

The Use of a Cultural Protocol for Quantifying Cultural Variations in Verb Semantic between Chinese and French*

Hintat Cheung^a, Yann Desalle^b, Karine Duvignau^c, Bruno Gaume^c,
Chunhan Chang^a, and Pierre Magistry^a

^aGraduate Institute of Linguistics, National Taiwan University,
No. 1, Sec. 4, Roosevelt Road, Taipei 10617, Taiwan
{hintat, chunhanchang}@ntu.edu.tw; pmagistry@gmail.com

^bOctogone, Université de Toulouse,
Maison de la Recherche, Université de Toulouse-Le Mirail, 5, allées Antonio Machado,
F-31058 - Toulouse Cedex 9, France
yann.desalle@univ-tlse2.fr

^cCLLE-ERSS, CNRS, Université de Toulouse,
Maison de la Recherche, Université de Toulouse-Le Mirail, 5, allées Antonio Machado,
F-31058 - Toulouse Cedex 9, France
{duvignau, gaume}@univ-tlse2.fr

Abstract. In this methodological investigation, we examined the influence of cultural background on viewers' interpretations of visual stimuli and verbs elicited by these materials. French and Mandarin native speakers' interpretations of seventeen short movies, produced by French speakers, depicting various state-changing actions were collected by a 25-item cultural protocol. A slight difference in the familiarity rating of movies is found between French and Mandarin participants. We also found that Mandarin speakers used more general verbs when describing actions depicted by movies with low familiarity rating and children used more conventional forms with movies of higher familiarity. Hierarchical cluster analyses were conducted in selecting movies that were matched in action-interpretations by both language groups.

Keywords: cultural interpretation, verb specificity, familiarity rating, Mandarin, French

1 Rationale

Using visual stimuli, either pictures or motion pictures, for eliciting language samples is a method commonly used in crosslinguistics studies (Chafe, 1980; Berman and Slobin, 1994;

*This paper is supported by an ANR-NSC (France-Taiwan) bilateral project M3 (Modeling and Measurement of Meaning).

Taylor, 2007). It is generally assumed that by using visual stimuli, comparable cross-language samples can be elicited because all human beings, regardless of the languages they speak, share the same visual system and thus the verbal responses collected are on the same perceptual ground. However, it has long been shown that memory of visual figures can be affected by the labels they are associated with. For example, two circles with a short straight line in between were recalled as a figure of two circles linked by a curve line, resembling the shape of a pair of glasses when it came with a label 'glasses' (Carmichael, Hogan & Walter, 1932). Following this line of reasoning, cultural knowledge could also have similar influence on viewers of different languages when confronted with visual stimuli.

For the purpose of estimating and controlling the intervening role of cultural knowledge in a larger project of comparing the verb networks of French and Mandarin (see Prévot, this volume), the present study was conducted to examine variations between Mandarin and French native speakers in their interpretation of videos that were used to elicit verbs of state-changing action. The two research hypotheses are: First, viewers' familiarity of the action depicted in the video may affect their verb choice. It is hypothesized that for actions that viewers are not familiar with, more general verbs, which is operationally defined here as verbs that have fewer restrictions on agent, instrument and object, will be used. For actions that are familiar, children will learn the adult conventional form faster. Second, viewers' cultural knowledge, both linguistic and non-linguistic, will affect their interpretation of the actions and thus may encode them from a different perspective. For example, Mandarin speakers may have difficulties in understanding the goal of the action 'crumbing bread', a culinary routine in the French culture, which, however, is not the normal way bread is consumed at a traditional Taiwan dining table. Mandarin viewers might use verbs that highlight the inappropriate manner of food-handling, instead of the action. Therefore, a questionnaire collecting interpretations of visual stimuli allows us identifying possible cultural-based mismatches in the verb networks of the two languages.

2 Organization of the Cultural Protocol

The cultural protocol used in this study is composed of twenty-five items, subdivided in two subparts (see Table 1). The first part taps on the viewers' familiarity of each of the seventeen short movies, including the object, instrument, action and the co-occurrence of these components. A total of nine items were constructed for this aspect. The second part is on the interpretation of the events depicted in the movies, focusing on dimensions of physical and functional state of the affected objects, temporal properties of the event and manner of the action, components that are often examined in the study of lexical semantics and event structure (Jackendoff, 1990; Pustejovsky, 1995; Rappaport and Levin 2010). Sixteen items were written for this purpose. Responses were coded categorically (Yes = 1; No = 0). Twenty Mandarin native speakers and twenty French native speakers participated in this study and they were tested in group of ten to twelve individuals. The average score of the nine items on the familiarity rating of the seventeen movies were summed and compared between the two language groups. Cluster analyses were conducted with the sixteen items that elicited interpretations of the event structure of the actions depicted in the movies.

Table 1: Items for familiarity rating and event interpretation

	Focus	Part 1 - familiarity of the event
1	Familiarity	I know the labels of all the object involved
2	Familiarity	These objects can be seen in everyday life
3	Familiarity	I have seen the action before
4	Familiarity	I know what this action is about
5	Familiarity	This action can be seen everyday life
6	Familiarity	The action and the object often occur
7	Familiarity	The action and the instrument often occur
8	Familiarity	This action is completed with a special gesture
9	Familiarity	I know the exact verb for describing this action
		Part 2 – Event Interpretation
10	Intention	The goal of the action is to destroy the object
11	Intention	The goal of the action is to repair the object
12	Intention	The goal of the action is to prepare for another event
13	Physical change	This action involved moving something out of the object
14	Physical Change	This action involved subdividing the object
15	Functional-change	Upon the completion of the action, the object gained a new function
16	Functional-change	Upon the completion of the action, the object maintained its original function
17	Functional-change	Upon the completion of the action, original function of the object is modified
18	Object label change	Upon the completion of the action, the object maintained its original appearance
19	Object label change	Upon the completion of the action, a new label for the object is needed
20	Object label change	Upon the completion of the action, the original label still applies
21	Instrument specificity	This action can be completed with some other instrument
22	Manner	This action is performed with maximal strength
23	Temporality	This action is completed simultaneously
24	Temporality	This action lasted for a while
25	Temporality	This action is repeated for a couple of times

3 Analysis and Result

3.1 Familiarity Rating and Verb Choice in Mandarin Speakers

Since the movies were produced in France, the French group, as expected, showed a higher overall familiarity rating than the Mandarin group, (French = 0.8827; Mandarin = 0.7715 ; See Figure 1) and the differences between the two groups are statistically significant ($t(32) = -2.811$; $p < .005$). To facilitate the investigation on how familiarity rating may affect the use of general verbs and conventional forms, the average score of the nine items in Part 1 of the seventeen movies were normalized and then divided into three bands of familiarity: six movies are high (0.88) in familiarity, 5 movies are mid (0.80) and six are low (0.64). The z-scores of movies in low familiarity band are negative.

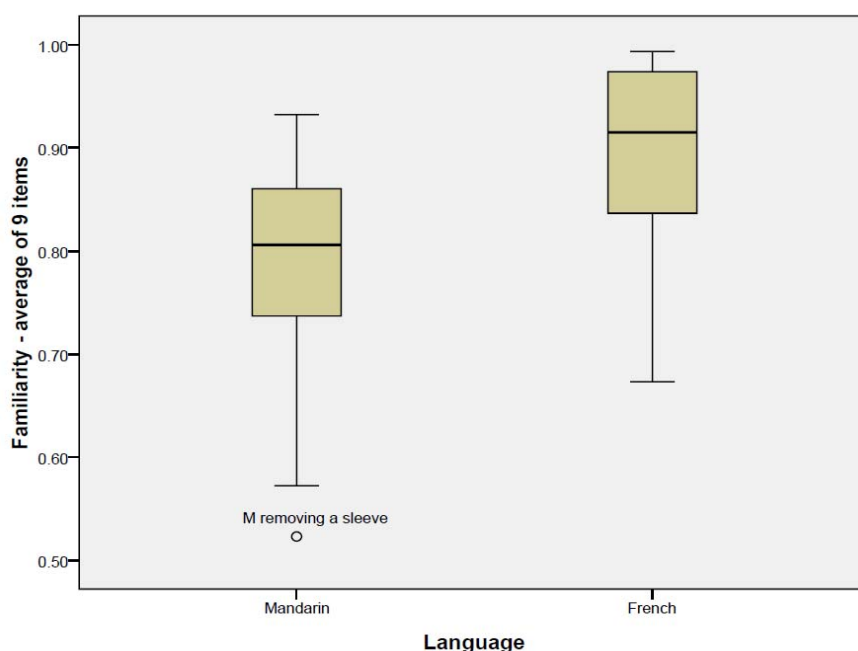


Figure 1: Boxplot of familiarity rating by Mandarin and French speakers

For items in the second part, paired-sample t-tests revealed that Mandarin and French raters differed significantly in two items and both of them are related to the interpretation of the outcome of the actions:

- (15) Upon the completion of the action, the object gained a new function
- (17) Upon the completion of the action, original function of the object is modified

To test the hypothesis that Mandarin participants might use more general verbs for describing actions that they are not familiar with, Mandarin verbs elicited by these movies are classified into two types: specific and general, following the classification schema of Pan (2010, this volume). The use of general verbs in different familiarity bands are shown in Figure 2. Results showed that for both adults and children, more general verbs are used with movies that received low familiarity scores (overall low = 54%; mid = 66% and high = 72%). On the developmental side, children use more general verbs than adults, above 50% even in movies with high familiarity band (adults = 43%; children = 61%).

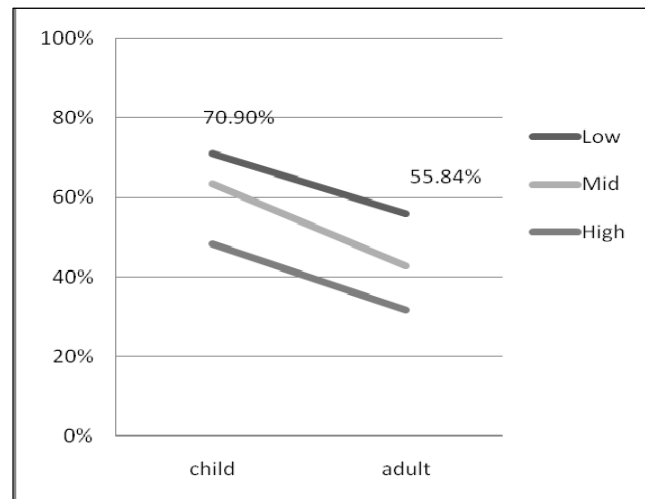


Figure 2: The use of conventional form in movies of different degree of familiarity

To examine if movies of higher familiarity will elicit more verbs from children that conform to conventional verb use, the mode of verb choice in adult for each movie is used as the criterion. For example, in the movie ‘chopping parsley’, 92% of Mandarin adults used the verb *qie* ‘cut’ and thus *qie* is considered the conventional form for this movie. The percentages of conventional form by familiarity rating in the three age groups are presented graphically in Figure 3. Mandarin adult speakers have similar verb choices 72% of the time when they are shown videos that are rated low in familiarity, and it is 88% for videos of high rating. The two child groups followed the same pattern, but with lower percentages, from 38% for low familiarity videos to 56% for the high ones. Unlike adults, children’s verb choices are sensitive to all three levels of familiarity while adults do not show such sensitivity in their responses for movies of high and mid familiarity.

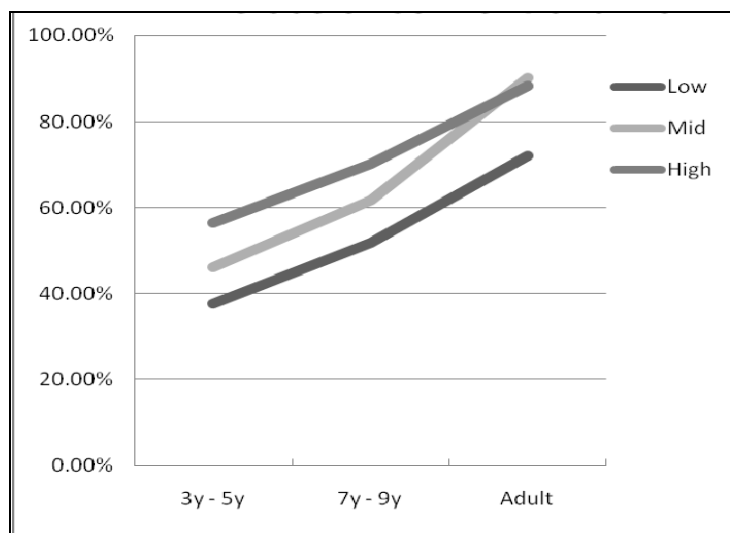


Figure 3: The use of conventional form in movies of different degree of familiarity

3.2 Match and Mismatch in Action-Interpretation

The seventeen video-clips used for the elicitation were produced in France (Duvignau and Gaume, 2003), depicting various state-changing actions: to deteriorate, to remove and to separate. The first analysis is to check if both French and Mandarin speakers have similar interpretations. A subject-based (i.e. average ratings of 16 items in Part 2 of the thirty-four movies, seventeen in Mandarin and seventeen in French) hierarchical cluster analysis, link method = average, was first conducted. As shown in Figure 4, there are four clusters at height 1.4, and three of them largely matched with the original design for eliciting action verbs of deterioration, removal and separation. The odd cluster is the French and Mandarin movie pair for the action of crumbling paper. Besides, most French movie and their Mandarin counterparts are found in the same major cluster. Only three pairs are misplaced (circled movies in Figure 4). They are movies for the action of:

- Sawing a plank
- Removing a sleeve
- Crumbling paper

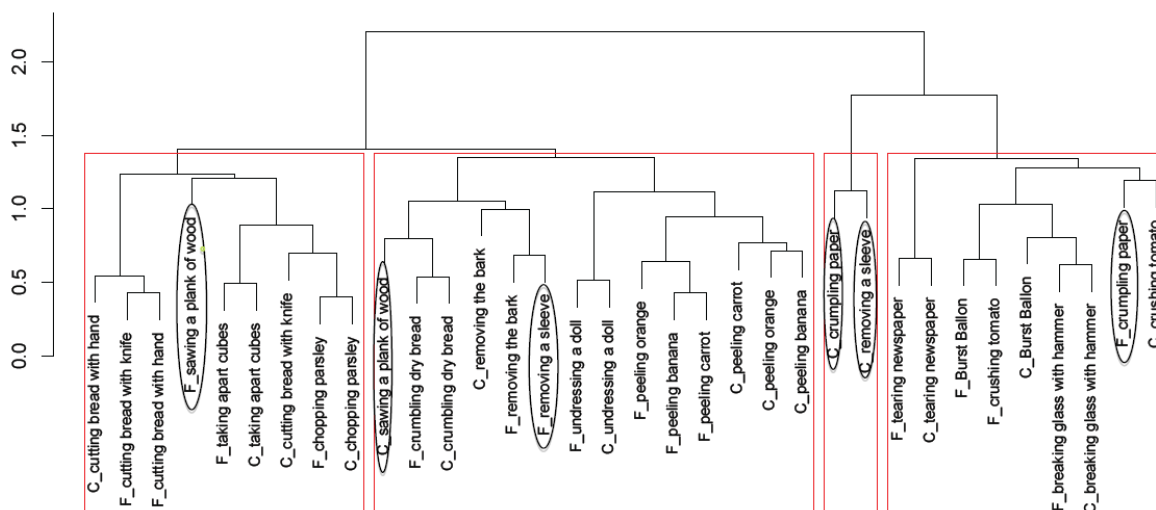


Figure 4: Dendrogram of subject-based hierarchical cluster analysis – Initial model

Several follow-up hierarchical cluster analyses were conducted by dropping different combinations of mismatched movie pairs. The final model is made up of fourteen movie pairs in two major clusters. The movie pairs on ‘sawing a plank’, ‘removing a sleeve’ and ‘cutting bread with knife’ were dropped. It is worth to note that in the first model, the movie pair ‘crumbling paper’ is a mismatch but when linked without the three movie pairs just mentioned, it is properly placed. The two major clusters in the final model stands for the action of deterioration and removal/separation.

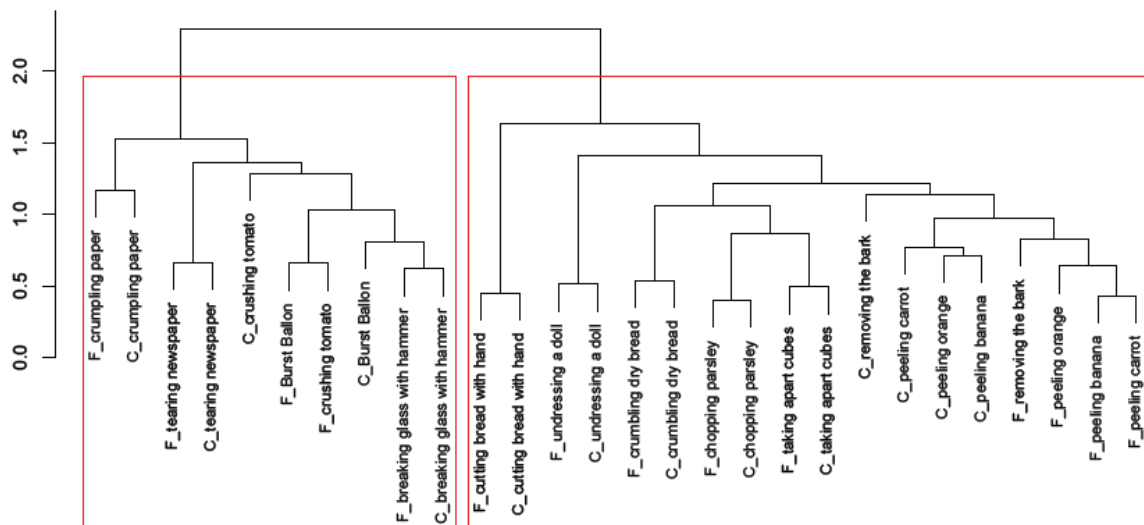


Figure 5: Dendrogram of subject-based hierarchical cluster analysis – Final model

4 Discussion and Conclusion

In this study a cultural protocol was employed to estimate the range of variations in the interpretation of visual stimuli made by speakers of two languages, the French group, who speak the same language as the producer, (i.e. French) and the Mandarin group, speakers of distinctively different cultural background. The overall results showed that the visual stimuli examined were rated as familiar by speakers of both languages, with French speakers provided an overall higher familiarity rating for all movies than Mandarin speakers. It is also found that Mandarin speakers used more general verbs to describe actions that they were less familiar. Besides, children produced more conventional forms when describing actions they are highly familiar.

It is generally assumed that cross-language samples, if elicited by the same visual stimulus are comparable at the level of perceptual and conceptual representations and thus allow extensive cross-linguistic comparison, such as in typological studies that examined how one single event is encoded in different language systems. In this study we have demonstrated that speakers' familiarity of the action or event presented in the visual stimuli can affect, at least, their verb choices. Variations in interpreting visual stimuli thus should be controlled when adopting non-native visual stimuli. The use of a cultural protocol, such as the one presented in this study allows us to estimate variations quantitatively. With proper statistical tools, such as cluster analysis, we can select materials that are culturally comparable and can have a better account of the source of variations found with the language samples.

References

- Berman, R. A. and D. I. Slobin. 1994. *Relating events in narrative: A crosslinguistic developmental study*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Carmichael, L., H.P. Hogan and A.A. Walter. 1932. An experimental study of the effect of language on the reproduction of visually presented forms. *Journal of Experimental Psychology*, 15, 73-86.
- Chafe, W. (ed.) 1980. *The Pear Stories: Cognitive, Cultural and Linguistic Aspects of Narrative Production*. Norwood, NJ: Ablex.
- Duvignau, K. and B. Gaume. 2003. Linguistic, psycholinguistic and computational approaches

- to the lexicon: Contributions to early verb-learning. *Journal of the European Society for the study of Cognitive Systems*, 6(1).
- Jackendoff, R. S. 1990. *Semantic Structures*. MIT Press, Cambridge, MA.
- Pan, C.F. 2010. Exploring Chinese Verbal Lexicon Developmental Trend with Semantic Space. *Proceedings of the Twenty-fourth Pacific Asia Conference on Language, Information and Computation*.
- Prevot, L., C.H. Chang and Y. Desalle. 2010. Computational modeling of verb acquisition, from a monolingual to a bilingual study. *Proceedings of the Twenty-fourth Pacific Asia Conference on Language, Information and Computation*.
- Pustejovsky, J. 1995. *The Generative Lexicon*. MIT Press, Cambridge.
- Rappaport H. M. and Levin, B. 2010. Reflections on manner/result complementarity, in M. Rappaport, M. H., Doron, M. and Sichel, I., (eds.), *Syntax, Lexical Semantics, and Event Structure*, Oxford University Press, Oxford, UK, 21-38.
- Taylor, J. 2007. Semantic categories of cutting and breaking: Some final thoughts. *Cognitive Linguistics*, 18 (2), 331-337.