# A bibliometric analysis of the Journal of cross-cultural psychology

van de Vijver, F.J.R.; Lonner, W.

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## RESULTS

To obtain an estimate of the perceived prototypicality of the instance terms for each cultural group, item prototypicality was calculated by averaging across subjects, separately by cultural group. Mean typicality and familiarity ratings for each item and language group can be obtained upon request from the second author. To ensure that there was some degree of convergence among members of each culture, split-half reliabilities were calculated by correlating ratings generated by the odd- and even-numbered subjects for each group. These reliabilities were consistently high for each category and cultural group. Overall reliabilities for each variable exceeded .98 for both cultures. Therefore, we can assume that the mean typicality and familiarity ratings provided a reasonable reflection of some common judgments within each cultural group.

*Cross-cultural variations in category structure*. One of the questions of interest in the present study was the degree to which Taiwanese-Chinese and Americans possess varying category structures. The degree of convergence between the typicality gradients of the Taiwanese-Chinese and Americans was calculated by correlating the mean ratings for each item and its translate both within category and across categories. As can be seen in the first column of Table 1, there was a substantial correspondence in the typicality gradients of Taiwanese-Chinese and American subjects, although this level of correspondence varied considerably across categories. The correlation in typicality ratings between Taiwanese-Chinese and American subjects ranged from .06 (for kitchen utensil) to .76 (for weapon), and 8 out of 10 cross-cultural typicality correlations were significant at the .05 level. When pooled across categories, the overall correlation between the Taiwanese-Chinese and Americans typicality judgments was .51 ($p < .05$). Although most of the cross-cultural correlations in typicality were significant, there was enough divergence in the ratings of the two cultural groups to suggest different typicality gradients for a number of categories. Therefore, further analyses examining potential correlates of this variation seemed reasonable.

To determine the degree of similarity between the two cultures in terms of the relative familiarity of various instances of the categories, correlations between the mean familiarity ratings for the 10 superordinate categories were calculated. These correlations suggested some divergence between the two cultures in terms of the relative familiarity of instances. The correlation between the American and Taiwanese-Chinese familiarity ratings for each category ranged from a low of –.34 (for vegetables) to .66 (for vehicle), and 5 out of 10 categories were significant at the .05 level. When all the categories

**TABLE 1**
**Correlations for Typicality and Familiarity Ratings for 10 Semantic Categories.**

| | *Cross-Cultural* | | *Within Cultures* | |
|---|---|---|---|---|
| *Category* | *Rated Typicality* | *Rated Familiarity* | *Chinese Typicality/ Familiarity* | *American Typicality/ Familiarity* |
| Bird | .49* | .26 | −.04 | .61* |
| Clothing | .71* | .60* | .37* | .60* |
| Color | .73* | .62* | .69* | .82* |
| Fruit | .37* | .00 | .65* | .81* |
| Furniture | .67* | .59* | .11 | .23 |
| Kitchen utensil | .06 | .00 | .03 | .44* |
| Musical instrument | .26 | .08 | .39* | .91* |
| Vegetables | .46* | −.34 | −.29 | .90* |
| Vehicle | .65* | .66* | .52* | .70* |
| Weapon | .76* | .48* | −.53* | .34 |
| Overall | .51* | .33* | .22* | .55* |

*$p < .05$.

were pooled for a single analysis, the overall cross-cultural correlation for familiarity was .33 ($p < .05$). These can be seen in the second column of Table 1. As anticipated, this correlation was significantly lower than the .48 cross-cultural familiarity correlation noted by Schwanenflugel and Rey (1986), $Z = 2.16$, $p < .05$. Thus, in this way, the cultures used in the present study were more distantly related than the ones used in the Schwanenflugel and Rey (1986) study.

*Familiarity and cross-cultural variation in category structure.* Given that Taiwanese-Chinese and American category structures were found to be relatively distinct, we were interested in determining the degree to which this cross-cultural variation in category structures could be accounted for by cross-cultural differences in their relative familiarity with category instances. This analysis proceeded in two steps: First, it needed to be demonstrated that cultural familiarity with instances was at least somewhat related to the perceived typicality of instances *within* cultures. If so, then we could examine the degree to which cultural familiarity could account for some of the disparities between cultures in their judgments of typicality for various category instances.

If cultural familiarity with instances is a partial determinant of category typicality within cultures, then it would be expected that familiarity ratings

would be positively correlated with typicality ratings within each culture. As can be seen in the third and fourth columns of Table 1, the evidence for this point was mixed. Across categories, there was a significantly positive overall correlation between category typicality and cultural familiarity for both the Taiwanese-Chinese (.22) and Americans (.55, both $p < .05$), suggesting that within each culture highly familiar instances tended to be viewed as somewhat more prototypical than less familiar ones. However, this relationship was smaller for the Taiwanese-Chinese than it was for the Americans ($Z = 4.38, p < .05$). Moreover, for the Taiwanese-Chinese participants, only 5 out of 10 categories displayed a significantly positive relationship between typicality and cultural familiarity, whereas for the Americans 8 out of 10 categories showed a significantly positive relationship. Consequently, this relationship was distinctly lower for the Taiwanese-Chinese than it was for the Americans.

It is important to consider whether the small correlation between typicality and familiarity for the Taiwanese-Chinese could be attributable to differences in the representativeness of the category exemplars used in the study. One way to address the representativeness issue is to compare the overall ratings of typicality and familiarity for the two groups. If items were less representative for the Taiwanese-Chinese group, then one would expect generally lower typicality and familiarity ratings for the Taiwanese-Chinese group than the American group. In fact, the Chinese rated the exemplars as being overall more typical (Taiwanese-Chinese: $M = 5.71$, $SD = 1.32$, and American: $M = 4.88$, $SD = 1.48$, $t(506) = 6.67$, $p < .05$), but somewhat less familiar (Taiwanese-Chinese: $M = 5.56$, $SD = 1.18$, and American: $M = 5.86$, $SD = 1.15$, $t(506) = 2.90$, $p < .05$). Thus, this analysis noted no overall trend toward reduced representativeness for the Chinese.

Another way to examine this issue is to compare published category norms from both countries with the items used in our study. Category norms have previously been collected by Battig and Montague (1969) for American subjects and similar norms have been collected for Taiwanese-Chinese subjects by Jeng, Lai, and Liu (1973). Unfortunately, 24% of the items from our study were not present in the Jeng et al. norms whereas only 13% could not be found in the Battig and Montague norms, $\chi^2(1) = 4.31$, $p < .05$. However, there have been many westernizing changes that have occurred in Taiwan since 1973, and we do not think these figures reflect modern Taiwanese-Chinese category knowledge. For example, of the items not appearing in the Jeng et al. norms, 76% were rated at least moderately familiar (> 5.0) by our Taiwanese-Chinese subjects. Correspondingly, 48% of the items not appearing in the Battig and Montague norms were now rated moderately familiar (> 5.0) by our American subjects. If these now familiar items can be

assumed to be included in each culture's current knowledge of potential category members, it would seem that our Chinese subjects had knowledge of at least 94% and Americans 90% of the items used in our study. Consequently, we feel that the smaller typicality-familiarity correlation displayed by our Taiwanese-Chinese subjects cannot be attributed to lower representativeness of category exemplars compared to our American subjects.

On the other hand, given the overall significant correlation between familiarity and typicality for both Taiwanese-Chinese and Americans, the degree to which cultural familiarity with instances could account for cultural variations in typicality gradients was then examined in four separate analyses.

First, if cultural familiarity is related to variations in category typicality across cultures, then it would be expected that each cultural group's typicality ratings would be more correlated with its familiarity ratings than the other culture's familiarity with instances. The .22 correlation between Taiwanese-Chinese typicality ratings and Taiwanese-Chinese familiarity ratings was marginally higher than the .09 correlation between Taiwanese-Chinese typicality ratings and American familiarity ratings, $t(251) = 1.93$, $p < .06$. The .55 correlation between American typicality and familiarity ratings was higher than the .13 correlation between American typicality ratings and Taiwanese-Chinese familiarity ratings, $t(251) = 6.93$, $p < .05$. Thus, this analysis was consistent with the view that cultural typicality gradients are at least partially reflective of the relative cultural familiarity with the instances that comprise the categories.

Second, if cultural familiarity with instances is related to differences in category typicality gradients, it would be predicted that items that form cultural prototypes should be more familiar to the culture for which they form prototypes than for the culture for which they do not. For this analysis, we defined the items that were ranked among the top four category instances in each category as being the category prototypes for that category for each culture. Of these prototypical exemplars, many (55%) were prototypes for one culture but not the other. A $t$ test found that the familiarity of the items forming cultural prototypical exemplars was higher than the familiarity of those same items when they did not form cultural prototypes, $t(43) = 3.10$, $p < .05$. Therefore, cultural familiarity with instances may be influential for determining which items are likely to be prototypes around which the categories are organized for that culture. High familiarity appears to be an essential characteristic of category prototypes within a culture.

Third, if familiarity plays a role in determining category structure, one would expect converging cross-cultural typicality gradients to the degree that the two cultures agree on the relative familiarity of instances. Comparing the

first and second columns of Table 1, this seemed to be the case. Cross-cultural typicality correlations were positively related to cross-cultural familiarity correlations across categories ($r = .74$, $p < .05$). Looked at another way, the five most converging categories cross-culturally (clothing, color, furniture, vehicles, and weapon) also had a greater percentage of instances that both cultures agreed were relatively familiar (83% receiving ratings of > 5.0) than the five least converging categories (birds, fruits, kitchen utensils, musical instruments, and vegetables with 68.3% receiving ratings of > 5.0), $\chi^2$ (1) = 13.84, $p < .05$.

Fourth, another way to examine whether familiarity can account for cross-cultural variation in typicality gradients is to statistically control for cultural familiarity and examine the change in the interlingual typicality correlation that results. That is, it is possible that differences between cultures in their familiarity with various instances might be obscuring the commonality that exists among cultures in their typicality gradients by acting as a suppressor variable. If so, statistically controlling for cultural familiarity should increase the correlation between cultures in their typicality gradients. To accomplish this, cultural familiarity with instances was controlled for by performing a bipartial correlation (Timm & Carlson, 1976) in which the independent effects of each culture's familiarity with the items were removed from the overall cross-cultural typicality correlation. This yielded a significant overall bipartial correlation of .58 ($p < .05$), which accounts for 7.6% more of the variance than the .51 cross-cultural typicality correlation noted earlier. Therefore, it seems likely that cultural familiarity with instances is having a small influence on variations in cultural typicality gradients.

*Language structure and typicality gradients*. It is clear that Chinese carries more information regarding superordinate category information than does English through the presence of category classifiers. For example, less than 1% of English items in the present experiment carried such information, whereas 35% of the Chinese items carried such superordinate classifier information. Therefore, we performed several analyses to examine the possibility that these classifiers in Chinese were related to the perceived category structures for the Chinese speakers.

First, we examined the distribution of these verbal classifiers in terms of the typicality ratings of the instances. Category classifiers were disproportionately associated with typical instances (53.2% of items rated > 6.0) compared to atypical instances (8.8% of items rated 4.0), $\chi^2$ (1) = 21.81, $p < .05$.

Second, we examined the correlation between the presence or absence of these classifiers and the typicality ratings both across and within categories.

Across categories, the presence of classifiers correlated .28 ($p < .05$) with Chinese speakers' typicality ratings. (Interestingly, the presence of classifiers was not significantly correlated with familiarity, however, $r = .08$, $p > .10$, suggesting that the presence of classifiers is uniquely associated with typicality). Within categories, correlations between the presence of category classifiers correlated and typicality judgments ranged from 0 to .57. Thus, although there was an overall small, positive correlation between the presence of category classifiers and typicality ratings, these correlations ranged considerably from category to category.

This diversity in the category classifier/typicality correlations proved to be informative for building an understanding of why the typicality/familiarity relationships were lower for Taiwanese-Chinese than for Americans. That is, significant correlations between category typicality and category classifier presence is associated with nonsignificant typicality/familiarity relationships. For example, the presence of classifiers was significantly correlated with typicality ratings for 5 out of 10 categories (bird, .36; clothing, .41; furniture, .47; vegetable, .55; and weapon, .57, all $p < .05$). As can be seen in the third column of Table 1, four out of five of these categories also displayed nonsignificant or negative relationships between category typicality and cultural familiarity. When these five categories were combined for an overall correlational analysis, a –.03 correlation between category typicality and cultural familiarity was obtained (compared to a significant .41 correlation for the corresponding categories in English). Thus, when the classifiers provided information regarding the structure of the category, the influence of familiarity on the resulting category structure appeared to be minimized.

However, of great interest to us were the categories for which the presence of category classifiers was arbitrary with regard to typicality, as it is in English. There were five categories for which the presence of the classifiers was uncorrelated with degree of category membership (color, .00; fruit, .33; kitchen utensil, .00; musical instrument, .16; and vehicle, .31, all $p > .05$). As can be seen in third column in Table 1, four out of five of the significant positive relationships between category typicality and cultural familiarity were associated with these categories. A separate correlation analysis performed, including only these five categories, yielded a .52 correlation between category typicality and cultural familiarity (compared to a .73 correlation for the corresponding categories in English). Given that the relationship between category classifiers and typicality is probably arbitrary in English, we find it interesting that the correlation of .52 for the arbitrary categories in Chinese is strikingly similar to the .55 correlation noted for the English categories overall in this study. Thus these results examining lan-

guage factors suggest that the presence or absence of category classifiers may be important to the perceived structure categories and may moderate the importance of familiarity in determining the structure of categories.

Although the above pattern is intriguing, it is highly speculative because it is based on a relatively small number of categories for each case. Clearly, further research using a larger number of categories is necessary to assess the generality of this finding. Moreover, it is important to consider other classifier languages that may also encode categorical information.

## DISCUSSION

In this experiment, strong cross-cultural variation in the structure of categories was observed between Taiwanese-Chinese and American participants. This variation was indicated by rather large discrepancies in relative category typicality judgments cross-culturally for some categories. Therefore, the finding of cross-cultural variation in category structure provides a meaningful starting point for distinguishing potential factors that might account for that variation.

One factor that might account for cross-cultural variation in category structures is cultural familiarity or variation in the familiarity that a culture has with different exemplars of the category. To discern cultural familiarity with instances, members of a culture are asked to decide, for example, the relative familiarity of cherries versus mangos. Most Americans have less contact with mangos than with cherries, but the opposite is probably true for the average Taiwanese-Chinese person, and their familiarity ratings should reflect this fact accordingly. To what degree does the relative ubiquitousness of cherries for Americans and the relative infrequency of mangos influence their standing in the category in terms of prototypicality and the corresponding meaning of the category term *fruit*? Using direct ratings of familiarity, this study produced four sources of evidence suggesting that the cultural familiarity with instances does play a role in determining the perceived structure of categories cross-culturally.

Language structure is another factor that may influence the perceived structure of categories. Language structure has a long history of being viewed as having important cognitive consequences (Sapir, 1921; Whorf, 1956). In this case, the presence of category classifiers for the speakers was examined. This study found that category classifiers tend to be incorporated as part of the labeling system of Chinese in a nonarbitrary way. It appears that category classifiers are more likely to be associated with terms for highly prototypical exemplars and to be absent for less prototypical exemplars. More than half

of the prototypical items used in this study had category classifiers associated with them, whereas they were rarely associated with atypical exemplars. Moreover, the presence of category classifiers was not related in any meaningful way to the relative familiarity of exemplars. Overall, this means that category classifiers may serve as a unique signal of representative category membership.

On the other hand, category classifiers were not diagnostic of prototypical exemplar status in all categories. However, the presence or absence of a significant typicality-classifier relationship may be important. We noticed a potentially interesting relationship between the classifier predictability, familiarity, and the assessed typicality gradients. Specifically, it seems that the presence of a diagnostic typicality-classifier relationship may serve to moderate the influence of other, potentially useful variables in determining category structure such as cultural familiarity. That is, when categories possessed classifiers that were predictive of representative category membership, we found no correlation between category typicality and cultural familiarity in Chinese speakers. However, when the classifiers were uncorrelated with perceived category structure, the correlation between category typicality and cultural familiarity was similar in size to the relationships noted for Americans in this study and for the Spanish-speaking Americans in the Schwanenflugel and Rey (1986) study. Thus, when the category classifiers are arbitrarily associated with category typicality (as they probably are for English and Spanish), a very similar relationship between category typicality and cultural familiarity is shown cross-culturally.

The current study also provides useful information for deciding the general issue of whether the category structures that people form merely reflect the structure of objects and events in the world. According to some formulations of the prototype view of word meanings and concepts (Heider, 1972; Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976), category structure is said to emerge as a function of overlapping attributes that are shared with related items within the category and that maximally distinguish them from unrelated objects in contrasting categories. Given the similar extensions of the category terms for the Taiwanese-Chinese and Americans in the present study, nearly identical category structures would be anticipated for the two cultures from this point of view. The results of the current study suggest that both differences in the relative availability of exemplars across cultures as well as language factors may also influence the structure of categories from culture to culture.

However, this is not to suggest that the correlational structure of the environment plays no role in determining category structure. In fact, we noted a fair degree of commonality between the category structures of the Taiwanese-

Chinese and American participants. If there was no commonality across cultures in the way they viewed categories, then one might expect that linguistic and familiarity variables would totally determine the contents of the categories that get formed. Clearly, this is not the case. When cultural familiarity was statistically controlled for, the cross-cultural correlation in typicality ratings actually increased rather than decreased (as would be expected if familiarity was the sole determinant of category structure). Thus actual structural characteristics, such as family resemblance, may also play a role in deciding category structure.

Last, because our goal is to identify potential contributions to cross-cultural variation in category structure, it is important to consider whether the variation we have noted can be accounted for more elegantly by other structural variables. One important distinction is that between human artifacts and natural kinds (Gelman, 1988; Gelman & O'Reilly, 1988). Artifacts are said to be defined functionally. Natural kinds, in contrast, have similar internal structures, possess greater coherence in terms of category attributes, and, thereby, enable category-based inferences to a greater degree (Gelman & O'Reilly, 1988). As a result, one might expect the greatest cross-cultural correspondence in terms of typicality gradients for natural kinds. This was not the case. Cross-cultural typicality correlations varied considerably for both natural kinds (bird, fruit, vegetable, and, perhaps, color) as well as artifacts (clothing, furniture, kitchen utensil, musical instrument, vehicle, and weapon). Consequently, although the artifact/natural kind distinction is an important one psychologically, it will probably not be very useful for defining the conditions under which cross-cultural variation in category structure emerge.

In sum, the current study of the nature of categories in Taiwanese-Chinese and American adults suggests that at least two factors contribute to cross-cultural differences in the structure of categories: the relative familiarity of exemplars to members of the culture and language structure. There may be others.

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*Pei-Jung Lin received her Ph.D. in educational psychology with an emphasis in applied cognition and development from the University of Georgia. She is an associate professor of early childhood education at Taipei Municipal Teachers College, Taipei, Taiwan. Her research interests include culture and conceptual development and applications of cognitive developmental theory to the classroom.*

*Paula Schwanenflugel is a professor of educational psychology and a research fellow of the Institute of Behavioral Research at the University of Georgia. Her research interests include language, culture, and thought with particular interest in semantic development.*

A brief 20-item measure of psychological distress, the GHQ20, was administered to three diverse ethnic groups, which included Chinese, Filipino, and Maori subjects. The FACTOREP method was employed to see if the previously reported four-factor structure of the GHQ20 could then be replicated. The four-factor structure was clearly replicated across the three groups. It is suggested that this measure may be useful for future cross-cultural studies in which a brief symptom measure yielding information on several different dimensions of distress is required.

# DIMENSIONS OF DISTRESS
## A Cross-Cultural Factor Replication

RICHARD J. SIEGERT
*Victoria University of Wellington*
RITA CHI-YING CHUNG
*University of California, Los Angeles*

**The application of** exploratory factor analysis to the study of differences in the expression of psychopathology, particularly depression, across different cultures, has recently proved a productive strategy for researchers (e.g., Beiser, 1985; Binitie, 1975). Although such an approach may be enlightening in clarifying differences in the expression of psychopathology in different cultures, its weakness is that it does not necessarily permit a comparison between cultural groups along dimensions of distress that may be common to both.

The present article attempts to use factor analysis in a confirmatory rather than an exploratory sense with a well known symptom measure across three distinct English-speaking ethnic groups. The confirmatory method used is that of FACTOREP, devised by Walkey & McCormick (1985). The FACTOREP procedure uses the *s* index, a statistic similar in form to chi-square to generate matrices of interfactor similarity (Cattell, Balcar, Horn, & Nesselroade, 1969).

The FACTOREP procedure is now available as a computer program (Walkey & McCormick, 1983) that calculates what amounts to a three-dimensional matrix of *s* index values, with one dimension representing analyses across different numbers of factors, the second representing repli-

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