Finding Correspondences between English, German and Japanese Infant-Cry Words : A Technique for Translating Ambiguous Terms

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In New Zealand, Germany and Japan native speakers created separate lists of words to describe infant crying. Each word was then rated against the same (translated) set of 127-point bipolar adjectival scales. A combined cluster analysis showed a single dominant " intensity " dimension with three clusters of terms occurring at better than 90% agreement. The resulting cluster map makes it possible for readers to find the closest equivalent infant-cry term from the other two languages.

Key words: infant cry; cross-national; cluster analysis

Although the expression of infant crying is not confined to any one country, it is clear that most research on this topic is reported in English language. Active cry researchers in countries which do not have English as their major language are at a disadvantage. Using standard dictionaries is of marginal assistance since some terms have a particular flavour which is easily lost in translation. For example in English "grizzling" and "colic" are often used; the former appears to be limited to some groups whilst the latter is almost universal. For non-English speakers these terms can be difficult to understand. Indeed, in English even, " colic " is not only symptomatic, implying an underlying cause, but it is used by some as an explanation and by others as a behavioural expression devoid of any other trimmings. Thus to say an infant has " colic " can mean any one of several things. In the present paper we limit ourselves to behavioural descriptions.

The impetus for the present study arose when the senior author was working at the laboratory of the second. At a seminar we tried to match German and English infant cry terms by direct correspondence. We needed agreed-upon criteria against which different

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terms could be evaluated. Thus, if it was possible to utilise a common framework the terms could be aligned within separate behavioural nets and then combined. To achieve this objective any one of at least three frames could be used. First, the same recordings of different infant cry sounds could be played back to listeners in each country and indigiuous cry-terms applied. Second, photographs or video film of infants in various "cry" poses could be shown and specific cry-terms applied. Third, cry terms could be rated against a standard set of bi-polar adjectival scales. There were three advantages for selecting the latter approach. First, it would be less likely to reach a ceiling effect, the range of possibilities is not limited by the assessment procedure. Second, the means of analysis would not rely on frequency counts and so prevent coarse separation with corresponding lack of definition. Finally, there is available already a tradition for analysing semantic-type data (e. g. Brennan and Kirkland, 1985). Eventually we may be able to triangulate (Webb et al., 1981) these three perspectives, but for the present report a semantic approach is adopted.

Method

Participants Colleagues, mothers, clerical staff and students from each of the author's institutions were invited to participate in the rating task. This involved 25 New Zealanders, 14 Germans and 25 Japanese.

Procedure Initially, the authors arranged for native speakers to produce lists of infant-cry terms. During this process the net was cast as wide as possible ; over a period of several days friends were asked, parents involved and dictionaries consulted. Subsequently, editorial selection resulted in three sets ; 13 words from English and Japanese speakers, with 15 from the Germans. In each case the words " pain," " hunger," and " sleepy " were included (in appropriate translation).

For the second phase 12 bi-polar adjectival scales were chosen, some were selected from the available literature and others included which appeared to have high face validity. These terms were then translated from English into the other two languages by local denizens. The scales were as follows :

1. mouth closed—wide open ; Mund geschlossen—weit offen ; 口が閉じている—口が開いている
2. strong—weak, stark—schwach, 強い—弱い
3. calm—agitated, ruhig—aufgeregt, おだやか—興奮している
4. pleasasant—unpleasant, angenehm—unangenehm, 快—不快
5. important—not important, wichtig—nicht wichtig, 重要—重要でない
6. continuous—many pauses, kontinuierlich—viele Pauses, 続ける—断続する
7. shrill—not shrill, schrill—nicht schrill, 鋭い—鋭くない
8. not meaningful—meaningful, nicht bedeutungsvoll—bedeutungsvoll, 無意味—意味深い
9. fast—slow, schnell —langsam, 速い—遅い
10. large—small, gross—klein, 大き—小さい
11. relaxed—tense, entspannt—angespannt, リラックス—緊張している
12. wide awake—sleepy, hellwach—schlaefrig, 目が冴える—眠い

Prior to analysis results from scales 2, 5, 6, 7, 9, 10, 12 were reversed.

Instructions Printed onto the cover page of the response booklets were the following directions. These were slightly modified in translation to suit grammatical style.

" On each of the following pages are identical sets of opposite words. At the top of the page is one term to describe an infant's crying. Try to use this word in the sentence 'I can hear a ____ cry'. Show how you would rate this cry on each of the scales for an infant aged about 6 months. For example, if you thought the term matched one of the extreme words, put your mark (cross or check) nearest that word. Do remember to put one mark on each and every line".

To assist participants gain experience in using these scales one or two examples were provided using non-cry terms.

Cry Terms The following terms were selected and printed one per page though in different order in the response booklets. English words were:

1. colic, 2. croaky, 3. fretting, 4. fussing, 5. grizzling, 6. hunger, 7. pain, 8. screaming, 9. sleepy, 10. sobbing, 11. wailing, 12. whimpering, and 13. whining.

For Germans the following 15 words were offered:

14. quakend, 15. shluchzend, 16. kreischend, 17. stoehnend, 18. muede, 19. noergelnd, 20. quaekend, 21. weinend, 22. wimmernd, 23. seufzend, 24. quengelnd, 25. Hunger, 26. meckernd, 27. Schmerz, and 28. klagend.

The Japanese cry-terms included:

29. J1 メソメソ 30. J2 ギャー, 31. J3 ワーワー, 32. J4 ギャースカ, 33. J5 ワンワン, 34. J6 しくしく, 35. J7 ぐずぐず, 36. J8 嗚咽, 37. J9 悲鳴, 38. J10 フェンフェン, 39. J11 エンエン, 40. J12 すすり泣き, and 41. J13 泣き叫び. (In the results section numbers preceding these terms are used as identifying tags).

Analyses From each participant completing a booklet was obtained a cry-term by bi-polar scale data matrix. The matrices from each national group were averaged and then pooled for an overall analysis. Cluster analysis was used for both the preliminary averaging as well as for the final combination.

Cluster analysis has been used in a whole range of studies, including biological classification, market research, educational measurement, infant- and cry-perception. Briefly, cluster analysis uses a similarity matrix coupled with information about the data to reveal groups which are similar. In the present procedure a minimum spanning tree is constructed which draws a line between data points which are closest in terms of their percentage similarities. Clusters are within those regions where the points are well connected and dissimilar to those outside. This proceedure is carried out for rows and columns independently, though once the cry-terms are clustered it is possible to identify the bases upon which these groups are formed by cross-referencing to the scales. As in factor analysis, interpretation of clusters is mostly subjective though guidelines are available from the scales. The main reason for using cluster analysis with the present data sets is that there is no *a priori* imposition on the structure, whatever structure is in there will emerge.

In the preliminary phase three National data sets were created by averaging across individual similarity matrices. This procedure preserves general response patterns without bias; if different ranges of the scales were used it is their relative magnitude rather than absolute differences which are maintained. Since the present paper is addressing similarities between countries, rather than individuals within countries, these three similarity matrices were combined for a single analysis. It was assumed that the bi-polar scales were translated adequately (a reverse translation with other persons naive to the purposes of the study indicated this was so) and used similarly by respondants. Thus, in the final analysis the data matrix consisted of 12 columns (the bi-polar scales) and 41 rows (13 English, 15 German, 13 Japanese cry-related terms).

Results

Bi-polar descriptors The loadings for the first three dimensions were .847, .333 and .249, indicating a main one with contributions from the remaining two. At greater than 90% consensus across all respondants three clusters of descriptions emerged: 5,8; 3, 11, 12; and 1, 2, 7, 9, 10. Ungrouped were 4 and 6. It appears the first cluster represents "evaluation," the second "affect" and the third "potency" (Brennan and Kirkland, 1985). It should be noted too, that from the minimum spanning tree, scale 11 is linked in with the "affect" cluster and scale 6 is associated with "potency". However clusters coalesce at 84% level, becoming part of a single group.

Cry terms: In this case "loadings" on the first three dimensions are .963, .197 and .097, indicating a single dominant dimension. From the cluster analysis it is clear that cry-terms are arranged into a "horseshoe" (Figure 1).

The position of a cry term along the "horseshoe" is significant for interpretation (Kruskal and Wish, 1968); suggesting that the single curvilinear "horseshoe" dimension corresponds to a continuum along which the terms vary. (For explication of the terms refer back to Cry Words in the METHOD section; 1-13 for English printed in medium; 14-28 are German in bold; and 29-41 Japanese in italic).

Three clusters of terms were evident at 92% level of agreement. The most "intense" was for terms: 1, 6, 7, 8, 16, 25, 27, 30, 37, 41. Next was a small cluster with 11, 31, 32, 33. Then occurred the main cluster with all remaining terms excepting 9, 18, 21 which were ungrouped. From the "reversed" bipolar scales the following ratings were obtained. By relating these modal ratings back the scale sets "profiles" (Kirkland and Brennan, 1984) which highlight the similarities and differences can be drawn. For the first cluster the 12 ratings are: 6, 6, 6, 6, 6, 5, 6, 6, 6, 6, 6, 6. The second can be profiled by 6, 6, 6, 5, 5, 5, 5, 5, 4, 5, 5, 5. Third, the largest cluster is typified by ratings of 3, 3, 4, 5, 4, 4, 2, 4, 3, 3, 4, 3. However, at 88% similarity these cluster groups dissolve and all the 41 terms are embraced within a single group.

Of greater importance is not the clusters themselves or the point at which their differences disappear, but the interrelationships between terms. For instance the amount of agreement between extreme terms is 30% (English), 45% (German) and 48% (Japanese); suggesting either the English speakers are more accustomed to this sort of task, or are more willing to use scale extremes, or that there do exist more polarised terms. What we offer here is a look-up translation table showing correspondences

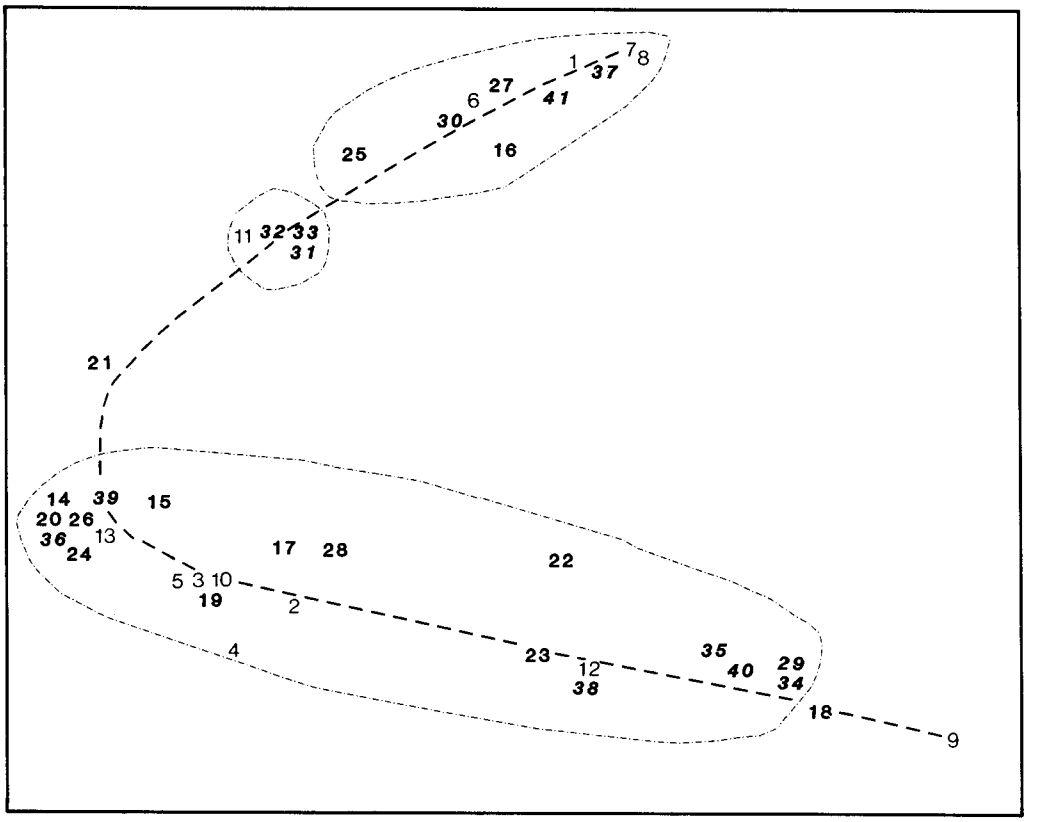

FIG. 1 Map showing numeric tags for English (1-13, medium print), German (14-28, bold) and Japanese (29-41, italic) cry terms.

between different infant-cry terms.

Conclusions

There is one main dimension accommodating the similarities and differences between the 41 cry terms. This suggests the terms are "graded" (after Murray, 1979) along an "intensity" continuum. The distances shown on the 2-dimensional representation (Figure 1) are relative. To fit the single continuum onto the printout (Figure 1) it has been folded by the computer into the conventional horeshoe pattern. Thus terms 9, 18, 34 are further from the other extreme (of 1, 27, 41) than they are from the "middle" (13, 26, 36). To use the figure, simply find the unknown word (e.g. Whining), locate its number tag (13), and find relevant language terms from the closest tags (24, 26, 36 or 39).

Apart from the three languages included in this report the procedure could be extended in two ways. First, other languages could be included. Once relevant sematic differential data are obtained, pairwise contrasts could be made using cluster analysis. Second, there could well be differences in a single language (either nationally or internationally) and this technique could be employed to help sort these out.

Finally, the technique could be used by researchers interested in examining terms

other than from the infant-cry literature. For example one could adapt the approach for examing " health " related terms like depression, stress, fatigue, coping and so forth. In fact, now the technique is available it could be applied wherever ambiguity exists, to help clarify terms and open channels of communication.

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