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SPATIAL SEGREGATION TRENDS IN THE TEL AVIV METROPOLITAN AREA, ISRAEL*

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The spatial segregation among population groups is an outcome of their ethnic, cultural, socio-economic, and demographic differences. The following article analyzes the segregation among population groups in Israel's Tel Aviv metropolitan area in the early 1970s. In addition to spatial segregation according to age, socio-economic status, and ethnic groups, a unique importance is attached to the ethnic factor in Israeli society, which affects the social stratification. The length of residence in Israel is also an important factor in shaping the spatial distribution of the population. The segregation trends in the Tel Aviv metropolitan area in the early 1970s are analyzed mainly by Segregation and Dissimilarity Indexes. The main findings indicate that ethnic origin is the characteristic with the highest degrees of segregation, and that recenty-immigrated groups tend to be more segregated than veteran ones. The socio-economic charcteristics reveal U-shaped segregations, indicating greater segregation at the extreme socio-economic levels.

The spatial structure of the population in a city or in a metropolitan area is a complex subject. The heterogeneity of any city population can be defined according to different characteristics of the population: socio-economic status, ethnic and religious affiliation, and demographic characteristics (Timms, 1971; Morgan, 1975; Morrill, 1965; Macomber and Greenberg, 1968; Guest, 1972; Hershkovitz, 1972). As Wirth wrote in 1938 (Wirth, 1938), the spatial concentration of different population groups within the city is integral part of the urban way of life.

Many previous works analysing the spatial structure of a city population use multivariate analysis and particularly factor analysis as a basic method (Abu-Lughod, 1969; Berry and Rees, 1969; Borukhov et al, 1979; Hershkovitz, 1979). These studies identify three basic dimensions which influence the spatial organization of the population: socio-economic status, family status and ethnic status.

Another aspect which has been studied in previous theoretical and empirical studies deals with the association between the degree of social differentiation among population groups and geographical space (e.g. Timms, 1971; Bourne and Murdie, 1972). The main conclusion from these works is that as the social differentiation is greater, or as the differences among the groups have a greater influence on creating different life-styles, the tendency towards spatial segregation in a city's space is greater.

Many ecological studies dealing with residential segregation in the city emphasize segregation according to socio-economic status (e.g., Duncan and Duncan, 1955 b;

Latif, 1974). These studies, based on analysis of occupation, education, and income levels, reached several conclusions: (1) the dissimilarity of distribution of different socio-economic groups exists in cities all over the world; (2) the degree of the dissimilarity is a function of the social distance among the groups; and (3) the socio-economic groups characterized by the highest degree of segregation are those in the extreme levels of the social stratification.

Ethnic origin, as it affects the spatial segregation, has also been examined in several studies on American cities (e.g., Boal, 1978; Morrill, 1965). In some works dealing with ethnic segregation there is a relationshp between the degree of such segregation and the length of stay of the ethnic groups in a certain area (Duncan and Liberson, 1969; Liberson, 1962; Liberson, 1974). These studies show that the longer the ethnic groups are in the country (and the society), the more assimilated and less segregated they are in their residential patterns. Liberson analyzed the influence of segregation on specific immigrant groups in ten American cities in terms of four particular aspects of their lives: the ability to speak English, citizenship involvement, marriage, and occupational structure. He found that as the ethnic group is more segregated, it tends to be less involved in the other aspects of the entire society. His findings also show that if the group of the parents' generation is more segregated, then the group of the next generation tends to be the same. Klaff (1973) analyzed the segregation of twenty-two ethnic groups in three cities in Israel: Jerusalem, Tel Aviv, and Haifa for 1961. He found that there existed a strong spatial segregation among the ethnic groups. Klaff analyzed the association between the ethnic origin and socio-economic status in Israeli society, an association also reflected in the spatial differentiation among population groups in these cities.

The spatial segregation among population groups is an outcome of their ethnic, cultural, socio-economic, and demographic differences. Most previous studies dealing with urban population segregation are concerned with the question of the degree of segregation in different population groups (ethic groups, socio-economic groups, etc.). The most common measures of segregation in cities are the Indexes of Dissimilarity and of Segregation presented by Duncan and Duncan (1955 a), used later by many others (e.g., Tauber and Tauber, 1965; Agresti, 1980; Schnore and Evenson, 1966; Van Valey et al., 1976; Clemence, 1967; Roof and Van Valey, 1976).

One of the questions that might be involved in measuring urban segregation concerns a comparison of the degree of the spatial segregation according to different characteristics of the population. We may assume that the features which cause the highest degree of segregation have the greastest influence on shaping the spatial organization of the city's population.

RESEARCH AREA AND RESEARCH QUESTIONS

The present study analyzes the segregation among population groups in the Greater Tel Aviv Metropolitan area in 1972. As shown in Figure 1, the study area includes the city of Tel Aviv-Jaffa as the center of the metropolitan area and a large ring of surrounding communities, including 21 cities and urban settlements. The total population in the study area was 1,080,690 in 1972, out of which 363,610 were in the city of Tel Aviv-Jaffa. The Tel Aviv metropolitan area has a special importance in Israel's settlement system. The region has the largest concentration of population and the largest share of economic and social activities in the country.

relocation, some of the ethnic groups have tended to live near populations of the same origin. Sociological studies (e.g., Peres, 1977) introduce several main types of inter-ethnic relations. One type reflects situations with positive connections in which common activities afford communication at different levels. A second type reflects a situation of disconnection among ethnic groups, which is reflected by social and/or geographic distance. The third type reflects situations of competition and/or struggle among the ethnic groups. It is suggested, therefore, that as the social differences among the groups become greater, so does the tendency towards spatial segregation.

Studies which analyze the social stratification in Israel deal mainly with the basic question of association between ethnicity and socio-economic status in Israeli society (e.g., Hartman and Eilon, 1975; Peres, 1977; Eisenstadt, 1979). According to some of these studies, the association between the two has declined in recent years, while other studies emphasize the increase of the gaps between different socio-economic groups.

There are few studies dealing with the spatio-social structure of the population in the Tel Aviv metropolitan area. One of them (Shachar, Hershkovitz & Shatir, 1978) tests the social area analysis model for Tel Aviv metropolitan area in 1961 and 1972 (including the city of Tel Aviv and five more surrounding cities). The other one (Borukhov et al, 1979) analyses the social ecology of the area in 1972, using factor analysis. They also refer to the small metropolitan areas. The third one (Hershkovitz, 1979) relates to the greater metropolitan area (see Figure 1) and analyses the spatial structure of the population in 1961 and 1972, and the changing process during this period.

These studies clearly indicate that in the early 1960's there was no separation among the ethnic, socio-economic, demographic and family variables in shaping the spatial structure of the population (Hershkovitz, 1979). This conclusion reflects the empirical association that existed in Israeli society among these characteristics in the early 1960's. According to the same study (Hershkovitz, 1979), the association between ethnic and socio-economic status in the early 1970's is weaker than in 1961. Borukhov's study (Borukhov et al, 1979) shows an association between ethnic variables and his socio-economic factor, but this is relatively low in comparison to the association between socio-economic variables and his socio-economic factor. It should be noted that because the Israeli society is composed of people from many countries, the ethnic factor by itself has an extremely high and important influence on shaping the spatial structure of the population as was found in the studies mentioned above.

The present study relates to one aspect of the spatio-social structure of the population in the Tel Aviv metropolitan area- spatial segregation trends in the early 1970's. The analysis involves three main groups of population characterisitcs: family status, socio-economic status and ethnic status. As noted above, these three groups are identified in many of the urban ecological studies, using social area analysis or factor analysis as their basic method.

The variables which have been used in the present piece of work are the following: for the family status- age and family size; for the socio-economic status- education level, income level and type of occupation; and for the ethnic status- country of origin and length of stay in Israel.

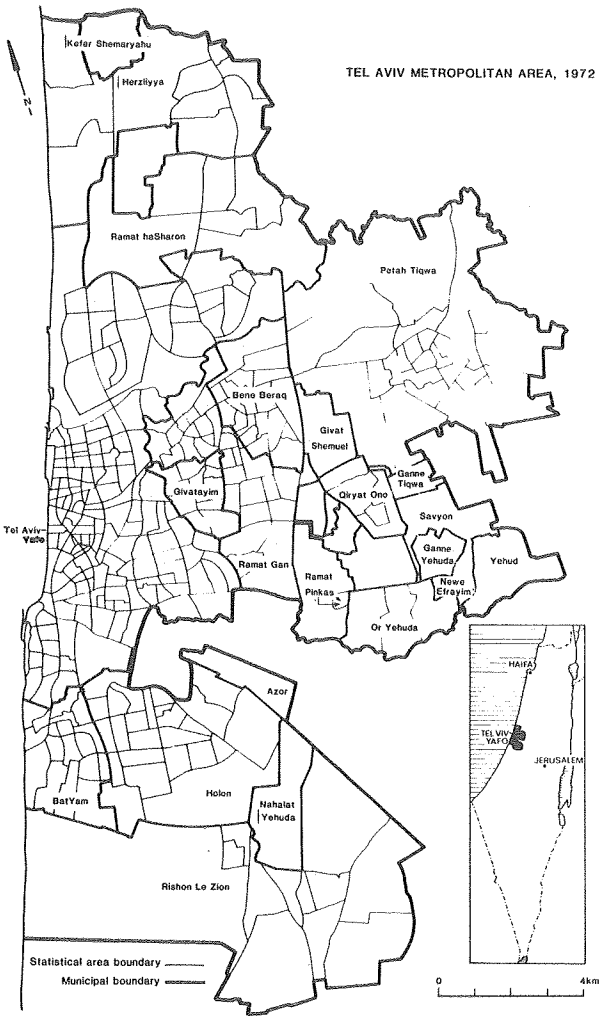

Fig. 1: Research Area, Tel Aviv Metropolitan Area, 1972.

The spatio-social structure of the population in the Tel Aviv metropolitan area is an outcome of the unusual importance of the ethnic factor in Israel. Israeli society is composed of an international array of immigrants who migrated to Israel at various periods, although most of them migrated after state independence in 1948. There are three major immigrant groups in Israel: Euroupean-American, Asian and African. These three groups are divided into subgroups according to their individual countries of origin. According to the 1972 population census (Central Bureau of Statistics, 1972) the population in the Tel Aviv metropolitan area in 1972 was subdivided by origin as follows: 46.7%- Israeli born; 13.8%- born in Europe and America; 27.2%- born in Asian countries and 12.3% of African origin. This means more than half of the population in the metropolitan area were born abroad. In addition to this, a large part of these immigrant groups who arrived after 1940 were placed by the authorities in public housing programs located throughout Israel, including different parts of the Tel Aviv Metropolitan area. To add to this process of

Comparing different characteristics enable us to evaluate the relative importance of each of them in the spatial structure of the population in the Tel Aviv metropolitan area in the early 1970's. Accordingly, we are concerned with two main questions:

(1) Which of the population characteristics- socio-economic, ethnic or demographic- had the highest degree of segregation in 1972?

(2) What are the spatial patterns of the segregation trends in the Tel Aviv metropolitan area?

METHODOLOGY

The following study is based on data for 320 statistical areas in the Tel Aviv metropolitan area in 1972, varying in size between 3,000 and 5,000 inhabitants. One of the main problems in using these kinds of data units is lack of homogeneity in their size and/or composition. This is a universal problem in all works relying on official data (for example in American cities which use data of census tracts). In general we can say that the finer the area units, the more information we obtain by the measures and by the maps presenting trends and processes. Generalizing for an entire city is one extreme of analysis, and the other extreme is using data for individuals. Thus, in a metropolitan area such as the one of Tel Aviv, which uses 320 statistical areas as basic areal units, there seems to be a fine enough grain in order to analyse the segregation trends all over the metropolitan area

The spatial segregation and the differences of distribution among population groups is investigated in this research by Segregation and Dissimilarity Indexes. These indexes are introduced in detail in several works (e.g., Duncan and Duncan, 1955 a and b). As noted above these two indexes have been used in many works dealing with segregation trends in cities. The Dissimilarity Index measures the distribution difference between distinct population groups. In fact, it measures what percentage of a population has to move to other areas in the city in order to achieve the same distribution as the comparative groups in the analysis. While the Dissimilarity Index is computed between any two population groups, the Segregation Index is computed between one specific group and the entire population. As introduced by Duncan and Duncan (1955 b), to compute the dissimilarity index one calculates the percentage of each group residing in each area unit. Therefore, the index of dissimilarity between the groups is one-half of the sum of the absolute values of differences between the respective distributions, taken area by area.

The values of both indexes range from 0 to 100. The higher the value the higher the dissimilarity between the distribution of the two groups and the segregation between the analyzed group and the entire population. A value of 100 means complete segregation or dissimilarity and 0 means no segregation or dissimilarity. Together, both indexes enable us to learn about the spatial differentiation of each population group by comparison with one specific group (Dissimilarity Index) and by comparison with all other groups (Segregation Index).

The two indexes by themselves tell us nothing about the spatial pattern and the spatial location of the groups. Mapping the distribution of the groups with the higher segregation degrees enables us to determine whether or not the high segregation is reflected by spatial concentration in geographical continguity or if there are several geographical clusters.

SEGREGATION TRENDS

The analysis of the segregation trends in 1972 in the Tel Aviv metropolitan area as presented below refers to the different characteristics of the population discussed above: family status, socio-economic status, and ethnic characteristics. For each of these, the analysis is based on the Segregation Index and the Dissimilarity Index. A map is given to introduce the distribution of the different population groups in the research area.

Family Status

The age group of the population under investigation indicates the stage of the life cycle of the population in the area. The findings in Table 1 show that the highest segregation occurs in the oldest age groups, medium segregation in the youngest age groups, and the lowest segregation in the other groups. The Dissimilarity Indexes (Table 1) indicate clearly that as the difference between the age groups grows, the dissimilarity in the distribution is greater. Figure 2 shows the concentration of the oldest group (age 5 and over) mainly in the center of the metropolitan area in the city of Tel Aviv-Jaffa.

The family size variable is an indicator of both the stage in life-cycle and socio-economic status. Very small families (1 to 2 persons) belong to a different socio-economic stratum because they include widows, widowers, singles, divorced, young couples without children, and old couples. On the other hand, big families with many children belong mainly to the low socio-economic stratum. The association between the spatial location in the area and the family-size is a result of two main factors. The first factor is the service systems, which are needed by different populations, either because of age or family-size (for example, families with children, without children, singles and others). The second factor is the association between family size and socio-economic status. As we can see in Table 2, this leads to a high spatial segregation among large families and other family size groups because they belong also to a low socio-economic stratum. For the medium-sized and small families we can expect much more dispersion, although we can assume that the smallest families will be more segregated than the medium sized families. The Dissimilarity Index (Table 2) also grows concurrently with the difference between the family-size of the group (Table 2).

Socio-Economic Status

Many studies dealing with social stratification (e.g., Eisenstadt, 1977) investigate such variables as education level, income level, and type of occupation as indicators of socio-economic status. The data for income level, in the discussion below, refers only to the wage earners (hired) and does not include self-employed persons, since in the census data there is no information about this employed group.

Education and Income Level. A very interesting and important finding from analyzing the socio-economic segregation in the Tel Aviv metropolitan area is that the segregation of these indicators assumes a U-shape. We can see this in Tables 3 and 4. This means high segregation in the groups at the extremes of the scale and lower segregation in the median. Figures 3 and 4 introduce the distribution of population with high level of education (13 or more years of education), and the income level of the population in the Tel Aviv metropolitan area. The spatial

Table 1: Segregation and Dissimilarity Indexes of Age-Groups in Tel Aviv Metropolitan Area, 1972

Segre-gation Index	Age Group	Dissimilarity Index															
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
16.07	0-4	0.00	9.64	15.40	19.51	15.81	10.58	9.45	14.43	18.11	21.77	24.54	28.59	31.75	34.60	33.88	35.01
12.89	5-9		0.00	10.32	15.15	14.18	14.80	11.32	11.78	14.88	18.66	21.64	25.66	29.40	32.66	31.88	33.16
11.26	10-14			0.00	10.12	12.52	17.79	15.97	13.42	12.38	15.08	17.84	22.65	26.50	29.25	29.17	30.05
12.65	15-19				0.00	11.44	19.92	19.63	17.86	14.51	15.02	16.35	20.74	24.34	27.19	27.12	28.03
8.63	20-24					0.00	14.63	15.57	16.44	14.14	14.85	15.15	18.52	21.15	24.63	24.00	25.80
13.63	25-29						0.00	10.88	14.62	16.61	18.52	20.54	24.21	26.98	29.78	30.02	30.83
13.80	30-34							0.00	11.78	15.35	19.07	21.42	25.38	28.46	31.93	31.84	32.75
12.36	35-39								0.00	10.58	14.82	18.34	22.40	26.03	28.71	29.40	30.88
9.89	40-44									0.00	10.22	13.52	18.80	22.31	25.34	25.70	27.11
10.56	45-49										0.00	9.63	14.72	18.43	21.67	22.33	24.40
12.32	50-54											0.00	10.99	14.57	17.63	18.94	21.99
16.33	55-59												0.00	10.40	14.01	16.93	20.05
20.24	60-64													0.00	11.47	14.33	18.66
23.41	65-69														0.00	13.58	18.38
23.02	70-74															0.00	14.14
24.49	75+																0.00

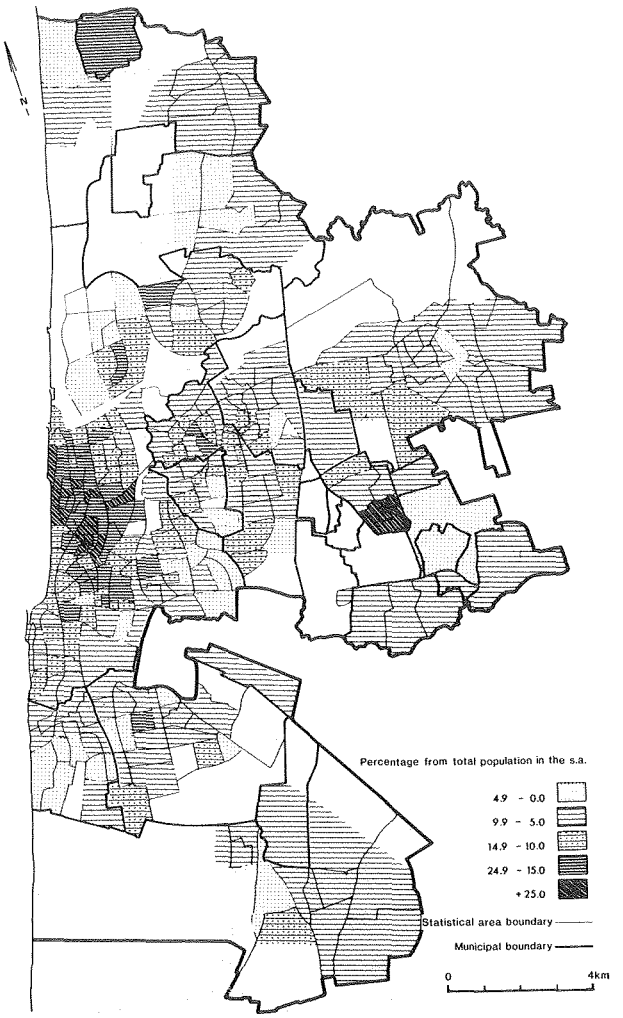

Fig. 2: Distribution of Age-group 65 and over, 1972.

Table 2: Segregation and Dissimilarity Indexes of Family -Size groups, Tel Aviv Metropolitan Area, 1972

Segre-gation Index	Family Size	Dissimilarity Index								
		1	2	3	4	5	6	7	8	9+
27.62	1	0.00	17.60	28.91	32.97	37.63	41.71	47.97	59.94	66.28
13.87	2		0.00	15.41	19.80	24.19	31.12	41.15	52.72	61.37
10.54	3			0.00	10.97	16.06	27.26	38.95	51.54	60.93
15.45	4				0.00	14.22	28.10	40.71	52.47	61.21
17.60	5					0.00	21.34	43.48	46.01	56.82
26.29	6						0.00	23.74	33.86	45.94
37.14	7							0.00	29.34	38.34
49.32	8								0.00	36.29
58.59	9+									0.00

differentiation between groups with different income levels and the segregation of the high level education groups can be clearly seen. There are clusters characterized by high socio-economic status which are located mainly in the northern part of the city of Tel Aviv-Jaffa and in some other suburbs of the metropolitan area, namely, Savion, Ganei-Yehuda and Kfar-Shmariahu. On the other hand, the low socio-economic status is located mainly in the southern part of the city and of the metropolitan area. It seems that the U-shape of the Segregation Index also has a brief pattern in the geographical space of the metropolitan area. The two extremes of the socio-economic status groups are located in different parts of the metropolitan area.

The analysis of the differences in distribution among the population groups as indicated by the Dissimilarity Indexes (Tables 3 and 4), shows the same tendency to increase in dissimilarity as the difference between the groups is larger.

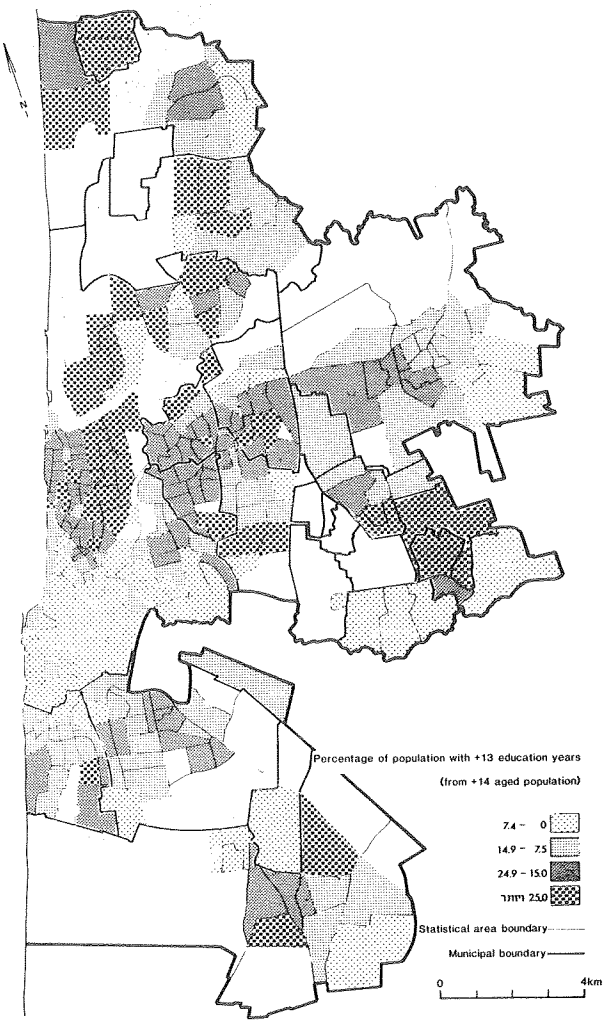

Fig. 3: Distribution of Population with High-level Education, 1972.

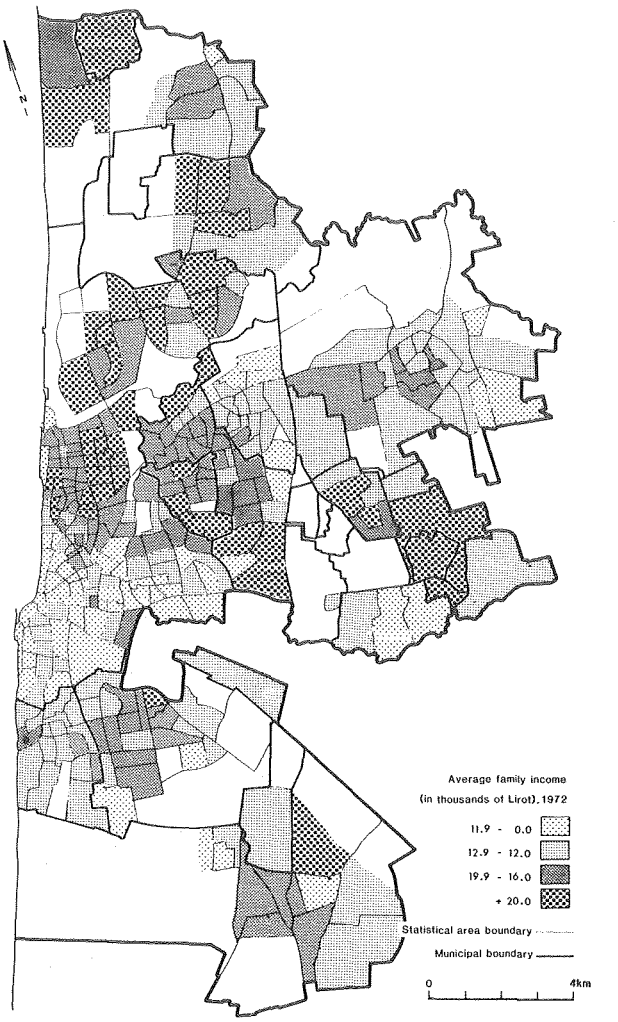

Fig. 4: Distribution of Income-level Groups, 1972.

Table 3: Segregation and Dissimilarity Indexes of Education-Level Groups, Tel Aviv Metropolitan Area, 1972

Segre-gation Index	Education Level[a]	Dissimilarity Index						
		0	1-4	5-8	9-10	11-12	13-15	16+
37.65	0	0.00	23.14	26.35	36.91	46.59	53.11	59.67
26.29	1-4		0.00	17.27	27.06	36.54	44.19	51.45
17.70	5-8			0.00	14.04	24.23	32.84	41.73
7.61	9-10				0.00	13.01	22.05	32.29
16.72	11-12					0.00	12.07	22.36
23.25	13-15						0.00	14.62
32.54	16+							0.00

[a] — Number of years of education

Table 4: Segregation and Dissimilarity Indexes of Income-Level Groups, Tel Aviv Metropolitan Area, 1972

Segregation Index	Income Level[a]	Dissimilarity Index			
		-7,999	8,000-11,999	12,000-19,999	20,000+
33.90	-7,999	0.00	24.14	35.22	48.18
23.19	8,000-11,999		0.00	24.12	39.42
18.56	12,000-19,999			0.00	26.92
34.19	20,000+				0.00

a - Annual family income (1972 I.L.)

Occupation. Findings from other studies show that there is spatial segregation in type of occupation, a variable which also reflects the socio-economic status (Blau and Duncan, 1967; Hodge et al, 1969; Duncan and Duncan, 1955 b). Many studies analyse the degree of prestige of occupation. Their basic assumption is that the occupational structure is hierarchical. Leveling the different occupations is done in most of these studies by prestige status, social standing and social status (for example Siegel, 1971; Hodge et al, 1966). Description of the grading of occupations in Israel has been done in some works (e.g., Kraus, 1976, who summarised previous works in this area in Israel). These studies relate to many small occupational groups, and by their nature they had to be based on as many groups as they could. The present study about segregation trends in the Tel Aviv metropolitan area is based on main occupation groups, each of them including many small occupation groups analysed in the studies mentioned above about Israel.The present study deals with eight occupation groups as shown in Table 5. We can say in general that these groups represent three main socio-economic status groups. The first three- academic and scientific professions, other liberal arts professions, and management- represent high socio-economic status. Clerks and salespersons represent medium socio-economic status. People employed in services, industry, and construction represent low socio-economic status.

The segregation indexes for these groups, as shown in Table 5, indicate U-shaped segregation, similar to the shape defined for education and income level groups. The dissimilarity indexes (Table 5) also indicate the following trend: as differences among the distribution of the groups become more apparent, there is a correspondingly greater gap in their positions on the employment scale. It seems that the largest differences are between groups which represent high socio-economic status and those which represent low socio-economic status. Figure 5 presents the sharp separation between the northern and the southern parts of the metropolitan area. The population engaged in academic and scientific pursuits is clustered mainly in the northern part of the region, with a special concentration in the northern part of the city of Tel Aviv-Jaffa itself. In the southern part of the metropolitan area, there is no region with high proportions of this employment

Table 5: Segregation and Dissimilarity Indexes of Occupational Groups, Tel Aviv Metropolitan Area, 1972

Segregation Index	Occupation Group	Dissimilarity Index							
		Academic and Science	Other Liberal Professions	Managers	Clerical	Sales Workers	Services	Professional Workers in Industries*	Other Workers in Industries*
31.93	Academic & Science	0.00	21.70	21.90	25.38	28.39	47.67	42.62	55.04
18.61	Other Liberal Professions		0.00	30.50	14.87	21.82	35.76	27.91	41.86
37.83	Managers			0.00	32.14	33.21	52.35	48.28	60.23
12.82	Clerical				0.00	15.20	30.19	21.98	36.53
17.23	Sales Workers					0.00	30.70	25.78	37.94
24.29	Service Workers						0.00	37.81	39.17
20.01	Professionals in Industries*							0.00	20.85
30.46	Other workers in Industries*								0.00

* The industries included are: manufacturing, mines, construction, and transportaion.

group. This situation is reversed in the southern part, which includes mainly people employed in the low levels of the employment scale.

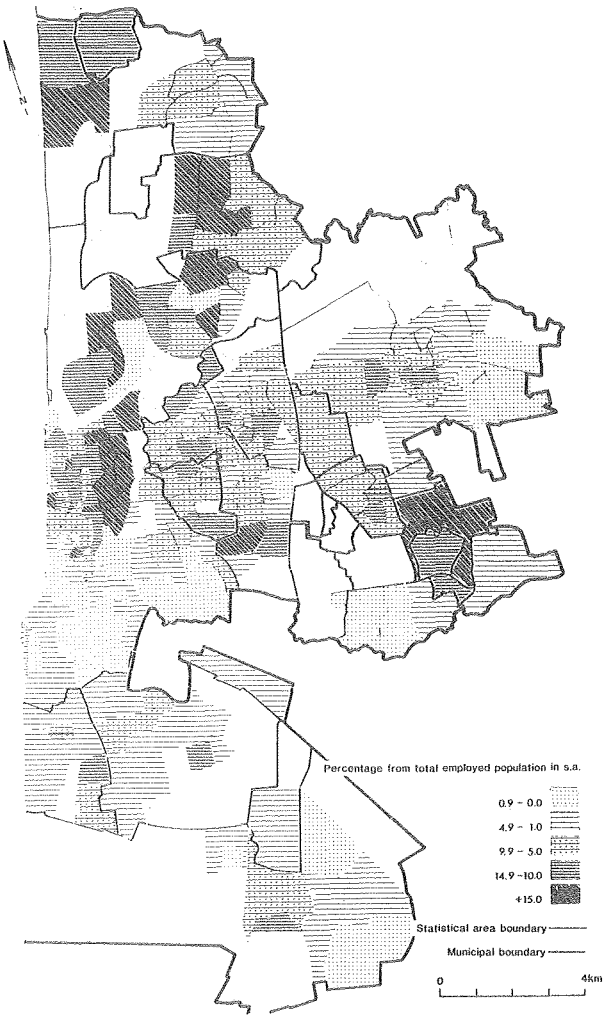

Fig. 5: Distribution of Employed Persons in Academic Professions, 1972.

From the analysis dealing with socio-economic segregation in the Tel Aviv metropolitan area, we can conclude that there is a high spatial segregation of the extreme socio-economic groups, as indicated by education and income levels and occupational ranking.

The U-shaped structure of the segregation of socio-economic groups has been found in all the socio-economic indicators. The tendency is to be more spatially segregated as the socio-economic characteristics of the group are more disparate. These trends of segregation and those of the dissimilarity in distribution of the different socio-economic groups is reflected briefly in the spatial context of the area.

Ethnic Origin

The segregation analysis of ethnic groups in the Tel Aviv metropolitan area in 1972 was carried for nineteen ethnic groups and for groups with varying lengths of time in Israel, and specifically those who came to Israel before and after 1948. The influence of the duration of residence in Israel is very important because it adds another dimension to the ethnic origin segregation trends. Table 6 presents ranked segregation index values of ethnic groups in the metropolitan area by their length of stay in Israel. Several findings are evident: (1) the highest segregation is of Indian and Yemen-Aden immigrants; (2) the lowest segregation is of Romanian immigrants; (3) the segregation of most European immigrants is very low; (4) the segregation of North American immigrants is higher than Europeans. Concerning the length of stay in Israel, newcomers to Israel (after 1948) are more segregated than the veterans (arriving before 1948). Part of this is an outcome of post-1948 public housing projects in Israel when waves of immigrants were placed together. To add to this, some ethnic groups themselves tend to be more segregated socially and spatially than others.The analysis of the dissimilarity indexes among ethnic groups is done by using the method of 'Smallest Space Analysis' (SSA) which was developed by Guttman (1968). Using this method enables us to identify which ethnic groups have a low dissimilarity index, indicating that their distributions in the metropolitan area is similar. In the SSA method the variables are presented as points in abstract space (not a geographical one), and the distances between them are based on the degree of association among the variables. As the association is higher, the distances between the points representing them will be smaller and vice versa. The SSA method is applicable to any kind of matrix of relationships between variables and enables us to analyse the structure of this matrix. Dissimilarity Index matrix is one of this kind. Thus, in the analysis of the dissimilarity among the ditribution of

Table 6: Ranked Segregation Values of Ethnic Groups, Immigrated to Israel before and after 1948

Ranking	Immigrated before 1948		Immigrated after 1948	
	Ethnic origin (country)	Segreg. Value	Ethnic origin (country)	Segreg. Value
1	India	41.10	India	80.33
2	Latin America	37.34	Algeria-Tunis	61.24
3	North America	36.42	Morocco-Tangier	59.74
4	Algeria-Tunis	35.62	Libya	58.45
5	Czechoslovakia	34.20	North America	58.23
6	Syria-Lebanon	33.42	Latin America	57.67
7	Yamman-Aden	32.84	Yamman-Aden	56.73
8	Libya		Iran	55.58
9	Morocco-Tangier	31.74	Syria-Lebanon	55.49
10	Hungary	31.45	Turkey	54.83
11	Bulgary-Greek	31.24	Iraq	54.22
12	Poland	30.05	Egypt-Sudan	53.75
13	Iraq	29.84	U.S.S.R.	53.42
14	Iran	29.60	Czechoslovakia	51.23
15	U.S.S.R.	29.52	Germany-Austria	50.02
16	Turkey	28.97	Bulgary-Greek	49.73
17	Germany-Austria	28.44	Poland	48.22
18	Egypt-Sudan	27.92	Hungary	44.23
19	Romania	27.53	Romania	41.10

ethnic groups in the Tel Aviv metropolitan area, the method of SSA is used for the dissimilarity indexes among the groups. Of crucial importance in analysing the SSA diagram is the relative distance among all the points in the space, which reflects the level of association among the variables. In our concern it can be said that the similarity in the geographical space is represented by small distances in the space diagram (SSA) system and vice versa.

A few previous studies used the SSA method for analysing dissimilarity indexes among different types of groups: occupational groups (Blau and Duncan, 1967; Kraus, 1976), religious and ethno-religious groups (Laumann, 1969) and ethnic groups in Israel (Klaff, 1973). Klaff analyzed the dissimilarity among ethnic origin groups in three cities in Israel in 1961: Jerusalem, Tel Aviv and Haifa. Klaff's findings for the city of Tel Aviv for 1961, (based on subquarter division) presents the main differentiation between western and eastern country of origin groups which have greater residential proximity among themselves than to groups of the other ethnic origin (Klaff, 1973).

It has to be mentioned that identifying the structure of the SSA diagram is done by looking for clusters of points on the diagram according to the relative distance between them. By using the SSA method for the dissimilarity index among the ethnic groups in the Tel Aviv metropolitan area in 1972, we expect to find the following: (1) The ethnic origin groups with a high degree of segregation will be located on the space-scheme at a relatively large distance from all the other groups; (2) the ethnic origin groups with a low degree of segregation will be located on the space-scheme at a relatively small distance from all the other groups; (3) the higher segregation degrees of the newer immigrant population in Israel will be reflected in the space-scheme through a higher degree of differentiation among clusters of ethnic origin groups.

Figures 6 and 7 represent spatial-schemes of the dissimilarity among ethnic groups according to their length of stay in Israel. An anlaysis of the scheme for ethnic groups immigrating to Israel before 1948 (Figure 6) shows a different pattern of differentiation from the pattern of the other groups, coming to Israel after 1948 (Figure 7). In the diagram of the more veteran ethnic groups (Figure 6) we can easily define only two clusters of origins. One includes Latin American and North American immigrants, and the other includes all the other groups. It is much more difficult to define clusters among all the other ethnic origins, and we cannot identify a clear separation between European, Asian, and African immigrants. In comparison, using the SSA diagram for the ethnic groups that immigrated after 1948 (Figure 7), we can identify three main clusters of ethnic origins and discern that the dissimilarity between the distribution of these main ethnic clusters is smaller than the dissimilarity between them and the groups with other origins.

The three main clusters are: (1) The first cluster includes all American-European immigrants. Because of their relatively high segregation, Latin American and North American immigrants form a sub-cluster within this main cluster. The differences in the distribution of all European immigrants are very small. (2) The second cluster consists of Asian immigrants. The distances among the distribution of Asian immigrants, as represented on the scheme, are bigger than among European immigrants. (3) The third cluster includes African immigrants (except those of Egyptian and Sudanese descent, who are in the same cluster as Asian immirants).

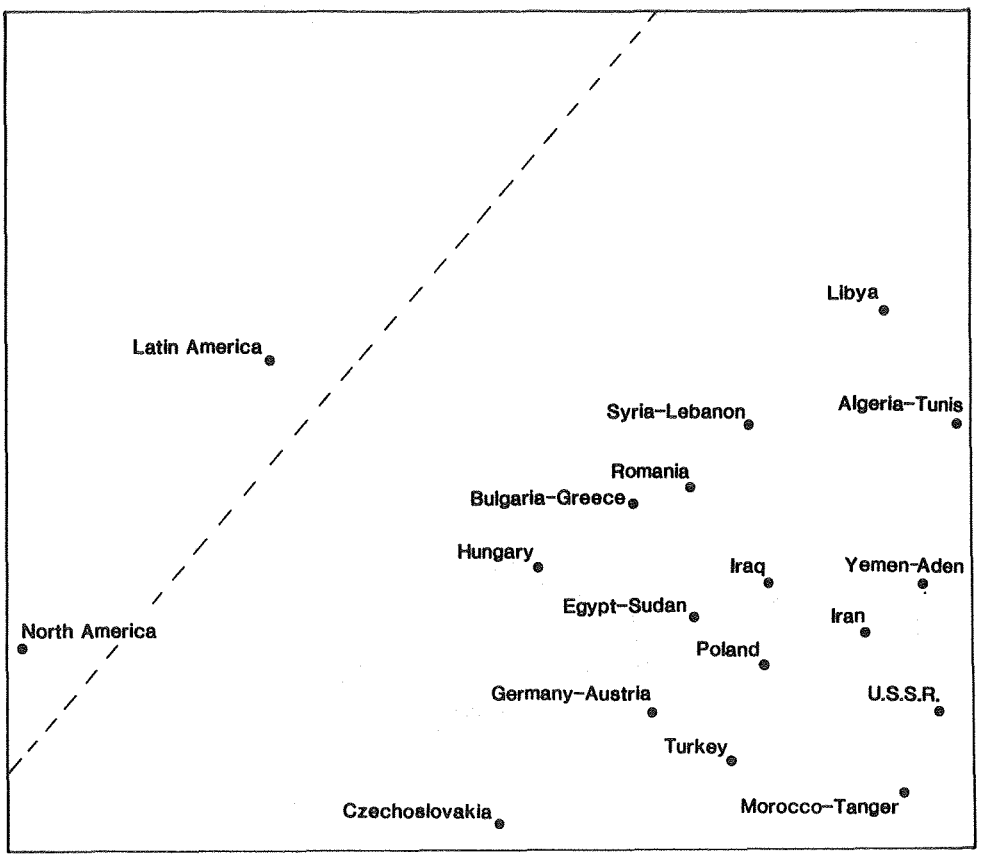

Fig. 6: S.S.A. Diagram of Foreign-born, Immigrated to Israel before 1947.

The African immigrant populations are very different, both in their distribution among the other countries and among themselves.

The main conclusion from this comparison is that the differences in the distribution among the new immigrants are greater than those among the veterans. Two main reasons are suggested for this situation. One is the public housing projects in the mid-1950's which absorbed large groups of immigrants who were often assigned on an ethnic basis, especially when there were relatively large waves of immigrants from the same origin. The second, and equally important reason, is that, as an independent consideration in the urban location of a private individual and/or family, ethnic origin seems much more important among the newcomers after 1948 than among those who came to Israel before 1947.

Figures 8, 9, and 10 introduce the distribution of European-American, Asian, and African immigrants. These maps show a clear separation between these three groups in the city of Tel Aviv-Jaffa itself, while in other settlements of the metropolitan area, there is more spatial mixture between Asian and African immigrants. Figure 8 presents the high concentration of European-American immigrants in the central and northern parts of the city of Tel Aviv-Jaffa and in some other large clusters, mainly in the eastern and northern parts of the metropolitan

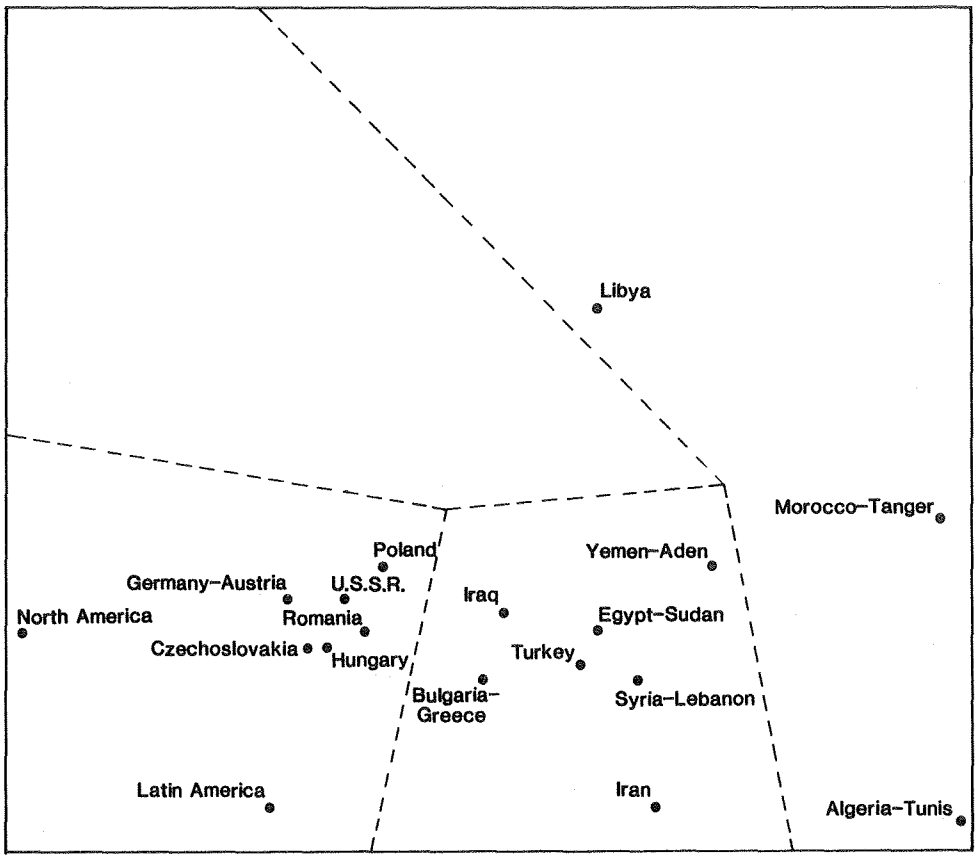

Fig. 7: S.S.A. Diagram of Foreign-born, Immigrated to Israel after 1948.

Table 7: Segregation Values of Population Characteristics, Tel Aviv Metropolitan Area, 1972

Characteristics	Segregation Values		
	Minimum	Maximum	Range
Family Status			
* Age	8.63	24.49	15.86
* Family Size	10.54	58.59	48.05
Socio-Economic Status			
* Education Level	7.61	37.65	30.04
* Income Level	18.56	34.19	15.63
* Occupation	12.82	40.29	27.47
Ethnic Status			
* Foreign-born immigrated before 1947	27.53	41.10	13.57
* Foreign-born immigrated after 1948	23.32	80.33	57.01

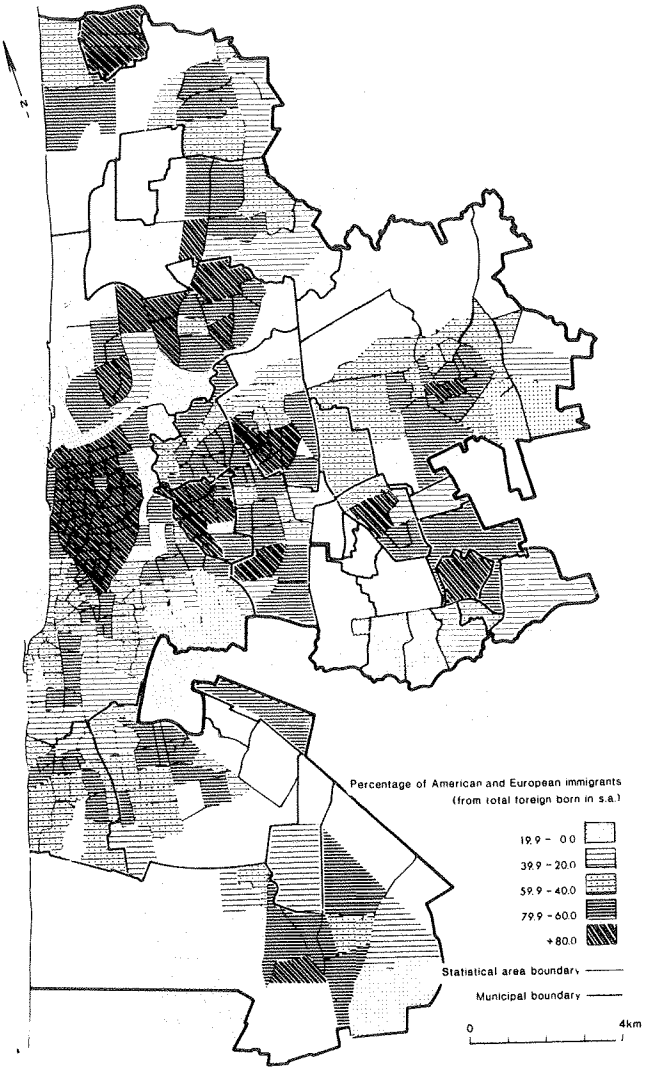

Fig. 8: Distribution of American-European Immigrants, 1972.

area.Figures 9 and 10 show the concentration in separate locations of Asian and African immigrants, primarily in the outer settlements of the metropolitan area. It seems that the African immigrants are far more spatially differentiated from the entire population, as we saw in the segregation indexes and the SSA. The dissimilarity between the distribution of European-American and African immigrants is larger than between European-American and Asian immigrants.

CONCLUSIONS

The spatial differentiation trends of population groups in the early 1970's in the Tel Aviv metropolitan area are summarised in Table 7 which presents segregation index values using several characteristics of population groups. From this comparison we can draw several important conclusions:

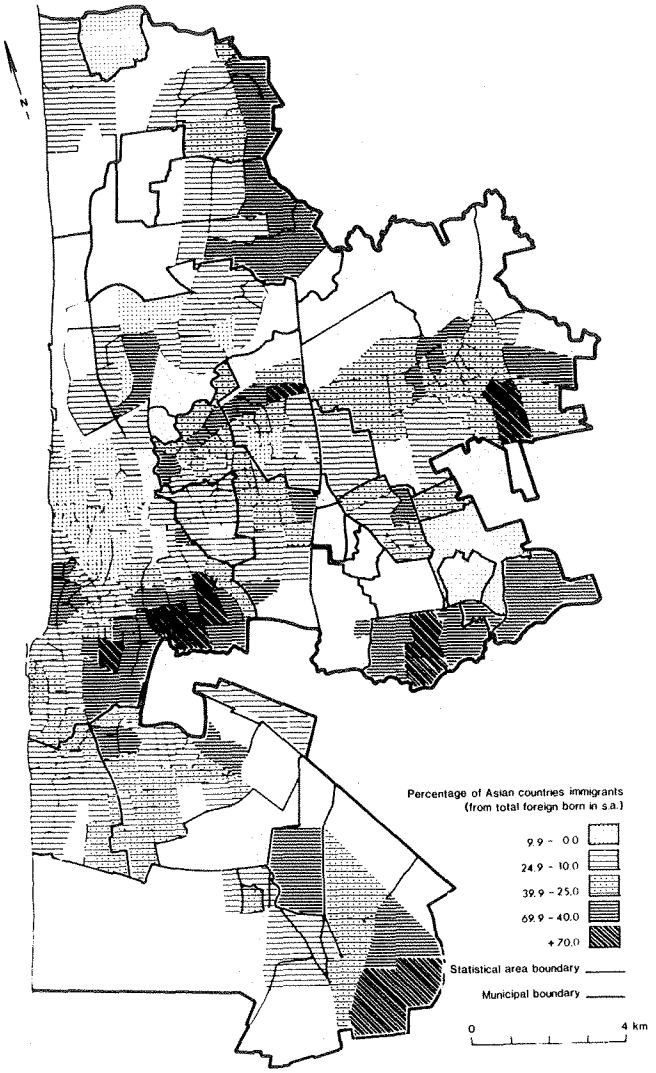

Fig. 9: Distribution of Immigrants from Asian Countries, 1972.

(1) Ethnic origin is the characteristic resulting in the highest degrees of segregation.

(2) Recently immigrated populations tend to be more segregated than veteran populations.

(3) The socio-economic characteristics produce U-shaped segregation, which means that there is high segregation at the highest and the lowest socio-economic levels and medium segregation in the other levels. Among the socio-economic characteristics analysed in the research, the educational level and occupational status (rather than income level) have the largest range of segregation values. This means that income level, by itself, is not the most important variable in defining socio-economic status, but it is complimentary to some other characteristics, such as occupation status and educational level.

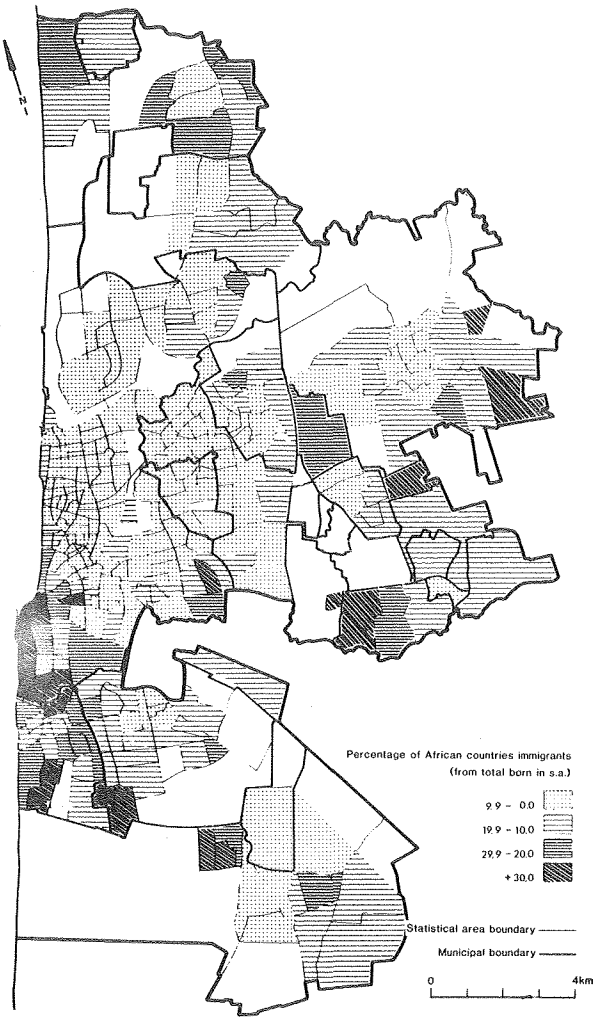

Fig. 10: Distribution of Immigrants from African Countries, 1972.

This conclusion is similar to those found in other works dealing with factors affecting the prestige level of different occupations (Hodge et al, 1964).

It can be summarized that spatial differentiation between population groups in the Tel Aviv metropolitan area in the early 1970's is clearly a function of the social distance between them, a distance reflected in the dissimilarity in the distribution of ethnic and socio-economic groups. As shown in other works in the early 1970's there was still an association among the socio- economic and ethnic characteristics of Israeli society. Ethnic segregation, therefore, is partially connected to socio-economic segregation and partially stands by itself as an outcome of social trends of the ethnic groups and of housing processes in Israel.

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