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ABSTRACT

A comparison of freehand sketch maps of the world provides a simple but effective means of exploring images of the world. The maps of 60 high school students from Nogales, Arizona, and 60 from Nogales, Sonora, were analyzed according to number of map features included, percent of features for each continent, frequency of country identification in South America and Asia, perceived relative sizes of the continents, and the accuracy of forms of the continents. The data were examined to discover cultural influences on map differences, and other influences such as proximity, size and shape of countries and continents, and currency in the news of particular countries. Results indicated a tendency for Mexican students to have a better conception of South America, while the American students were more aware of many Asian areas. Both groups saw North America and Europe as the most important areas of the world, suggesting the importance of their cultural roots there. (Author/JH)

Thomas F. Saarinen

The Effect of the Border on Student Views of the World: Nogales, Arizona and Nogales, Sonora

Comparison of freehand sketch maps of the world provides a simple but effective means of exploring images of the world. Examination by the author of student sketch maps from several different world areas has revealed rather marked ethnocentric points-of-view.[1] The factor of proximity appears to be very important in explaining what features are included or omitted. Those closest to home are more likely to be included with diminishing frequencies of features found as one moves further from home. But other factors are also important in determining whether a place appears. Some of these are the size and shape of country, whether it is currently in the news, and certain cultural factors.

The present study was designed to explore in a preliminary fashion some of the effects of cultural differences. One would expect marked differences in the type of map sketched by students of different nationalities because of cultural differences. However one would also expect major differences solely on the basis of location. To neutralize the dominant factor of location and thus get a better idea of the role of culture two sets of maps were obtained. Sketch maps of 60 students from the Nogales, Arizona high school were compared with 60 of their counterparts from a high school in Nogales, Sonora. On a world scale their locations are essentially the same. Therefore comparison of the two sets of maps should provide a good test of the role of culture. The major differences should be the product of different education systems, family situations, and exposure to mass media which are mainly in English north of the border and in Spanish south of the United States-Mexican border.

A major limitation of the study design is that the Arizona-Sonora border does not mark a clear-cut change in culture. Many of the students of Nogales, Arizona

may participate more fully in distinctive border culture than the larger American culture. Well over one third of them listed Spanish as their mother tongue and almost all said they spoke both English and Spanish. In the case of the sample from Nogales, Sonora virtually all listed Spanish as their mother tongue while just over a quarter indicated that they spoke English as well. The educational system and the languages of instruction might be expected to reflect national differences. But the degree of differentiation in world view might tend to be diluted by many other aspects of culture held in common by the two sample groups. Another limitation which should be mentioned was the rather poor quality of the two sets of maps. The Nogales Arizona group averaged 14.6 items per map while the Nogales Sonora group averaged 16.2 items per map. These numbers compare unfavorably with some other groups tested.[2] While this may be an accurate reflection of their degrees of knowledge of the world it does limit the amount of material available to assess differences. This is because the poorer maps typically list only continents instead of the more usual building blocks which are the nations.

To compare the two sets of maps the data for each map was transferred to cards for computer sorting. In addition to the presence or absence of various features, measures were included of the size of continents and ratings of how well their shape was rendered. The major objective of the paper was to compare the two sets of maps. But another objective was to develop effective methods of scoring for use in future applications of the technique.

A preliminary view of some of the similarities and differences between the groups may be obtained by inspection of the percentage of features devoted to each continent as seen in Table 1.

Table 1 Percentages of Map Features Devoted to Each Continent

	Continents in Order of Size						
Sample Group	Asia	Africa	North America	South America	Anarctica	Europe	Australia
Nogales, Arizona	15.6	4.8	44.3	6.9	2.0	23.2	3.4
Nogales, Sonora	9.9	5.4	48.5	13.2	..7	20.5	1.7

Immediately apparent is the lack of any relationship between the size of the continent and the proportion of map features devoted to it. If we assume that the areas most mentioned are those perceived to be most important it is clear that North America is the most important continent for both groups. This underlines the importance of proximity as noted above. The home area and adjacent locations tend to be drawn with much greater detail and accuracy then places far from home. In the case of the two groups from Nogales the proportion of map features devoted to North America came close to half of those for the entire world. For both groups Europe was second but the proportion of map features was only about half as great as for the home continent. The first major difference appears in the third ranked continent; for the Arizona students it was Asia for the Sonora students, South America. An original hypothesis was that the Mexican students would be more aware of other Latin American nations and this does appear to be the case. Considerably smaller proportions of map features were devoted to Africa, Australia and Antarctica. In almost all cases little more than a labelled outline of the continent appeared; if even this. The only marginal difference between the two sets of maps was a slightly greater awareness of Australia by the Arizona group. This might be due to the broad cultural and language similarities of the U.S. and Australia. As judged by the proportion of references to each continent the two groups resembled each other more than they differed.

In proportion of map features devoted to South America the Mexican students exceeded their American counterparts. A more detailed examination of the number of references to various South American countries illustrates the differences but underlines their marginal nature. In Table 2 we see that very few students from either group included any detail in South America. The total number of references to countries was only 17 for all 60 of the Nogales Arizona students and 45 for those from Nogales Sonora. For both groups the same countries appeared most frequently: Brazil a giant country, Argentina also rather large in area, and Chile, more memorable because of its peculiar shoestring shape. In addition to these the Sonora students also included a scattering of references to seven other South American countries. This slightly greater awareness of Latin American countries also showed up in the distribution of map references to North America. The higher proportion provided by the Sonoran students may be largely explained by their tendency to develop more map features to Mexico and Central America. In contrast the Nogales Arizona students exhibited only the dimmest awareness of Central America with 4 separate references (all of Panama) out of a total of 60 maps.

Table 2 Number of Map References to South American Nations by Student Groups

Nation	Student Sample: Nogales, Arizona	Nogales Sonora
Brazil	5	12
Chile	5	13
Argentina	3	6
Columbia	1	3
Peru	1	2
Bolivia	1	2
Uruguay	1	2
Venezuela	0	1
Ecuador	0	3
Paraguay	0	1
Total	17	45

The students from Arizona included a higher proportion of references to Asia than the Sonaran students. A detailed exmination of the narrow inventory of countries included in both samples (Table 3) illustrates another minor difference in perspective

Table 3 Number of Map References to Asian Nations by Sample Groups

Nation	Student Sample: Nogales, Arizona	Nogales, Sonora
China	21	11
Japan	18	9
India	16	18
Vietnam	9	1
Phillipines	7	0
Korea	5	2
Mongolia	3	0

Nationalist China	2	1
Cambodia	2	0
Laos	2	0
Thailand	2	0
Burma	1	0
Total	88	42

While the important Asian nations China, Japan and India are noted by many students in each group the number of mentions by Americans is slightly larger. Furthermore they include a scattering of references to Asian nations which presently or in the past have been associated with a heavy American military involvement such as Vietnam, Korea, Cambodia, Laos and Thailand.

Table 4 Continent Areas Compared to North America: Objective Reality and Subjective Views of Students

Continents	Area (in 1000s of square miles)*	Area of North America	Nogales, Arizona	Nogales, Sonor
Asia	16,900	1.82	.99	.84
Africa	11,500	1.24	.61	.70
North America	9,300	1.00	1.00	1.00
South America	6,800	.73	.42	.45
Antarctica	5,300	.57	.25	.23
Europe	3,750	.40	.55	.45
Australia	2,950	.32	.23	.22

* Source World Almanac 1971

One element of distortion in student sketch maps which lends itself readily to measurement is the comparative size of the various continents. The actual size may vary considerably from map to map. A more interesting and revealing measure is the relative size of the continents. To determine this ratio the size of each continent, as roughly measured by placing a grid of dots over them, was compared to the area devoted to the home continent, North America. Since the home area

tends to be exaggerated in size it would be expected that the others would appear much smaller than is actually the case. Table 4 compares the real ratio of North America to other continents until the ratio measures based on the subjective views on student maps. For each group the areas of North America on their maps were compared to the areas of each other continent. It is clear that North America is exaggerated in size on the student maps for only one other continent achieves a ratio as great as reality. In both cases, Europe, the second most frequently featured continent, is drawn larger than life-size. There appears to be a general tendency to exaggerate in size the areas seen as most important in terms of number of features. Aside from North America and Europe all the other continents appear to be ranked in the correct order in terms of size. In cases where one group more frequently mentioned features of a continent they also tended to increase the size of the continent. Thus the American students tended to have slightly larger Asias and the Mexican students had larger South Americas than their counterparts. The differences are minor but appear to be consistently in the right direction.

A final feature of the sketch maps to be considered is shape. One might expect that the most mentioned areas, those usually most familiar for the students would also be more likely to be drawn with a reasonably rendered shape. To test this each continent on each map was rated in terms of the degree to which the shape conformed to reality. The results are show in Table 5 which also reveals how bad many of the maps were. This may be seen in the column showing the percentage of cases in which the continent was not shown at all or incomplete. Antarctica was eliminated because the great majority of students from both groups did not include it. As expected, North America was drawn with a reasonable shape more often than any other continent. Europe, though important in terms of number of map mentions was among the most difficult to draw with a reasonable shape. In contrast Africa with a rather clear "Gestalt" did not provide as much trouble even

Table 5 Rating of the Shapes of Continents as Depicted on Student Sketch Maps (in Percentage)

Continent	Nogales, Arizona			Nogales, Sonora		
	Incomplete or not shown	Vague or Distorted	Reasonable Shape	Incomplete Not Shown	Vague or Distorted	Reasonab Shape
Asia	25.0	48.3	26.7	15.0	58.3	26.6
Africa	30.0	31.7	38.3	15.0	36.7	48.3
North America	15.0	23.3	61.7	0	31.7	68.3
South America	28.3	30.0	41.7	18.3	23.3	58.7
Europe	26.7	55.0	18.3	10.0	56.7	33.3
Australia	56.7	30.0	13.3	68.3	20.0	11.7

though features on that continent were very seldom known. Though many Asian places appeared on the map of the American students the continent itself was vague or distorted on the majority of the maps in which it was included. We might conclude that the student accuracy in rendering of shape is more directly related to the simplicity of the true shape of the continents than with their degree of knowledge of its features. Thus North and South America and Africa were relatively easy while the more complicated Europe and Asia posed problems. Australia, though possessing a rather simple outline, tended to be omitted from most maps while appearing as a vague blob on many that included it.

Some general conclusions emerge from the analysis. In spite of the rather poor quality maps and the lack of a clear cultural divide certain consistent differences did appear in the two sets of maps. Some of these were the tendency for the Mexican students to have a somewhat better conception of South America while the Americans were more aware of many Asian areas. However for both groups North America and Europe were seen as the most important areas of the world. The cultural roots of both groups lie largely in that continent if we are to judge by student sketch maps of the world.

FOOTNOTES

1. Thomas F. Saarinen, "Student View of the World," chapter 9 in Roger M. Downs and David Stea (eds.), Image and Environment: Cognitive Mapping and Spatial Behavior (Chicago; Aldine Publishing Co., 1973).

2. Averages in items per map for other high school groups were Helsinki, Finland, 45.6, Calgary, Alberta, Canada 42.3, Tucson, Arizona 24.6, and Makeni, Sierra Leone 9.9. See Thomas F. Saarinen "The Use of Projective Techniques in Geographic Research," in William H. Ittelson (ed.), Environment and Cognition, (N.Y.: Seminar Press, 1973) table 7.