers in such fields as linguistics, psychology, and anthropology are studying classifiers because of their potential as a window for gaining new insights into the cognitive process of categorization. Early studies such as Adams and Conklin (1973), Denny (1976) and Allan (1977) laid the theoretical foundation for studying classifiers from the cognitive linguistic perspective. Volumes published in more recent years such as Craig (1986), Senft (2000), and Aikhenvald (2000) represent advancement in theory and research of classifiers and, more broadly, noun categorization.

As cognitive linguists are generally interested in discovering both culture-general and culture-specific categorization principles, collection of data from different classifier languages is crucial for advancing our understanding of the relationship between classifiers and conceptual categories. In recent years, a considerable amount of research has been accumulated concerning such classifier languages as Japanese (e.g., Matsumoto 1993; Nishimitsu and Mizuguchi 2004) and Chinese (e.g., Tai 1994; Zhang 2007). There is, however, a relative dearth of research on classifiers in the Southeast Asian language of Hmong from the cognitive linguistic perspective. The purpose of the present study, therefore, was to examine classifiers in the Hmong language with a particular focus on gaining insights into the underlying cognitive process of categorization among Hmong speakers.

Previous Studies of Hmong Classifiers

Two types of literature represent the body of knowledge currently available on Hmong classifiers: dictionaries/textbooks and research papers. Two sizable dictionaries have been complied by scholars involved in the creation of the Romanized popular alphabet (RPA) for Hmong, which is now in wide use in the United States. The first is the Hmong-French dictionary by Bertrais-Charrier (1964), which includes classifiers as main dictionary entries. The other is the Hmong-English dictionary by Heimbach (1979), which has a list of classifiers as an appendix. Other useful current Hmong-English dictionaries include Xiong (2006) and Xiong (2003). Several grammars also provide useful information on classifiers in Hmong. Mottin (1978) grammar of White Hmong lists 53 classifiers; Lyman (1973) dictionary and his (1979) Grammar contain useful information about classifiers, and the textbook by Jaisser (1995) includes a set of exercises introducing classifiers.

Aside from dictionaries and textbooks, several researchers (Jaisser 1987; Jarkey 1991; Melton 1991; Ratliff 1991; Bisang 1993) have investigated Hmong classifiers. Among these, of particular importance to the present study is Bisang's (1993) study, which offers the most systematic account of the characteristics and functions of Hmong classifiers available to date. After differentiating classifiers from quantifies and class nouns, Bisang identified the following seven as the true classifiers: *lub*, *tus*, *leej*, *rab*, *txoj*, *daim*, and *txhais*. In addition to these true classifiers, Bisang also identified a few other words (*thooj*, *qhov*, *zaj*, *tsab*) that "one must understand as classifiers when they are used with a very limited number of nouns" (p. 10). Drawing on the classification criteria proposed by Denny (1976) and Allan (1977), Bisang proposed the following system of conceptual classification underlying Hmong classifiers:

leej [+human], *tus* [+animate], *lub* [-animate]
txoj [one-dimensional], *tus* [one-dimensional]
daim [two-dimensional], *lub* [three-dimensional]
rab [tool, instrument; CL for things with a handle]
txhais [one of a pair of objects occurring together]
(Bisang 1993, p. 20)

Bisang (1993) notes that the Hmong classifier system is consistent with the general tendency of animate/inanimate and human/non-human distinctions being two of the most basic distinctions. The focus of the present study was the second-order classification of inanimate objects.

Shape and Function

Bisang (1993) utilized Allan (1977) shape (dimensional) criterion for sorting Hmong classifiers for inanimate objects: *txoj* for one-dimensional objects, *tus* for one-dimensional objects, *daim* for two-dimensional objects, and *lub* for three-dimensional objects. An obvious issue that begs for further specifications is the distinction between *tus* and *txoj*. Aside from *tus* participating also in a higher-order distinction of animacy in Bisang's analysis, length and flexibility have been identified as the factors influencing the choice between *tus* (for shorter and less flexible objects) and *txoj* (for longer and more flexible objects) (Jaisser 1987). There has been, however, no systematic attempt to examine the operation of these factors among Hmong speakers in choosing between the two classifiers.

In his analysis of Hmong classifiers for inanimate objects, Bisang (1993) referred to the function criterion only in connection with *rab*. The possible interaction between shape and function, however, may merit further examination. An example of such an interaction can be found in Japanese. Matsumoto (1993), in his analysis of Japanese classifiers for inanimate objects, discussed "configurational" and "nonconfigurational" properties. Matsumoto's approach to analyzing configurational classifiers in Japanese is consistent with Bisang (1993), sorting the classifiers by the dimensional saliency: *tsubu* [saliently zero-dimensional], *hon* [saliently one-dimensional], *mai* [saliently two-dimensional], and *ko* [saliently three-dimensional]. Each of these is considered as the "default classifier" (Mizuguchi 2004) for each conceptual category; the default classifier can be preempted by more specific "non-default" classifiers that can only co-occur with referents in a lower (more specific) category.

In contrast to the orderly conceptual system of the configurational classifiers, Matsumoto (1993) found it infeasible to extract salient properties for the nonconfigurational classifiers. He observed:

> Nonconfigurational properties such as function and structure are very diverse among different entities in the world, and therefore, the semantic categories of such classifiers are also very idiosyncratic. Therefore, it is not possible to find a small set of feature oppositions or taxonomy structure among the nonconfigurational classifiers, let alone in the classifier system as a whole. (Matsumoto 1993, p. 697)

Matsumoto (1993) also pointed out that nonconfigurational classifiers cut across the referential domains of configurational classifiers. For example, a raincoat may be referred to either with the nonconfigurational classifier *chaku* (the classifier appears to be etymologically related to the verb *kiru* "to wear") or the configurational classifier *mai*. Previous studies of Hmong classifiers, however, have paid relatively little attention to the effects of such shifting of focus between shape and function on the choice of a classifier.

Research Questions

The purpose of the present study was to test the theories of classifiers reviewed above against data systematically collected from Hmong speakers. In particular, we were interested in

(1) confirming the distribution of configurational classifiers according to the dimensional saliency and (2) examining the effect of shift of focus on shape and function on the choice of a classifier.

Our inquiry was divided in three stages, each of which was guided by a research question. In the first experiment, we attempted to ascertain the dimensional characteristics of common Hmong classifiers. Specifically, the following research question was advanced:

> RQ1: How are Hmong classifiers distributed across the saliently one-dimensional, two-dimensional, and three-dimensional referents?

In the second experiment, we attempted to further examine the cognitive bases of *txoj* and *tus*. Specifically, the following research question was advanced:

> RQ2: What are the effects of the length, flexibility, and function of an object on the choice between *txoj* and *tus*?

In the third experiment, we focused on the interaction between the shape and function of an object on the choice of a classifier. Specifically, the following research question was advanced:

> RQ3: What is the effect of shifting of focus between shape and function on the choice of a classifier?

General Method

Participants

Forty-three Hmong speaking people (24 male, 19 female) living in the Minneapolis-St. Paul metropolitan area participated in this study. The mean age of the participants was 32. Eleven participants were in the age range of 17–19, 13 participants were in the age range of 21–29, nine participants were in the age range of 31–38, and 10 participants were in the age range of 40–66. Nine of the participants were born in the United States (they were all 21 years old or younger), 28 were born in Laos, and six were born in Thailand. Sixteen of the participants selected White Hmong as the language they spoke most fluently, one selected Green Hmong, eight selected English, and 18 reported that they spoke two or more languages equally well (White/Green Hmong, Lao, Thai, and English were the common languages they reported). One participant reported that he did not speak White Hmong but spoke Green Hmong. None of the participants, however, had any difficulty communicating with the two interviewers, who spoke in White Hmong.

General Procedure

Three experiments were prepared for the study. The procedure of each experiment will be described in detail later. In each experiment, participants were presented with some physical objects and/or descriptions of objects and were asked to select a classifier and/or rate the acceptability of certain classifiers for each item. The script of the interview was prepared by the present authors in consultation with the two Hmong-English bilingual undergraduate students, who served as informants and interviewers in this study. The interviews were conducted in Hmong, except for a few English words (e.g., the participants were asked if they knew the word "baseball bat").

Wood Experiment

As discussed earlier, Bisang (1993) utilized the configurational (shape) criterion for sorting Hmong classifiers for inanimate objects: *txoj* for one-dimensional objects, *tus* for one-dimensional objects, *daim* for two-dimensional objects, and *lub* for three-dimensional objects. The primary purpose of this experiment was to test the theory of the relationship between configurational characteristics of objects and classifiers against data collected from various Hmong speakers in a controlled setting. In order to control the effect of the materials, we decided to use wood pieces in various shapes. Wood was chosen because it is a natural material that is common in the environments where many of the Hmong participants lived in Asia (Laos/Thailand) as well as in the United States.

Procedure

The interviewer showed each participant various pieces of wood. For each piece of wood, the participants were asked to complete the sentence "Kuv xav yuav ib ___ ntoo" (I want to buy one ___ wood) by providing a classifier. (The interviewer showed this sentence written on a card while reading it aloud to the participants.) The following pieces of wood were used for eliciting responses: (1) a plate (9 cm × 9 cm × 5 mm); (2) a round-faced stick (1 cm diameter, 15 cm long); (3) a square-faced stick (1.3 cm × 1.3 cm × 15 cm); (4) a ball (6 cm diameter); (5) a cube (5 cm × 5 cm × 5 cm). The participants were also presented with a pencil (approximately 15 cm long) and asked to complete the sentence "Kuv xav yuav ib ___ cwjmem/xaum" (I want to buy one ___ pencil) by providing a classifier. Finally, the participants were asked if they were familiar with baseball bats, and if the answer was affirmative, they were asked to complete the sentence "Kuv xav yuav ib ___ baseball bat" (I want to buy one ___ baseball bat) by providing a classifier.

Results

Plate

There was a strong consensus on the choice of a classifier for the wood plate; 40 participants chose *daim*, and three chose *qhov*. The three participants who chose *qhov* were young and have lived in the United States all or most of their lives (an 18-year-old female and a 19-year-old male were born in the United States; a 21-year-old male was born in Thailand but moved to the United States when he was 2 years old).

Round-Faced Stick

There was a fairly strong consensus on the choice of a classifier for the round-faced stick; 36 participants chose *tus*, three chose *yav*, one chose *yam*, one chose *lub*, one chose *daim*, and one chose *qhov*. The three men who chose *yav* were all born in Laos and grew up in Laos or Thailand (one lived in Laos for 20 years and in the United States for 33 years; the second man lived in Laos for 15 years, in Thailand for 3 years, in the United States for 19 years; the third man lived in Laos for 24 years, in Thailand for 3 years, in the United States for 35 years).

Square-Faced Stick

The consensus was slightly weaker on the choice of classifier for the square-faced stick; 33 participants chose *tus*, five chose *yav*, two chose *daim*, two chose *qhov*, and one chose *yam*. In addition to the three participants who chose *yav* for the round-faced stick, the following two chose *yav* for the square-faced stick: a 23-year-old man who was born in Thailand but has lived in the United States for 13 years, and a 18-year-old woman who was born in the United States.

Ball

There was a strong consensus on the choice of a classifier for the wood ball; 41 participants chose *lub*, and two chose *qhov*. The two participants who chose *qhov* were: a 21-year-old man who was born in Thailand but has lived in the United States for 20 years, and a 19-year-old man who was born in the United States.

Cube

Many participants appeared to have difficulty in choosing a classifier for the wood cube. The first reaction of many participants was a question: "What is this?" The choices made by the participants reflected the apparent cognitive ambiguity; 11 participants chose *lub*; 10 participants responded with the English word "chunk"; six chose *qhov*; four chose *daim*; three chose *thoog* ("block"); two chose *pob* ("bunch"); one responded with the English word "bunch"; one chose *yav*; one chose *lub* and *daim*; one chose *tus*; one chose *ib chiab* (compared to ice cube). Two participants were unable to choose any word for this object. Nine of the 11 participants who chose *lub* (four males and five females) had lived in Laos and/or Thailand for at least 9 years and were generally older (between 23 and 60 years old). The other two who chose *lub* were a 22-year-old female who lived in Laos for 4 years before moving to the United States and an 18-year-old male who was born in the United States. Among the six participants who chose *qhov*, no particular gender/age patterns were observed; four of them were males and two were female; four of them were 21 years old or younger and spent most of their lives in the United States, but the other two were 35 and 62 years old and spent many years in Laos and Thailand.

Pencil

There was a strong consensus on the choice of a classifier for a pencil; 41 participants chose *tus*, and two participants chose *rab*.

Baseball Bat

Thirty-eight of the 43 participants were familiar with the word/object "baseball bat" (and the game of baseball). Of the 38 participants, 36 chose *tus*, and two chose *rab* as the classifier for a baseball bat. The two participants who chose *rab* for a baseball were the same persons who chose *rab* for a pencil.

Zipper Experiment

The wood experiment was not suitable for examining *txoj*, a classifier postulated to be associated with one-dimensional objects. Therefore, this experiment was designed for examining *txoj* with a focus on its relationship with *tus*. As discussed earlier, unlike in the Japanese classifiers system, where classifier *hon* can co-occur with prototypically one-dimensional referents (e.g., a string) but also with stick-like referents (e.g., a pencil), these two configurational classes seem to be distinguished more often in the Hmong classifier system through the use of *txoj* and *tus*. Zippers were selected as the objects to elicit responses in this experiment because of their potential for cognitive ambiguity. A zipper is quite possible to be categorized as a one-dimensional object, especially if it is long. A zipper, however, is less flexible than a string; it is more like a rope, which may be perceived to be like a stick when it is relatively short. Zippers also have a functional similarity with sticks; we grab on (the handle of) a zipper like we grab on a stick. Zippers are also interesting objects for examining the figure-ground effect; when a zipper is embedded in the "ground" (e.g., a pair of pants), the perception of its one-dimensionality may be altered.

Procedure

The participants were first asked if they knew the English word "zipper." If the participants were not familiar with the word, an explanation would be given in Hmong. The participants were then asked which Hmong classifier they would use for a zipper.

After these initial questions, the participants were presented with three different examples of zippers. The first two items were "short" and "long" brass zippers (19 and 64 cm; the cloth tape holding each zipper was 3 cm wide). The third item was a brass zipper on a pair of jeans (the length of the zipper was similar to the "short" zipper). The participants were asked to rate the acceptability of *tus* and *txoj* for each item by using the following 5-point scale: 1 = tsis yog li, 2 = tsis yog, 3 = qhia tsis tau seb nws yog los tsis yog, 4 = yog, 5 = yog heev (1 = very not correct, 2 = not correct, 3 = cannot tell, 4 = correct, 5 = very correct). The rating was prompted by the interviewer showing a card on which the 5-point rating scale is written while reading the five options aloud. The participants were also given an opportunity to report other classifiers they may feel appropriate for each item.

Results

Thirty-nine of the 43 participants were familiar with the English word "zipper"; the other four participants understood what a zipper was after an explanation given in Hmong. Twenty-four participants chose *tus* as their initial choice of a classifier, eight chose *txoj*, six chose *qhov*, four chose *lub*, and one chose *qhov* and *lub*. The five participants (three males and two females) who chose *lub* (including the person who chose *qhov* and *lub*) were all 21 years old or younger and born in the United States. Of the six participants who chose *qhov*, four were 20 years old or younger; two (a male and a female) were born in the United States, and the other two (a male and a female) moved to the United States at the age of one and three, respectively. The other two who chose *qhov* were older; a 35-year-old male who has lived in the United States for 28 years and a 29-year-old male who has lived in the United States for 15 years.

There was no significant difference between *tus* and *txoj* in the acceptability rating for the short zipper or the zipper on jeans. For the long zipper, however, the acceptability of *txoj* was significantly higher than that of *tus* ($t = 2.02$, $p = .05$). The results of ANOVA indicated a significant effect of the type of zippers on both the acceptability of *tus* ($F(2, 84) = 3.89$, $p < .05$) and *txoj* ($F(2, 84) = 3.15$, $p < .05$). Tukey-HSD post hoc tests revealed that the difference in the acceptability of *tus* between the long zipper and the zipper on jeans was statistically significant ($p < .05$) while the differences between the short zipper and the long zipper, and between the short zipper and the zipper on jeans were not significant. Tukey-HSD tests indicated no significant difference among the acceptability ratings of *txoj* for the three types of zippers. It should be noted, however, that the difference in the acceptability of *txoj* between the long zipper and the zipper on jeans (.34) was very close of the critical value of HSD (.35 at alpha = .05).

Software/Computer Processor Experiment

This experiment was designed to examine the interaction between shape and function in the selection of a classifier. We decided to focus on the domain of computer technology for the objects to elicit responses in this experiment for a few reasons. Firstly, computer technology is relatively new, and each language must accommodate new technological artifacts as they come along. For relatively new referents in this domain, therefore, "standard" usage of classifiers is less likely to have been established. Secondly, many objects in technology are not easily amenable to configurational classification; computer software and digital music, for example, may come in various shapes of storing media or may be downloaded and stored in a computer without being packaged in any tangible forms. Thirdly, for many objects in computer technology, it is also often difficult to infer their functions from their appearance. All these characteristics of computer technology are likely to conspire to increase cognitive ambiguity, which would be useful for examining factors influencing individual Hmong speakers' selection of classifiers.

Procedure

"Computer software" and "computer processor" were used as the objects to elicit responses. The participants were first asked if they were familiar with these words in English. (The interviewer showed a card with "computer software" or "computer processor/computer chip" on it while pronouncing each phrase.) If they were familiar with them, they were asked which Hmong classifiers they would use for them. After these initial questions, the interviewer presented each item in three different ways with varying emphasis on configurational and functional features of the object. After each presentation, the participants were asked to rate the acceptability of *daim* and *lub* as the classifiers for the item by using the following 5-point scale: 1 = tsis yog li, 2 = tsis yog, 3 = qhia tsis tau seb nws yog los tsis yog, 4 = yog, 5 = yog heev (1 = very not correct, 2 = not correct, 3 = cannot tell, 4 = correct, 5 = very correct). The participants were also given an opportunity for providing other classifiers they would use.

The three presentations of "computer software" were designed to shift their emphasis from function to appearance (shape). In the first presentation of "computer software," it was described with an emphasis on its functions:

> Computer software yog qhov ua rau lub computer ua tej yam khoom. Piv txwv li, yog hais tias koj xav siv lub computer los sau ntawv koj yuav tsum tau siv computer software los sau ntawv. Yog hais tias koj xav siv computer los ua lej, koj yuav tsum tau siv computer software thiab thiaj li ua tau. (Computer software is the thing that makes the computer to do certain things. For example, if you want to use a computer to write

letters, you have to use computer software to do that. If you want to do math on the computer, you have to use also computer software to do that.)

In the second presentation, the interviewer took out a laptop computer, telling the participant that she would "show what computer software looks like." She then opened several applications, which popped up as "windows" on the screen.

In the third presentation, software was presented in an even more tangible form; the interviewer showed a CD to each participant, stating, "Computer software often looks like this before putting it in a computer."

The three presentations of "computer processor" were designed to shift their emphasis in the opposite direction of the presentations of "computer software," i.e., from appearance to function. In the first presentation, an Intel Pentium 4 Processor was shown to each participant. The dimensions of the processor were roughly 3.5 cm × 3.5 cm × 5 mm.

In the second presentation, we attempted to provide the participants with what we considered to be a fairly common description of the computer processor that was reasonably translatable into Hmong. The interviewer gave the following description:

> Kuv yuav nyeem kab lus ntawm no nrog koj, qhia koj txog computer processor hais tias nws ua dabtsi thiab. Computer processor yog ib hom computer chip. Nws yog qhov uas tseem ceeb tshaj nyob rau lub computer. Hauv lub computer, nws yog yam ua cia computer software ua haujlwm. (I am now going to tell you what "computer processor" is. "Computer processor" is a type of "computer chip." It is the most important part in a computer. In a computer, it allows computer software to work.)

In the third presentation, each participant was presented with a description of the computer processor that compared its function to the function of a human brain:

> Tamsim no kuv yuav qhia koj txog ib co tib neeg txoj kev xav txog computer processor. Muaj ib co tib neeg xav hais tias lub computer zoo li ib tug tib neeg, hom computer processor xav zoo li ib tug neeg lub hlwb.. (I am now going tell you some people's way of thinking about "computer processor." Some people think that the computer is like a human being, and that "computer processor" thinks like a person's brain.)

Results

Computer Software

Of the 43 participants, 24 said that they knew the English word "computer software." Of those who were familiar with the term, eight said that they would use *lub* as the classifier for computer software, four chose *daim*, four chose *qhov*, four chose *cov*, one chose *qhov* and *cov*, and three were unable to come up with any classifier.

The mean scores of the acceptability of *daim* and *lub* as the classifiers for computer software after the first presentation (a description of the function of software) were respectively 3.05 and 2.77. After the second presentation ("windows" on the computer screen), the means were 2.93 for *daim* and 2.60 for *lub*. After the third presentation (a CD), the means were 4.35 for *daim* and 1.72 for *lub*. The results of ANOVA indicated a significant effect of the presentation type on both the acceptability of *daim* ($F(2, 84) = 23.02$, $p < .01$) and *lub* ($F(2, 84) = 12.44$, $p < .01$). Tukey-HSD post hoc tests revealed that the differences in acceptability of *daim* between the first and the third presentations and between the second and the third presentations were statistically significant ($p < .01$) while the difference between the first and the second presentations was not significant. Tukey-HSD tests revealed the same pattern for the acceptability of *lub*; the differences between the first and the third presentations and between the second and the third presentations were statistically significant ($p < .01$) while the difference between the first and the second presentations was not significant.

Computer Processor

Of the 43 participants, 18 said that they knew the English word "computer processor" or "computer chip." Of those who were familiar with the terms, 15 said that they would use *lub* as the classifier for computer processor, two chose *daim*, and one chose *qhov*.

The mean scores of the acceptability of *daim* and *lub* as the classifiers for a computer processor after the first presentation (an actual example of a computer processor) were respectively 3.72 and 2.51. After the second presentation (a description of its function of running software), the means were 3.19 for *daim* and 3.00 for *lub*. After the third presentation (a "brain" metaphor), the means were 2.58 for *daim* and 3.70 for *lub*. The results of ANOVA indicated a significant effect of the presentation type on both the acceptability of *daim* ($F(2, 84) = 13.04$, $p < .01$) and *lub* ($F(2, 84) = 13.45$, $p < .01$). Tukey-HSD post hoc tests revealed that the differences in acceptability of *daim* between the first and the third presentations and between the second and the third presentations were statistically significant ($p < .01$ and $p < .05$, respectively) while the difference between the first and the second presentations was not significant. Tukey-HSD tests revealed the same pattern for the acceptability of *lub*; the differences between the first and the third presentations and between the second and the third presentations were statistically significant ($p < .01$) while the difference between the first and the second presentations was not significant. It should be noted, however, the difference of the acceptability of *daim* between the first and second presentation (.53) was almost equal to the critical value of HSD (.53 at alpha = .05), and the difference for *lub* (.49) was also quite close to the critical value (.55 at alpha = .05).

Conclusions and Discussion

In this study, we attempted to evaluate the fit of a hypothesized conceptual classification system underlying Hmong classifiers against data collected from various Hmong speakers. The results of the "wood experiment" supported some of the associations between Hmong classifiers and the configurational properties postulated by Bisang (1993); strong associations were found between the (saliently one-dimensional) wood sticks and *tus*, between the (saliently two-dimensional) wood plate and *daim*, and between the (saliently three-dimensional) wood ball and *lub*.

The results of the experiment, however, also indicated limitations of explaining common Hmong classifiers in terms of a few basic configurational characteristics. Such a limitation is most clearly demonstrated by the lack of consensus among the Hmong speakers on the classifier choice for the wood cube. The cognitive ambiguity experienced by the Hmong speakers presents a sharp contrast to the likely reaction from Japanese speakers, who would not hesitate to choose *ko*, the default classifier for three-dimensional objects, for the wood cube. Hmong classifier *lub*, therefore, cannot be adequately explained in the same way as the Japanese classifier *ko* simply in terms of its association with the saliently three-dimensional property. The problem of the cube for the Hmong speakers was apparently that they were not sure what it was, in contrast to the wood "ball." Some of the participants noted that it would be easier to choose a classifier if they knew what the wood cube was used for (e.g., an ornament for a house, as suggested by one participant), indicating an association between *lub* and functional features of an object. (It should be noted that *lub* is used for various kinds of machines.)

A possible reason for the difficulty of selecting a Hmong classifier for the wood cube may lie with the artificial nature of the shape. Unlike ball-like objects, cubes are less likely to be observed in the natural environment. The cube-like objects are thus more likely to be human-made objects, which tend to have a specific functional purpose (e.g., a toaster, a dice, etc.). Yet, the wood cube used in the experiment did not appear to have any specific function, which may have made it a difficult object to place in a conceptual category in the eye of the Hmong speakers.

The distinction between natural shapes and artificial shapes may also account for the slightly stronger consensus on the choice of the classifier *tus* for the round-faced wood stick than that for the square-faced stick used in the experiment. The difference between the round-faced wood stick and the square-faced wood stick, however, may also be related to a more specific functional characteristic of *tus*. Some of the participants in this study suggested a conceptual association between *tus* and the act of gripping, which is consistent with the "animate" characteristic of a stick. The square-faced stick used in the experiment seems less suitable for gripping—certainly less comfortable—than a round-faced wood stick. The association between *tus* and the notion of gripping is also congruent with the strong consensus on the choice of *tus* for a pencil and a baseball bat—the objects specifically designed for gripping. (It is interesting to note that *rab*, a classifier for tools, was chosen much less frequently for a pencil and a baseball bat than one might predict based on the previous literature on Hmong classifiers, e.g., Melton 1991 and Bisang 1993.)

The zipper experiment examined the relationship between *txoj* and *tus* as the classifiers for saliently one-dimensional objects. As the initial choice of a classifier for a zipper, *tus* was clearly preferred to *txoj*. Some of the participants noted that they had the image of "zipping up and down," and a few of them specifically mentioned the action of grabbing on to the handle of a zipper. Such observations may indicate an association between *tus* and the functional feature of a zipper. The length and its related notion of flexibility also seem to be significant factors because the acceptability of *txo*j was found to be significantly higher than that of *tus* for the long zipper while such a significant difference was not found for the short zipper or the zipper on jeans. With regard to the possibility of the figure-ground effect, the lack of significant difference in the acceptability of a classifier (*tus* or *txoj*) between the short zipper and the zipper on jeans (i.e., in the comparison in which the length of the zipper is controlled) makes it impossible to draw any conclusion.

The interaction between shape and function was further examined in the "computer software/processor" experiment. In the course of the three presentations of "computer software," in which the focus was shifted from function to shape, the acceptability of *daim* significantly increased while the acceptability of *lub* decreased, indicating the focus of *daim* on the configurational (saliently two-dimensional) property and the focus of *lub* on the functional (machine-like) properties. (The choice of *lub* in the first and second presentations of software may also be motivated by the association of *lub* with abstracts.) Such varying focuses of the two classifiers were confirmed even more convincingly by the results of the presentations of "computer processor," in which the focus was shifted from shape to function. Although *lub* was initially the most frequent choice of the classifier for a computer processor among those who were familiar with the English term, the participants preferred *daim* after the first presentation (an actual sample of a processor), indicating their focus on the flat shape. In the course of the three presentations, however, the acceptability of *daim* significantly decreased while the acceptability of *lub* increased, reflecting the participants' increasing attention to the functions of the computer processor. It should be noted, however, that different types of motivation may account for the acceptability of *lub* for the second and the third presentations; for the second presentation (of the processor's function of running software), the acceptability of *lub* is likely to have been based on the classifier's association with machines whereas the third presentation (a "brain" metaphor) may have invoked a configurational (the shape of a human brain) motivation as well as a nonconfigurational (the "thinking" function of a processor) motivation.

One of the rather unexpected, yet interesting results of the present study was the considerable amount of variance found among Hmong speakers in their choices of classifiers even in situations where pragmatic factors were largely controlled. The magnitude of individual variance found in this study demonstrates the importance of securing a reasonable sample size in collecting data for Hmong classifier research.

The results of the present study also indicated a possible language change among Hmong speakers in the United States: the increasing use of *qhov* as a default classifier for inanimate objects. Bisang (1993) listed *qhov* as one of the classifiers "occurring only with a few particular nouns" (p. 20) but also noted its flexibility of functioning as a quantifier and a class noun as well as a classifier. Perhaps due to its function as a classifier for various abstract nouns, some participants in the present study preferred *qhov* as a classifier when the referent was either configurationally under-specified (e.g., computer software) or failed to fall in a familiar configurational category (e.g., the wood cube). The participants who preferred *qhov* tended to be young persons who were born or have lived most of their lives in the United States. Although such a tendency points to a possible language change, its confirmation will require an examination of data collected from a much larger sample of Hmong speakers in the United States.

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