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THE CUMULATIVE EFFECT OF ENVIRONMENTAL  
DEPRIVATION ON COGNITIVE DEVELOPMENT  
IN EARLY CHILDHOOD

by

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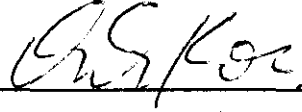
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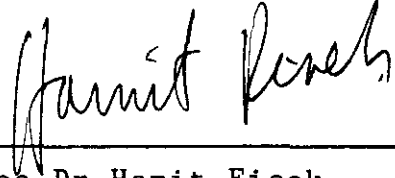
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## A B S T R A C T

The present study investigates the cumulative effect of environmental deprivation on children's cognitive functioning.

It was hypothesized that (1) Three year old children attending educational preschools would perform better in cognitive functioning than the same age children raised at home, (2) Five year old children attending educational preschools would perform better in cognitive functioning than the same age children raised at home, (3) the difference in cognitive functioning between children attending educational preschools and raised at home would be greater in the five year old group compared to three year old group.

Classification and seriation tasks devised by Piaget were administered as measures of cognitive functioning to 120 Low SES children at two age levels, 3 and 5, half of them attending education preschools and half raised at home.

Results indicated no significant difference between the educational preschool children and home reared children

at either age. The only significant difference was found between the two three year old groups in terms of classification behavior.

The results, being insignificant, didnot support the main hypothesis that there would be a greater difference between the two groups of elder children because of longer exposure to environmental deprivation.

## I- INTRODUCTION

In recent years particular attention has been given to the environment of children of lower socio-economic status families with the conviction that the intellectual functioning of children growing up in disadvantaged, unstimulating environmental conditions is deficient. But there is an obvious need for more detailed information regarding the relationships between several aspects of these environments and the developmental characteristics of children growing up under such conditions. It has been shown that several variables, including differences in nutritional levels, complexity of material environment, parental outlook and education, and parents' socio-economic conditions affect intellectual growth, particularly in the earliest years of life and that they may have a permanently enhancing or depressing effect on development. Since cognitive development is central to the child's overall development, the present study aims to investigate the effects of deprived environments on this area of development.

The importance of cognitive growth has been emphasized

and investigated by many researchers. Bloom, for example, reviewed research data related to various aspect of development, like height, IQ scores and personality measures and concluded that change in the measurements are closely related to environmental conditions and that "variations in the environment have the greatest quantitative effect on a characteristic at its most rapid period of change" (Bloom, 1964, p.vii). Since the most rapid changes in development take place during the first couple of years, this conclusion implies that the child's earliest experiences are crucially important. Investigators have found that the provision of appropriate play materials and the organization of the physical and temporal environment have an especially strong influence on IQ scores. Bradley and Caldwell (1976, cited in Fein, 1978, p.159) found that "infants who come from homes rich in appropriate kinds of experiences have mental test scores that show a progressive increase during the first three years of life. By comparison, infants who came from homes poor in certain kinds of experiences have mental scores that progressively decrease". So, it can be concluded that the quality of a child's interactions with the environment is important for cognitive growth.

In the present study, cognitive development will be considered within the Piagetian framework which will be discussed in depth later. In Piaget's theory the continuous interaction between the individual and environment is

stressed. Piaget assumes that the process of discovery about the child's world and growth occurs primarily through the child's involvement with and action on his/her environment. In this view "the child is not a passive recipient of environmental events, but rather, she seeks out experiences and uses the environment" (Bee, 1978, p.22). It has been asserted that opportunities for interaction are insufficient in deprived environments and that this contributes to differences in the level of development.

At this point, it will be useful to define the term "environmental deprivation".

Depriving environments have been characterized as deficient both in terms of amount and richness of stimulation. The home environment has been studied as a factor contributing to development and studies have shown that the home is the most important influence on the intellectual and emotional development, particularly in the preschool years. Deprived home environments can be characterized as those lacking in organization and providing very few play materials, books and other forms of stimulation. Furthermore, there is typically low amount of interaction with the mother and the material environment due to low degree of involvement and/or unresponsiveness on the part of the mother. Parents in deprived homes have been observed to provide for the child impoverished forms of language, arbitrary modes of discipline and inadequate models of conceptual activity. Parents

were generally found to hold unskilled or semi-skilled jobs which yielded an extremely low income and they had a very limited education (Ginsburg, 1972). It has been also observed that low SES families tend to be larger (with more than three children) than middle class families. The child in a very large family can generally be given only a small amount of attention and care since the amount of parental attention which each child receives decreases as the number of children in the family increases. Marjoribanks proposes that a single child in a family may score higher on cognitive tests whereas a child with siblings may have lower ability scores (Marjoribanks, 1974, cited in Rieget and Meachan, 1976).

It has been generally emphasized that intelligence test scores of deprived children are lower on the average than those of children from more stimulating environments. More stimulating environments, such as middle and upper class family environments, provide their children with rich amount and variety of play material, more opportunities to interact with the environment in various ways, and close and frequent interaction with the mother. The education and income levels of parents in these families, which are normally higher compared to lower class families, were found to be the most influential factor on the children's cognitive growth. Silverman notes that cognitive development of disadvantaged children is not as good as advantaged children since

the restricted experiences and insufficient intellectual stimulation produce certain cognitive deficiencies (Silverman, 1965 cited in Bloom et al, 1967). Silverman also adds that "although parents of disadvantaged children are increasingly becoming interested in seeing their children succeed, they do not have the same intellectual and material resources that middle class parents have" (Silverman 1965, cited in Bloom et al, 1967, p.69).

Although the term 'disadvantaged' can be used with a variety of meanings -from mentally retarded to culturally disadvantaged- and as Tizard puts it "no one of which can claim more validity than others" (Tizard in Bruner et al, 1978, p.148), the present study deals with a group which can be characterized in terms of the factors discussed above as distinctive of environmental deprivation.

Many studies have revealed that the deprived family environment has a harmful effect on children's intellectual development. Kohn and Rosman (1973) proposed to investigate the extent to which preschool cognitive functioning is related to a series of background demographic variables dealing with advantaged-disadvantaged status (social class, race, welfare, size and intactness of family). They selected five year old subjects from three social class levels that ranked from low to high. They used a set of cognitive tasks. Results of general measures of intellectual achievement (The Stanford-Binet Intelligence Scale Form L-M and others) and

other measures designed to tap more specific aspects of cognitive functioning (such as visual cognition measures) showed that background variables accounted for a significant amount of variance in intellectual functioning. The major finding of the study was that cognitive functioning in five year old children is a function of the children's background- of the six background variables, social class was found to be the most significant predictor of intellectual functioning, that is, poor performance in intellectual functioning was found to be the most significant predictor of intellectual functioning, that is, poor performance in intellectual functioning was associated with low social class. Similarly, reviewing some developmental researches, A.C.Mundy-Castle (1972) concluded that cognitive development is influenced significantly by variations in socio-economic background (Mundy-Castle 1972, cited in Dawson and Lanner, 1974).

In a longitudinal study (Golden, Birns, Bridger and Moss, 1971) with Black children from different social classes, a highly significant IQ difference was found between children from lower class black families on welfare and middle class black families. This finding supports the view that the same pattern of social-class differentiation in cognitive development exists among black children as among white children, as had been previously reported by Terman and Merrill (1937). The results support the view that culturally disadvantaged preschool children are less advanced in intellectual

performance than advantaged children of the same age (Mumbauer and Miller, 1970).

A comparative study of cognitive development has been conducted using the acquisition of conservation as the dependent variable (Gaudia, 1971). The research sample was composed of lower class children of three racial groups - American Indians, Blacks and White Americans. Comparisons were made between the performances of the three racial groups. The performances of the entire sample were also compared with the results of the normative group representing all strata and racial groups of the society. Results stressed the existence of major differences in rates of acquisition of conservation between children of different races and social backgrounds. It was found that lower class children were later in acquiring conservation than the more advantaged social class groups (Gaudia, 1971).

In his well-known study, Dennis (1973) measured the behavioral quotient of the crèche children. At the time the children were brought to the institution, their behavior test scores were normal (BQ=100). After one year of stay in the institution test scores dropped down to BQ=50, showing severe retardation. In the crèche, the children were provided with enough food but nothing else. Thus environmental deprivation resulting from very little stimulation was found to lead to a significant degree of retardation.

Although there are not many systematic studies in Turkey in this area, sufficient evidence exists to show that especially low SES children are growing up under disadvantaged conditions, which provide the child with a minimum amount of stimulation necessary for cognitive development. Kağıtçıbaşı (1979) proposed that prenatal and postnatal physical health and nutrition as well as heredity affect cognitive capacity to a great extent. But the improvement of this capacity is dependent on environmental factors. Environmental factors are effective especially in early childhood and it is found that insufficient environmental conditions cause important retardations in cognitive functioning which is also very difficult, even impossible, to compensate at a later time (Kağıtçıbaşı, 1979).

In her study with 218 fifth grade children from rural and urban areas, Kağıtçıbaşı (1979, a) found that rural children from remote villages scored lowest in IQ whereas urban middle class children scored highest. These results were interpreted in terms of environmental deprivation and stimulation. In the most remote villages there was little intellectual stimulation due to low levels of parental education, lack of books, toys, different kinds of materials, magazines, pictures and television.

The negative effects of low SES on cognitive development have also been found by Ataman and Epir (1972). Their results showed that low SES children were very poor in

cognitive grouping and conceptualizing operations compared to middle SES children. Children from enriched environments did better on classificatory tasks. They formed more groups were better in verbalizing their responses and were more responsive, whereas children of low SES, formed fewer groups, tended to make more errors, such as calling a group of letters and numbers "letters", and used more general labels. They did not give further explanations about their groupings either. Another study by Şemin (1975) showed that low achievement in schools is closely related to inadequate family and environmental conditions.

Numerous investigations, as discussed above, have revealed that unstimulating (deprived) environments have restricting effects on cognitive development. In addition, it has been generally observed that the specific functions, concepts and skills which comprise intelligence develop and are learned best at certain age levels, which are difficult or impossible to compensate for fully in another period. Bloom (1964) has shown that the long term effects of extreme environments affect IQ by about 20 IQ points. Deprivation in the first four years of life can have greater consequences than deprivation in the later years. And the IQ's of disadvantaged children have been found to show a decrease after about age five. This seems to be part of a cumulative-deficit phenomenon. The deficit was seen to be cumulative or increasing with time (Silverman 1965, cited in Bloom et al, 1967).

The cumulative effects of deprived environments children's development have been investigated by many other researchers. Skeels and Fielmore (1937), for example, studied two groups of children from very poor home environments, entering orphanages. The first group of children were between the ages of two to four and the other children were between the ages of 13 to 14. The children were tested at the time they were brought to the institution and lower IQs were found in the older group. This result showed that low IQs accrued from disadvantageous life circumstances is a cumulative one, increasing as the time they stay under these conditions increase. This view is supported by Gordon's study stressing that living permanently under bad socio-economic conditions causes a decrease in IQ. Gordon's studies (1923) with Gipsy children and canal boat workers in England, Asher's study (1935) with children from isolated mountain regions and Chapanis and William's (1945) study with Tennessee farm children show the same trend and stress the impact of environmental effect on IQ. These studies found a negative correlation between age and IQ: the older the child, the lower the IQ (Langmeier and Matejcek, 1975).

Thus, studies support the general conclusion that disadvantageous family background has cumulatively unfavorable effects on the child's intellectual development.

There are many other studies showing that preschool education affects the development of the child. It is generally

accepted that preschool education facilitates school success, relations with parents and others, communication patterns and adjustment to society (Weikart and Schweinhart, 1962). However, all preschool settings are not the same in terms of their aims and opportunities they provide. Educational preschool centers give importance to overall development of children, providing an enriched environment, organized activity program and trained staff members. Noneducational preschool centres, on the other hand, give importance only to safety and nutritional diet while ignoring social, emotional and intellectual development. Such differences in the nature of these institutions should be noted when considering the effects of preschool settings.

A study investigating the possible effects of intervention by providing an environment stimulative of cognitive growth on intellectual functioning, revealed that children in experimental programs made large gains in cognitive functioning. That is, environments and programs specifically prepared to stimulate cognitive functioning of children significantly enhances their cognitive development (Steel, 1975).

Educational preschool settings therefore are accepted to be effective in the cognitive development of the child. The enriched properties of an educational setting leads to gains in the cognitive functioning of the child. A more adequate environment through preschool and other experiences

results in considerable increases (10 to 15 points) in IQ. Thus, levels of intellectual functioning have been found to be quite changeable for deprived children and greatly affected by environmental experiences (Silverman 1965, in Bloom et al, 1967).

Öney's (1980) and Bekman's (1982) studies conducted in Turkey with low socio-economic status children provided similar evidence. In her comparative study Öney (1980) showed that children receiving an educational program did better on cognitive tasks than children not going to this kind of institution. In a more recent study, social class and background of children were found to be important variables determining "use of materials", "complexity of behavior" and "levels of social participation". The findings revealed that in education-oriented centers, children display behaviors relatively more complex and higher in social and cognitive content than children in maintenance-oriented centers (Bekman 1982).

In the light of these findings, the present study aims to investigate cognitive development in preschool children from Piagetian perspective. In Piaget's theory the continuous interaction between the individual and the environment is stressed. For intellectual growth the importance of early experiences in the constructive activity of the child is emphasized. Piaget believes that adaptation results from the interaction of the child with the environment through assimilation, which is the process of changing activities to

conform to environmental demands (Le Francois, 1977). According to Piaget "individual development is indeed a function of multiple activities, exercising, experiencing or acting upon the environment." (Piaget, quoted in Berry and Dasen, 1966, p.301). Social and psychological experiences as well as physical objects are part of the environment activating the individual growth process. Therefore it can be concluded that stimulation and experience are very important in the process of development, as Piaget conceptualizes it.

The present study is a substudy of the COMPREHENSIVE PRESCHOOL EDUCATION PROJECT <sup>conducted by a team in the</sup> ~~directed by the~~ Department of Psychology of Boğaziçi University. <sup>(Director: Prof. Dr. G. Loğıştı, Baş)</sup> This project aims to study the comparative effects of a comprehensive preschool education program, custodial preschool care and home care with no preschool program each alone or in combination with a home instruction program for mothers. The major goal of the project is to study the physical/motor, cognitive, emotional, personality and social development in children from low socio-economic status families living in shanty town areas in each of these preschool settings.

The present study deals with cognitive development only and aims to investigate the effects of environmental deprivation in this domain through a comparison of children raised in disadvantaged home environments with those attending educational preschools providing compensatory programs.

Classification and seriation are the domains in which cognitive functioning is assessed since these behaviors are considered as major mental operations constituting the foundations of logical thinking according to Piaget. In addition these mental operations begin to develop during the early childhood period which is under investigation in the present study. The universal nature of the operations underlying classification and seriation has been demonstrated by the findings of numerous studies a few examples of which are Kuhn (1972), Siegel (1971), Bruner and Olver (1966), Denney (1972) and Ataman and Epir (1977). For instance, Ataman and Epir (1977) have shown that the age trends in the development of classification found for Turkish children are very similar to those found for other children in other parts of the world.

In addition, the fact that assessments in these domains require a minimum amount of linguistic skill make these tasks particularly appropriate for the sample and purpose of the present study. And the period from three to five years is the most rapid growth of cognitive operations in the domains of classification and seriation is observed.

Description of Classification is described by Piaget and Inhelder as follows.

Classification implies a relation of resemblance between members of the same class, and one of dissimilarity between members of different classes (Inhelder and Piaget, 1969).

There are two main criteria for the operational existence of classes;

1- The subject can give an intensive definition of a class in terms of a more general class and one or more specific differences.

2- He/She can handle their extension in accordance with the structure of inclusion, as shown by mastery of the quantifiers "all", "some", or "none" (Inhelder and Piaget, 1969).

Fundamental properties of classes as Piaget defines them are as follows;

1- INTENSION of a class is the set of properties common to the members of that class, together with the set of differences which distinguish them from another class.

2- RELATIONS OF RESEMBLANCE, all those properties which are common to the elements of one class, even though the relation of resemblance as such is not explicit.

3- COMPLEMENTARITY - á of a class A' is the sum of the differences between its members and those of another class A where A and A' also have similarities by virtue of their common membership of B. For instance, vegetables are living things which are not animal where the difference non-animal is complementarity.

4- To define a class by genus and specific difference is to characterize its members as; both b and a or both b' and a'.

5- The EXTENSION of a class is the set of members (or individuals) comprising that class as defined by its intension.

6- INTENSIVE QUANTIFICATION is given by the use of one or more of the quantifiers "all", "some" and "none".

7- CLASS INCLUSION - Both; All A are some B and A B must be obtained to satisfy the condition.

8- CLASS MEMBERSHIP - The relation between an element X and a class A to which it belongs (Inhelder and Piaget, 1969).

As in the case of classification, Piaget defines the basic features of seriation. Seriation is the product of a set of asymmetrical transitive relations connected in series. Thus,

- 1- Operational seriation implies transitivity,
- 2- There is no perceptual series unless the elements are arranged in a particular way,
- 3- Seriation deals with transformation of asymmetric transitive relations and recognizes their reversibility (Inhelder and Piaget, 1969).

In the following section, the development of classification and seriation, as characterized by Inhelder and Piaget (1969) and as have been observed in numerous other investigations, will be presented, as well as basic elements of Piaget's developmental theory.

Piaget identifies four periods of cognitive development which are qualitatively different: the stage of sensory motor development, preoperational stage, stage of concrete operations and stage of formal operations. The order of stages of development is constant; one structure cannot appear before another but the age at which a stage is realized cannot be absolutely fixed, for it is always relative to the environment which may encourage, impede or even prevent its appearance. In addition, a stage may appear fairly early with one kind of situation or objects but later with another (Beard, 1972, p.31).

In the sensory motor period, child develops motor control and begins to distinguish objects of one class from those of another. Classification behavior is seen in a primitive motor form in this period. The child begins to perceive objects in terms of relations of similarity and dissimilarity which are the elementary relationships in classification. The end of the sensorimotor stage is marked by the emergence of the capacity for mental representation. The child now begins to be able to represent the external world mentally in images, memories and symbols which can be

combined without making further physical actions (Beard, 1972). These developments lay the ground for those of the next stage, that is the child begins to make internal and symbolic representations of sensory motor problems, inventing solutions by implicit rather than explicit trial-and-error behavior (Flavell, 1963, p.88). With the advent of these first and elementary representations, the child has essentially passed beyond the sensory-motor period into that of preoperational thought.

Inhelder and Piaget (1969) describe three main stages in the development of classification at the conceptual level; the first two occur within the preoperational period and the third stage within the concrete operational period.

The first stage is called the 'stage of graphic collections'. The classification behavior of this stage has several distinguishing characteristics. First, it is a relatively planless, step-by-step affair in which the classifying criterion is constantly changing as new objects are added to the collection. Second, the collection finally achieved is not a logical class at all but a complex figure (hence the name, graphic collections). The figure may be a meaningful object, e.g., a house, or it may simply be a more or less meaningless configuration. The child begins by putting similar objects together as though a true classification was coming about and then changes it into a configurational whole. "It seems very clear that such a configuration plays an essential

part in the eyes of the subject." (Piaget and Inhelder, 1969, p.18). There is no similarity among the objects grouped since the child cannot use a rule or a defining property to classify the objects. The motor characteristic of the products of classificatory behavior is that "intension does not define extension" (Ginsburg, 1979). Piaget and Inhelder and that graphic collections are the real precursors of classificatory behavior. There are various kinds of graphic collections but these do not appear to be a definite sequence. "From a developmental point of view all these modes of responses are equivalent" (Inhelder and Piaget, 1969, p.27). In the preoperational period, the child orders his concept of space and spatial relationship by his subjective experience. He cannot take into account more than one aspect of things at a time and cannot think in terms of the whole the parts simultaneously. All of these abilities acquired in the preoperational period give ground to abilities characteristic of concrete operations. "The rigid, static and irreversible structures typical of preoperational thought organization begin in Piaget's phrasing, to 'thaw out' and become more flexible, mobile, and above all decentered and reversible in their operation" (Flavell, 1963, p.163). The three main types of Graphic collections are as follows;

1- Spatial arrangements in which the child puts the objects in a line, either continuous or discontinuous. The child can construct a number of independent arrangements using

some of the objects but neglects the rest of them (small partial alignments). In the construction of successive similarities the child changes the criterion of similarity involuntarily (continuous alignments).

2- The classification may be in the form of collective objects which are two or more dimensional arrangement which slightly differ from one dimensional alignments. Since the tendency for a subject to add to a collective object by introducing heterogenous elements is particularly widespread collective objects are unstable and occur for less frequently than complex objects (Inhelder and Piaget, 1969, p.27).

3- Another type of classificatory product in the first stage is the complex objects when the child begins to build shapes without regarding to similarity. Collections are composed of heterogenous elements having a geometrical or descriptive character.

The second stage Piaget calls is 'non-graphic collections'. Children classify objects according to similarity alone. The products of the child's classificatory activity appear as real classes since the child forms classes hierarchically using similar defining properties and intension fully determines extension (Ginsburg, 1979). However, Piaget distinguishes this stage from the next by the fact that the child in the second stage fails to comprehend class inclusion, that is, the crucial relations among different levels of the

hierarchy, he has constructed. The child does not give adequate answers to class inclusion problems since he focuses on the parts of his construction which is subdivided hierarchically rather than the whole. He cannot relate the parts and the whole, simultaneously.

At the last stage of the development of classification the child begins to achieve reversible transformations. The child is now in the concrete operational period and becomes capable of operational thinking which refers to "the mental capacity to order and relate experiences to an organized whole" (Maier, 1965, p.125). He can reason about the whole and its parts. But at this age the operations are still concrete, still tied to particular experiences. The child cannot yet think about thinking or imagine things he has not experienced. During the concrete operational period, the child becomes aware of reversibility and begins to achieve reversible concrete operations: addition, subtraction, classification, seriation, hierarchical arrangements, class inclusion, transitivity and so on (Flavell, 1963). The child achieves hierarchical classifications without trial-and-error and begins to perform systematic and planned operations. He/She also begins to be successful in class inclusion judgments. "Appropriate answers to class inclusion problems require the ability to construct a hierarchical, exhaustive, intensively consistent ordering of objects, and the ability to compare the extensions of superordinate and subordinate groups." (Johnston, 1976, p.27).

Since the child at Stage I, is unable to make a hierarchical and ordered classification he cannot see the relation between intension and extension and thus can not deal with class inclusion problems. At the second stage although the child appears to capable of logical classification he can only deal with parts of the set but not the whole. Only at Stage III can the child give answers to inclusion problems since he is able to reason about the whole and part of the whole simultaneously (Jonhston, 1976).

After the beginning of youth, the formal operations period, the adolescent can think and reason in more abstract, symbolic terms. He can deal with relativity balance and equality between concepts and actions. The most important characteristic of this period is that child is able to find a systematic strategy which tries to determine reality within the context of possibility. This is fundamentally hypothetico-deductive in character (Flavell, 1963, p.205). The transition from inductive to deductive logic is the most crucial difference between the concrete and formal operational periods.

It is interesting to note that even though the individual's basic pattern of thinking and reasoning has been established and intellectual maturity has been reached at this period, not everyone reaches this stage of intellectual development.

As in the case of classification, the precursors of seriation can be seen easily in the sensory-motor period. The child begins to differentiate differences between several kinds of stimuli. For example, the child can build a tower at eighteen months, by using materials which are ordered in size. This is seriation behavior, but it is unsystematic.

In his work dealing with the development of seriation. Piaget discriminated three stages of development. In the first stage (four to five years of age) the child cannot arrange all the elements in order, but can only arrange them in sub-series of two, three or four elements. At the second stage (five to six years of age) the child generally achieves the proper arrangement of elements but sometimes makes errors, taking time to correct them. He tries to ordering again and again, using the trial-and-error methods. Children at this stage can achieve one-to-one correspondances, but again use only trial-and-error methods to solve the problem, since they can only cope with spatial relations at this level.

At the third stage, the child begins to think operationally. He uses a systematic way to seriate the material. Since he can do reversible operations, he can deal with different problems of seriation successfully, for example he can put two different series into one-to-one correspondance using an overall guiding plan.

The present study, which is mainly concerned with the

cumulative effects of early environmental deprivation, investigates classification and seriation in three and five year old children.

Given the developmental sequence discussed above, comparisons will be made between the three year old group and five year old group. The difference between the five year olds raised at home versus attending educational preschools is expected to be greater than the difference between to be greater than the difference between three year olds raised at home versus those attending educational preschools since five year olds raised at home are exposed to environmental deprivation for a longer period of time than three year olds.

Since it has been found in numerous studies that preschool education enhances intellectual and social development particularly for disadvantaged groups, a group of children from low socio-economic families attending educational preschools are taken as a comparison group. Performance of this group will be accepted as the baseline and comparisons will be made between the preschoolers and homereared groups for the two age levels. Then the differences of both age groups will be looked at.

While not central to the study, it is also expected that success in classification behavior will be greater than success in seriation behavior since as Inhelder and Piaget (1964) suggest, it takes children longer to achieve

operational seriation to achieve operational classification. As Elkin's (1964), Murray and Youniss's (1968) similar findings point out, a child cannot perform a task that involves the concept of seriation until the age six or seven. Below the age four or five children can not achieve operational seriation even with a small number of objects (Siegel, 1972).

#### HYPOTHESES

1- Three year old children attending educational preschools will perform better in cognitive functioning as measured by tests of classification and seriation behavior, than three year old children raised at home.

2- Five year old children attending educational preschools will perform better in cognitive functioning, as measured by tests of classification and seriation behavior, than five year old children raised at home.

3- The difference in cognitive functioning, as measured by tests of classification and seriation behavior, between the children attending educational preschools and children raised at home will be greater in the five year old group compared to the three year old group because of the longer exposure to environmental deprivation.

## II- METHOD

The present study, which is a part of the COMPREMENSIVE PRESCHOOL EDUCATION PROJECT, undertakes to investigate the impact of the cumulative effects of deprived environment on children's cognitive functioning. For the purpose of the study children in home care are compared with children in educationally oriented preschool institutions in terms of cognitive functioning as assessed by the stage of development reached in classification and seriation.

### 2.1. Selection of Centers

All the preschools were in Istanbul and were either under the supervision of the Ministry of Customs and Government Monopoly or the Ministry of Health and Social Welfare. Each center was staffed with trained nursery teachers who were graduates of "Girl's Vocational School".

The technique of purposive sampling was used in the selection of the centers. Three completely custodial schools and the three best educational preschools in Istanbul were found. The validity of classification of the centers as

working class was checked by the investigators of the main project, during the course of preliminary visit to each center.

Social class composition of the preschools was determined on the basis of socioeconomic background of the majority of children it served. The aim of the centers was determined on the basis of an interview with the headteachers (See Appendix 1) and a rating scale (see Appendix 2) completed by an observer after visiting the centers for five days. If the center satisfied the criteria for aim and social class, it was chosen for the study. If not, it was dropped.

Children were randomly chosen from a list provided by the headmistress according to the parent's educational level, occupation and income. Such information was gathered by the headteachers at the time of registration and renewed each year through an interview with the parents. This information was checked against the initial interview (see Appendix 3) given to the mothers at their own homes.

Working class was identified with an educational level of graduation from at most junior high school. Their corresponding occupational level was found to be generally low level factory jobs or small business like shoe repair, and the like.

Maintenance/custody and educational orientations which are presumed to form the existing dichotomy in the system

were first observed during preliminary visits to various centers. Preliminary observations indicated that some centers give importance to safety and nutritional diet (custodial care) while ignoring social, emotional and intellectual development other centers, however, give more importance to social development ignoring intellectual development to a great extent.

The interview used to determine the aim of centers consisted of 24 questions which inquired about the head-teacher's ideas on preschool education and the working conditions of that particular preschool center. In the construction of this questionnaire standard procedures for scale construction with the use of judges was used. The resulting questionnaire contained items reflecting different aims for each question and on which there was high inter-judge reliability. .75 was accepted as the lower limit of agreement.

The rating scale was the other instrument used in the main study for determining the educational orientation of the centers. Again, .75 was accepted as the lower limit for inter-judge reliability.

In the present study, children from three preschools with educational aims were used as subjects, as well as children raised at home.

The educational aim preschools gave service to children coming from low socio-economic status families where both th

parents were working. Thus the social class was kept constant. The factors; low-income, semi-skilled or unskilled worker status, low level of education, and residence in squatter areas were used as the indicators of low socio-economic status.

Two of the centers (Eczacıbaşı Çocuk Yuvası and Mensucat Santral Çocuk Yuvası) belong to private sector factories and the other one belongs to the Union of Child Welfare.

The Staff-Child ratio of educational aim preschools is 1 to 20 with an average of 15-20 children per teacher. The age range served by the centers is between 3;0-6;0 years. Children are provided with play material which were various in quality and plenty in quantity within an organized activity program. In the first two hours of the daily program, children are allowed to play with anything that they choose, then they are asked to clean and tidy-up and participate as a group in educational activities. Such as learning different concepts, colors, shapes, numbers, information about the world and/or discussing daily events or telling stories, singing etc. Then, children are provided different kinds of materials for creative art activities such as collage, painting making models, etc.

The physical setting of educational centers is colorful and attractive to the children. Each age group has a large playroom, having an exit to an outdoor play area-which

consistes of a sandpit, see-saw and swings, rubber tyres, tricycles, climbing frames, slides and barrels.

Each playroom consisted of various toys; different sizes and shapes of building blocks, constructional toys (noppers, legos, boxes, etc.), puzzles, dolls, painting materials of different kinds, and also various corners, dressing-up corner, book corner, house-corner with all sorts of appropriate materials.

Children in the home raised group had never attended a preschool. They were also from low socio-economic status families, living in the same areas as those attending the preschools. Their home environment provided them with very limited opportunities to play with different kind of toys and to use different kinds of materials. The home equipment were also very few in kind and very limited.

## 2.2. Subjects

The subjects of the study were 60 children at the age of three (born between May 1979 and May 1980) and 60 children at the age of five (born between May 1977 and May 1978). Half of each group were raised at home (never attended nursery schools) and the other half were preschoolers. All of the subjects were from unbroken families. Any subjects who came from a broken family was not included in the sample.

Subjects were randomly chosen from a list obtained from the headmasters, according to age and unbroken family composition. Since the length of attendance at the center might affect the child's behavior, only children who had been in the center more than 3 months and less than two years were included in the sample.

The home-reared group was reached by the aid of the mothers of preschoolers and the ones that satisfy the criteria of selection were included in the study.

Distribution of children according to age and context of socialization is presented in Table 1.

AGE	HOME			EDUCATIONAL CENTRE			
	Üsküdar	Zeytinburnu	Levent	Eczacıbaşı	Mensucat Santral	Zeytinburnu Ç.E.K.	
3	10	10	10	14	8	8	60
5	10	10	10	12	10	8	60

N = 120

TABLE 1- Distribution of Children According to Age and Context of Socialization

### 2.3. Materials

The following materials were used in the assesment of the level of cognitive development in the domains of classification and seriation.

Classification Task: Blocks of various shapes and colors were used for the classification task. These included;

4 large cubes: (4.0 cm x 4.0 cm x 4.0 cm) 2 red, 2 blue,

4 small cubes: (3.0 cm x 3.0 cm x 3.0 cm) 2 red, 2 blue,

4 large circles: (diameter = 4.0 cm, height = 1.5 cm) 2 red,  
2 green,

4 small circles: (diameter = 3.0 cm, height = 1.5 cm) 2 red,  
2 green,

4 large triangles: (4.0 cm x 4.0 cm x 4.0 cm, height = 1.5  
cm) 2 green, 2 yellow,

4 small triangles: (3.0 cm x 3.0 cm x 3.0 cm, height = 1.5  
cm) 2 green, 2 blue.

Seriation Task: For the seriation task two sets of ten sticks (one red and one blue) and ten paper dolls were used. The collection of the ten sticks differed only in size, increasing in length from 9.0 cm to 16.2 cm, each differing from the next in the series by about 0.8 cm. There were longer sticks in the first collection (red) and smaller sticks in the second collection (blue). The smallest stick of the second collection differed by about 0.4 cm from the smallest stick of the first collection, being 8.6 cm. Thus, the length of the 10 sticks of the second collection increased from 8.6 cm. to 15.8 cm. having 0.8 cm. difference between the two

adjacent sticks of that collection. Each of these new sticks could fit in between those of the first series.

The sticks were smaller than the dolls and the differences between adjacent pairs of sticks were smaller than the differences between the pairs of dolls. The shortest paper doll was 9.5 cm and the tallest paper doll was 18.5 cm, with 1.0 cm difference between two adjacent dolls.

All materials have been tried out and found to be recognized by children of the two age groups in the pilot study.

#### 2.4. Procedure

The data were collected by three experimenters. One of them obtained the data of the three year old children while the other two collected the data of the five year old group. Before the data collection a pilot study was conducted at the preschool centre of Bogaziçi University with ten children. Inter-observer reliability was found to be .81 on the average. The minimum reliability score obtained during the study was .70 and the maximum score was .95.

For the preschool group data were collected in the center in a separate room. For the nonpreschool group the data were collected in the child's home, again in a separate room. The experimenter and the child sat on the opposite sides of a table, facing each other.

The children were required to work on the classification material first, and then carry out the seriation task. First, children were presented all of the blocks and they were left free to play with them for a few minutes. Then they were asked to name the colors and shapes of the blocks in order to see if they knew these concepts. The children who were familiar with colors and shapes were presented the tasks. For the children who were unfamiliar with colors and shapes, the experimenter provided explanations and examples, until she made sure that they understood the shape and color names of the objects.

In the following section procedures for the classification and seriation tasks will be discussed in detail.

#### A- CLASSIFICATION

TASK I - Only large and small cubes were left on the table and the child was given the following instruction. "Now, we will play a game with you. There are several boxes in front of you. Put together the things that are alike" (for the Turkish version of instructions, see Appendix 4).

TASK II - In addition to cubes, small and large circles were presented to the child and the instruction "now, put together the things that are alike" was repeated.

TASK III - All objects were presented to the child and the instruction "put together the things that are alike" was

repeated.

For each of these tasks if the child had placed objects in correct classes arranged hierarchically, questions about class inclusion were asked. There were three basic questions utilizing the adjectives of "more", "all" and "any", asked in the specified order and based on the child's classification according to colour, shape or size. For example, if the child had classified objects according to their shapes only, the questions were,

"Are there more boxes or more triangles?"

"Are all the toys boxes?"

"Is there anything left if all boxes are taken away?"

If the child had made a classification based on color and size, variations of the above questions on these bases were presented to the child.

Throughout these tasks the children were asked questions whenever they made mistakes and whenever the experimenter thought they gave the correct answer by chance.

#### B- SERIATION

TASK I - First, four dolls of different sizes were presented to the child with the following instruction "Now, we will play a different game. Put the dolls in order from the smallest to the biggest one". If the child could not manage to do it, the experimenter put them in the right order

and indicated the smallest and the biggest one and others. This operation was performed in order to clarify the procedure to the child. Since it was a warm up operation, any child, whether successful or not, was scored. Then the four dolls were removed from the table and the first collection of 10 sticks were presented to the child in a jumbled order with the following instruction "Now, choose the smallest stick and arrange them from the smallest to the biggest".

For the children who could not arrange the sticks correctly, the experimenter constructed a series as a model, saying "Make a staircase from the sticks like that". Then the sticks were mixed up again and the child was given a chance to arrange them again.

Children who were successful continued with the following task, while others continued with Task III, omitting Task II.

TASK II - In addition to the first collection of 10 sticks, the second set of sticks were presented to the child in a jumbled order with the following instruction "Insert these new sticks in between the others from the smallest to the biggest. While doing this, be careful not to change the order of first set". The child's task was to fit the new sticks into the ordering already constructed so as to make a new ordinal arrangement involving all 20 sticks.

TASK III - Children were presented 10 dolls and the

first set of 10 sticks in order with the following instructions; "The dolls are going for a walk, and each of them must have the proper stick. Choose one stick for each doll".

Whether they achieved one-to-one correspondence or not, they were presented the two sets again but in a jumbled order with the following instruction "Choose one stick for each doll".

## 2.5. Evaluation of Data

The data were subjected to qualitative analysis and each subject was assigned to one of the three developmental stages of classification and seriation. A total score was then computed for each child. In the following section, the criteria for scoring for classification and seriation tasks will be presented respectively.

CLASSIFICATION - Children were assigned to different stages on the basis of their responses to the different tasks.

For task I, II and III, responses were analyzed and categorized under stages I, II, and III according to criteria used by Piaget and collaborators.

STAGE I - This stage is called the stage of graphic collections where the child unites objects in collections based on the spatial configuration of objects.

Three types of reactions were included in this stage.

These were;

1- Small Partial Alignments - The child constructs a number of independent linear arrangements while leaving some of the material untouched. Successive similarities exist between one object and the next. For example, the child constructs a row of squares, ignoring the other shapes or arranges all of the objects, again ignoring some of them (left untouched). This was also called small partial alignments.

2- Collective objects, consist of two or three dimensional graphic collections of similar elements which form a unified pattern of figure. It may be a tower or two or more dimensional arrangements. Collective objects are composed of homogeneous elements.

3- Complex objects - Collections composed of heterogeneous elements having a geometrical or descriptive character. For example, the child constructs a rectangular using 4 squares and completes this shape with a triangle and calls it as "house". Pairing with exhaustive use of the material was also accepted as complex objects.

Children responding in any of these above forms were assigned to Stage I.

STAGE II - This stage is called the stage of non - graphic collections. Objects are assigned to one collection

or another on the basis of similarity alone. The products of this stage can still not be called classes since they are far from being based on logical operations.

The following criteria were considered in assigning subjects to Stage II.

- 1- All elements in the initial array have been classified,
- 2- Elements are divided into two or more collections each composed of elements of one kind and no others,
- 3- Collections of the same rank are disjoint,
- 4- There is no class inclusion.

If the child made a classification based on similarities but placed one object between the dissimilar ones in Task I, this kind of collection was called also non-graphic collections. If the child put two incorrect objects (placed between the dissimilar ones) in classification tasks II and III, it was again called non-graphic collections.

Subjects responding according to the above criteria were assigned to stage II.

STAGE III - The typical responses exhibited during this stage include the same criteria of Stage II, with the exception that there is class inclusion in Stage III.

Subjects who made a real classification and gave at least two right answers to three class inclusion questions were assigned to Stage III.

SERIATION - Subjects assigned to three stages according to their responses to the seriation tasks. The following criteria were considered in assigning subjects to the three stages.

STAGE I - The typical responses exhibited in this stage included;

- 1- No attempt at seriation,
- 2- Formation of subseries of 2, 3 or 4 elements which are not united,
- 3- Random arrangement of objects in an incorrect order,
- 4- Formation of two groups consisting of big ones in one collection and small ones in a second collection

Subjects responding in any of the above forms were assigned to Stage I.

STAGE II - Subjects arranging objects in a correct order through trial and error, using all elements in the initial array, were assigned to Stage II for the seriation task. Constructing an ordinal arrangement of sticks with one or two errors, for example, putting the second small stick in

between the third and fourth small stick in arrangement after having been presented the correct order by the experimenter were also assigned to Stage II. For task III, in which the child is expected to make each member of one ordering correspond to the appropriate member of the other ordering, at least 6 correct matching either by trial-and-error or by systematic arrangement was included in Stage II.

STAGE III - Subjects making a systematic arrangement of elements with an operational method were assigned to Stage III. These were not by trial-and-error but a systematic and planned performance. That is, the ordering is guided by an overall plan, the child usually beginning with the smallest and so forth in sequence until the ordering is complete. In a similar way, the child in this stage places two separate orderings into one-to-one correspondance by putting the biggest doll with the biggest stick, the next to biggest doll with the next biggest stick and so forth.

## 2.6. Scoring

Scoring was done by giving the numbers 1, 2, and 3 for the Stages I, II and III respectively. Then a total score was computed for classification and for seriation separately for each child on the basis of his scores on each of that three subtasks.

Combinations and their correspondent total scores for

classification tasks were as follows;

Children assigned to Stage I in 3 tasks were given a total score of 1. Also children placed in Stage I in two of the 3 tasks were given a total score of 1.

Children assigned to Stage II in 3 tasks were given a total score of 2. Also children placed in Stage II in two of the 3 tasks, and children assigned to Stage I in one of the tasks, to Stage II in one of the tasks and to Stage III in one of the tasks were given a total score of 2.

Children assigned to Stage III in 3 tasks were given a total score of 3. Also children placed in Stage III in two of the 3 tasks were given a total score of 3.

Combinations and their correspondent scores for seriation tasks were as such;

Children assigned to Stage I in 3 tasks and children assigned to Stage I in 2 of the three tasks were given a total score of 1.

Children assigned to Stage II in 3 tasks and children assigned to Stage II in 2 of the 3 tasks were given a total score of 2.

No one of the children could perform at Stage III level in any of the three tasks.

### III- RESULTS

The data were analyzed to determine the effects of different kinds of environment on cognitive development, as indicated by classification and seriation behaviors. Analysis was made on the basis of total score. Total score was computed for classification and for seriation separately for each child as explained above.

To test hypothesis 1, which stated that 3 year old children attending educational preschools would perform better on classification and seriation tasks than 3 year old children raised at home, the data from the 3 year old group were analyzed for each task (classification and seriation) separately.

The distribution of three year old children raised at home versus attending educational preschools among three developmental stages in terms of classification is given in Table 2.

	HOME RAISED	PRESCHOOLERS
Stage I	26	17
Stage II	4	8
Stage III	0	5

TABLE 2- Distribution of Three Year Old Children Raised at Home vs. Attending Educational Preschools to Three Developmental Stages on Classification Tasks

Chi-square statistic was computed on the data. Results indicated that there was a significant difference between the performances of the two groups ( $\chi^2 = 8.21$ ,  $df = 2$ ,  $p < .05$ ). As can be observed from the frequencies of Table 2, children attending educational preschools performed better on classification tasks than children raised at home, with a few children from the former group showing Stage III classificatory behavior.

The distribution of three year old children raised at home versus attending educational preschools among the three Piagetian developmental stages in terms of seriation is given in Table 3.

	HOME RAISED	PRESCHOOLERS
Stage I	30	30
Stage II	0	0
Stage III	0	0

TABLE 3- Distribution of Three Year Old Children Raised at Home vs. Attending Educational Preschools to the Developmental Stages on Seriation Tasks

As the frequencies in Table 3 indicate there was no difference between the performances of the two groups and no statistical tests were performed on the data.

These results show that hypothesis 1 was supported for classification but not for seriation. Results from chi-square analysis showed that the difference between children raised at home and attending preschools were significant in terms of classification behavior but there was no difference in terms of seriation behavior. Therefore it can be concluded that preschool experience did have significant effects on classification behavior at age 3, but this effect did not appear in seriation behavior.

To test hypothesis 2, which stated that five year old children attending educational preschools would perform better on classification and seriation tasks than five year old children raised at home, the data of five year old group were analyzed for each task separately.

The distribution of five year old children raised at home versus attending educational preschools among the three developmental stages in terms of classification is given in Table 4.

	HOME RAISED	PRESCHOOLERS
Stage I	3	4
Stage II	12	5
Stage III	15	21

TABLE 4- Distribution of Five Year Old Children Raised at Home vs. Attending Educational Preschools to Three Developmental Stages on Classification Tasks

Chi-square analyses indicated that there was no significant difference between the performances of the two groups ( $\chi^2 = 4.02, df = 2, p > .05$ ). As can be observed from the frequencies of Table 4, there was a slight difference in favor of preschoolers although it was not significant.

The distribution of five year old children raised at home versus attending educational preschools among the three developmental stages in terms of seriation is presented in Table 5.

	HOME RAISED	PRESCHOOLERS
Stage I	26	25
Stage II	4	5
Stage III	0	0

TABLE 5- Distribution of Five Year Old Children Raised at Home vs. Attending Educational Preschools to Three Developmental Stages on Seriation Tasks

As the frequencies in Table 5 indicated, again no

difference in performance was observed between the two groups and no statistical tests were carried out.

Since no difference was found in the seriation and classification behaviors of children raised at home versus those attending educational preschools, hypothesis 2 was not supported, that is having preschool experience did not have any significant effects on classification and seriation behaviors at age five.

The third hypothesis is the main hypothesis concerned with differences between the two age groups due to the cumulative deficit effect of deprived environments on cognitive functioning. This hypothesis was not statistically tested because chi-square analysis did not reveal any significant difference between the five year olds raised at home vs. those attending preschool. Thus it was not possible to perform a test of differences between differences. Therefore results of the present study didnot support the main hypothesis.

#### IV- DISCUSSION

There are many studies reflecting the effects of different environmental backgrounds on the overall development of the child. However, there are very few indicating the cumulative effect of environmental deprivation. These few suggest that "the longer the privation the more intellectual development is impeded" (Rutter and Madge, 1976, p.113). The present study set out to investigate the cumulative effect of environmental deprivation on cognitive functioning in low SES groups.

The results showed that three year old children attending educational preschools performed better on Piagetian classification tasks than their peers raised at home. However, results indicated that there was no significant difference between the performances of the five year old children attending educational preschools and their peers raised at home in terms of classification. Results also revealed that there was no difference between the differences of performances of children from different socialization context at the two age levels, in the expected direction.

Before the evaluation of the results, limitations of the study must be considered.

The sample size brought about the first limitation. The size of the total sample was not small, but since there were four different groups, the number of subjects per cell was very low for some cells. If a large sample was used, this problem could have been avoided. A larger sample could not be obtained because the educational preschool centers serving the low SES group are limited to three in number in the city of Istanbul.

It was difficult to equalize the subjects in terms of the degree of deprivation. While some children came from highly deprived homes as specified in the definition of deprivation, there were homes providing better opportunities, such as television or more complex toys, even though the general environment of these homes were classified as deprived.

A very important limitation is due to a factor which was also very difficult, even impossible to control. Some children seemed to be more comfortable and felt more free in communicating with the experimenter which in turn lead to better performance. On the other hand, some children had difficulties in communicating with the experimenter, were timid and afraid of being with a stranger. This factor might have been controlled by dropping these subjects from the

sample. But, since the children attending educational preschools were already limited, this kind of a control could not be applied.

One last limitation arises from the method of collection of data. The data were collected by three experimenters and reliability scores were obtained only during the pilot study. Reliability was not checked during the collection of the data, since the data of each group was collected by a single experimenter, this weakness was a serious one.

The results of the study will be evaluated, bearing these limitations in mind.

The difference between the classification behavior of the three year old preschoolers and those raised at home, may be attributed to the effect of educational preschools. As discussed in the introduction section, many studies, such as Silverman (1965), Steel (1975), Öney (1980), Bekman (1982) have revealed that preschool education affects the development of the child and enhances intellectual and social development to a great extent. In fact, there is a rather interesting finding in the present data in this direction. Five out of 30 three year old children attending preschools performed at stage III which is considerably above the typical performance of this age group in terms of Piagetian developmental stages. This unexpected outcome would have been attributed to a variety of factor like higher IQ's, parents with better edu-

cation or higher income level etc. However, none of these subjects showed any variation from the rest with respect to these variables which suggests that these findings are due to the effects of preschool environment.

No statistical difference was found between the performance of five year old children raised at home and their peers attending educational preschools. Also, most of the children from both groups performed at the third stage indicating that they had attained operational classification. Given the developmental sequence discussed in the introduction section, this finding is apparently earlier than the age at which Piaget found operational classification. It is not surprising to find that different samples of children attain these concepts at somewhat different ages. As Piaget stated, such variations would be expected among different cultural groups with different kinds of environments (Piaget, 1974). In addition research done with Piagetian tasks in recent years have revealed earlier ages of achievement in different domains of cognitive development (Bower, 1974). It might be that the technological and economic advances of the recent decades is a responsible general environmental factor. Therefore, the finding may be explained by differences in the conditions of life that may effect changes in educational and cultural emphasis on development of classificatory concepts up to this time.

Typical findings in studies of children's intellectual

development support the contention that social circumstances can and do influence intellectual development (Rutter and Madge, 1976). The most important aspects of social environment affecting development have been found to be the quality of parent-child interaction and the range of experiences available to the child. Although it is true that disadvantages of a poor environment are prevalent for families living in shanty town areas of a big city like Istanbul, these families are also exposed to a variety of environmental factors and information from mass media (e.g. television, newspapers etc.). These in turn, may affect the parent's mode of handling and rearing their children positively by motivating, educating and stimulating them. Older children might be affected by the environmental factors more than the three year olds since they can communicate more easily with their parents, talk, listen, understand and reason about what is going on in their environment more consciously.

On seriation tasks, no difference was found within each age group. This is not surprising given what we know about the development of seriation. As mentioned in the introduction, it takes children longer to achieve operational seriation than to achieve operational classification. If smaller tasks had been used, like four dolls instead of ten, some differences between the groups, at least for five year olds, could have been found. Perhaps, it would be better not to use seriation tasks at this level since the development of

seriation was found by Piaget to begin at the ages of four or five.

Based on the main hypothesis, there was no difference between the differences of performances of children from different socialization context at the two age levels. This result suggested that there was no cumulative deficit effect because of longer exposure to environmental deprivation. In regard to the question of why no cumulative deficit effect due to deprived environment was found in the present study, it is possible that the environments in the study were not deprived enough. Parents as well as children may have been affected by many factors, more possibly by mass media since most of the families had these opportunities.

As a result, the reason why the hypotheses of the present study were not supported in general, is due to the changes in the development of the cognitive abilities.

There is a growing concern for the development and schooling of lower-class children in Turkey and there are lots of studies on different areas of development (social, emotional, physical, intellectual). But there have been no previous studies on the cumulative effect of deprivation. Despite the limited results, contribution of the present study is that this is the only study in Turkey dealing with cumulative deficit effect of poor environments on cognitive development and it lays the ground for further studies in the area.

It appears that investigations of the relationship between the more specific environmental factors underlying social class differences and level of cognitive development would be beneficial, since classification and seriation are basic to logical thought and develops rapidly between the ages of two to six. It would be profitable to study seriation between the ages of five to nine; Since it develops later than classification as discussed before. It would also be helpful to obtain data from middle class children on cognitive tasks and to compare the results of children from two different socio-economic backgrounds utilizing the educational pre-school children as base-line group in comparisons. More extensive research in the area is needed in order to determine the basic factors contributing to the effects of cumulative deprivation on cognitive development.

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## APPENDIX 1

### MÜLAKAT FORMU

1. OKUL ADI \_\_\_\_\_
2. ÇALIŞMA SAATLERİ \_\_\_\_\_
3. HANGİ YAŞ GRUPLARINA SERVİS VERİYOR? \_\_\_\_\_
4. ÇOCUK SAYISI \_\_\_\_\_
5. ÖĞRETMEN SAYISI \_\_\_\_\_
6. YARDIMCI SAYISI VE NİTELİĞİ \_\_\_\_\_
7. GRUP SAYISI \_\_\_\_\_
8. GRUPLARDAKİ ÇOCUK SAYISI \_\_\_\_\_
9. GRUPLARDAKİ ÇOCUK-ÖĞRETMEN ORANI \_\_\_\_\_
10. ÇOCUKLAR ÜNİFORMA GİYİYORLAR MI? \_\_\_\_\_
11. VELİLER NEREDEN (FABRİKA İŞÇİLERİ, ÇEVREDEDEN) \_\_\_\_\_
12. GÜNLÜK PROGRAMINIZ NEDİR? \_\_\_\_\_
13. EĞİTSEL FAALİYETLERİNİZ NELERDİR? \_\_\_\_\_
14. SERBEST OYUN SAATLERİNDE ÇOCUKLAR NE TÜR ETKİNLİKLER YAPARLAR? \_\_\_\_\_
15. BU SAATLERDE ÇOCUKLARA NE TÜR ARAÇ GEREÇLER VERİLİR? \_\_\_\_\_
16. GRUP FAALİYETLERİ NELERDİR? NE SIKLIKTA? (Her söylenen faaliyet için sorulur)
17. ÇEVREYE GEZİLER DÜZENLİYOR MUSUNUZ? NE GİBİ? NE SIKLIKTA?
18. ÇOCUKLARA ÇEŞİTLİ MESLEK GRUPLARINI TANITMAYA ÇALIŞIYOR MUSUNUZ?  
ÖĞRETMEN  
HEMŞİRE  
POLİS v.s.

19. ÇOCUKLAR; UYGULANAN FAALİYETLERE KATILIP KATILMAYACAKLARINA KENDİLERİ Mİ KARAR VERİYORLAR ÖĞRETMEN Mİ? \_\_\_\_\_
20. ÇOCUKLAR MEVCUT OYUNCAK, ARAÇ, GEREÇLERDEN HANGİLERİNİ İSTEDİKLERİ ZAMAN KULLANIRLAR, HANGİLERİNİ ÖĞRETMEN DAĞITIR?
21. ÇOCUKLARA BİREYSEL OLARAK MI YOKSA GRUP HALİNDE Mİ YAKLAŞIYOR SUNUZ?  
- Bütün çocukların aynı etkinlikte aynı anda yer almasını istiyor musunuz?  
- Bir etkinlikten diğer bir etkinliğe geçişte çocuklar birbirlerini bekler mi?
22. UYGULADIĞINIZ/BENİMSEDİĞİNİZ DİSİPLİN YÖNTEMLERİ NELERDİR? NE GİBİ DURUMLARDA UYGULARSINIZ?
23. ÖĞRETMENLERİNİZİN BU PROGRAMDAKİ ROLÜ NEDİR?  
a) Programın planlanması  
b) Yöneltilmesi  
c) Uygulamada çocuklarla eş düzeyde paylaştıkları etkinlikler oluyor mu? Neler?  
d) Çocuklar öğretmenlere nasıl hitap eder?
24. AİLELERLE NASIL İLİŞKİNİZ VAR?  
Ne gibi durumlarda anneler size gelir?  
Ne gibi durumlarda siz onları çağırırsınız?

## APPENDIX 2

### GÖZLEM FORMU\*

#### A. FİZİKSEL NİTELİKLER

1. Okul binası kaç katlı? \_\_\_\_\_
2. Gruplar bağımsız mı? \_\_\_\_\_
3. Çocukların kullandıkları eşyalar onların boyutların da mı? \_\_\_\_\_  
Sandalye  
Masa  
Tuvaletler vs.
4. Bu eşyalar çocuk sayısı ile orantılı mı? \_\_\_\_\_
5. Çocukların özel eşyalarını koyacak bölümler var mı? \_\_\_\_\_
6. Bahçe var mı? \_\_\_\_\_
7. Gruplardan bahçeye çıkış var mı/veya? \_\_\_\_\_
8. Bahçeye ulaşmak çocuklar için kolay mı? \_\_\_\_\_
9. Isınma nasıl oluyor? \_\_\_\_\_
10. Yapay ve doğal aydınlatma yeterli mi? \_\_\_\_\_

#### B. YUVADA KULLANILDIĞI GÖZLENEN ARAÇ-GEREÇ LİSTESİ

1. "Yaratıcı Sanat Etkinlikleri" için Kullanılan Araç ve Gereçler
  - Resim sehpası \_\_\_\_\_
  - Pazen kaplı tahta \_\_\_\_\_
  - Kukla için taşınabilen oyun sehpası \_\_\_\_\_
  - Boya:
    - Sulu
    - Toz
    - Krayon
    - Kuru
  - Makas
  - Boya fırçası
  - Kağıt, çeşitli
  - Kil
  - Yoğurma maddeleri
  - Diğerleri - artık materyaller

\*Gözlem süresi içinde gözlenemeyenler sorulabilir.

2. "Müzik Etkinlikleri" İçin Kullanılan Araç ve Gereçler

Davullar \_\_\_\_\_  
Ziller \_\_\_\_\_  
Kaşıklar \_\_\_\_\_  
Üçgenler \_\_\_\_\_  
Marakas \_\_\_\_\_  
Flüt \_\_\_\_\_  
Tefler \_\_\_\_\_  
Tahta \_\_\_\_\_  
Armonika \_\_\_\_\_  
Dümbelek \_\_\_\_\_  
Radyo \_\_\_\_\_  
Teyp \_\_\_\_\_  
Pikap \_\_\_\_\_

3. Blok Köşesi

Bloklar, Çeşitli:

Büyük \_\_\_\_\_ Küçük \_\_\_\_\_ Silindir \_\_\_\_\_  
Üçgen \_\_\_\_\_ Tam \_\_\_\_\_ Yarım \_\_\_\_\_  
Çubuk \_\_\_\_\_ Çubuk \_\_\_\_\_  
Dörtte bir X.Y. biçiminde eğimli  
çubuk \_\_\_\_\_ minde so- blok \_\_\_\_\_  
palar \_\_\_\_\_  
Çatı blokları \_\_\_\_\_

4. Evcilik Köşesi ve Temsili Oyun Köşesi

Bebekler \_\_\_\_\_ Bebek yatakları \_\_\_\_\_  
Bebek arabası \_\_\_\_\_ Battaniyeler, şilteler ve yastıklar \_\_\_\_\_  
Evcilik oyunu için eski plastik eşya \_\_\_\_\_  
Ufak masa ve sandalyeler \_\_\_\_\_ Dolap \_\_\_\_\_  
Tahta oyuncak \_\_\_\_\_ Fırın \_\_\_\_\_ Oyuncak telefon \_\_\_\_\_  
Mutfak araçları \_\_\_\_\_ temizlik araçları \_\_\_\_\_  
Çeşitli erkek/kadın giysileri \_\_\_\_\_ Silifonlar \_\_\_\_\_  
Çeşitli meslekleri simgeleyen giysiler:  
Dr. çantası ve giysileri \_\_\_\_\_ Hemşire başlıkları \_\_\_\_\_  
İtfaiyeci \_\_\_\_\_ Kaptan, subay şapkaları \_\_\_\_\_

Kaptan, subay şapkaları \_\_\_\_\_  
Değişik zorluk seviyesinde tahta bilmeceler \_\_\_\_\_  
Resimli eleştirmeli oyunlar \_\_\_\_\_  
Ufak blok takımları \_\_\_\_\_  
Renkli tahtadan sayma boncuklar \_\_\_\_\_  
Marangoz aletleri \_\_\_\_\_

Su Oyunlarında Kullanılan Araç ve Gereçler

Ufak testiler \_\_\_\_\_ Süzgeçli kovalar \_\_\_\_\_  
Çeşitli boyutlarda taslar, leğenler \_\_\_\_\_ Plastik şişeler \_\_\_\_\_  
Kepçeler \_\_\_\_\_ Kamışlar \_\_\_\_\_ İlaç damlalıkları \_\_\_\_\_  
Şampuan şişeleri \_\_\_\_\_ Huniler \_\_\_\_\_ Süzgeçler \_\_\_\_\_  
Yumurta çırpıcısı \_\_\_\_\_ Fırçalar \_\_\_\_\_ Hortumlar \_\_\_\_\_  
Sabun (kalıp veya toz) \_\_\_\_\_

Açık Hava Etkinliklerinde Kullanılan Araç ve Gereçler

Çeşitli boyda toplar \_\_\_\_\_ Çemberler \_\_\_\_\_ İp atlamak için  
kalın ipler \_\_\_\_\_ Kum havuzu \_\_\_\_\_ Kovalar \_\_\_\_\_ Kaplar \_\_\_\_\_  
Kaşıklar \_\_\_\_\_ Ufak tabak-çanak \_\_\_\_\_ Tırmanma merdivenleri \_\_\_\_\_  
İp ya da tahta merdiven \_\_\_\_\_ Bisiklet \_\_\_\_\_ İp ve bahçe hortumu \_\_\_\_\_  
Otomobil tekerlekleri \_\_\_\_\_ Denge tahtası \_\_\_\_\_ atlama beygiri/  
tırmanma beygiri \_\_\_\_\_ Salıncaklar \_\_\_\_\_ Tahtaravalli \_\_\_\_\_  
Kaydırak \_\_\_\_\_ Oyun sandıkları \_\_\_\_\_

Doğa ve Fen Bilgisi Vermek İçin Kullanılan Araç ve Gereçler

Mıknatıslar \_\_\_\_\_ Büyüteçler \_\_\_\_\_ B.boy bahçe ve oda termometresi \_\_\_\_\_  
Cetveller \_\_\_\_\_ Ölçü aletleri \_\_\_\_\_ El aynaları \_\_\_\_\_ Makaralar, diş-  
liler, vidalar, somunlar, kancalar \_\_\_\_\_ Hayvan köşesi \_\_\_\_\_

Kitap Köşesi

Çeşitli hikaye kitapları \_\_\_\_\_ Mecmualar \_\_\_\_\_

C. YUVADA GÖZLENİLEN ETKİNLİKLERİN LİSTESİ

1. Yaratıcı Anlatım ve Sanat Etkinlikleri

Bloklar ve küplerle yapılan faaliyetler \_\_\_\_\_  
Kil ve diğer yoğurma faaliyetleri \_\_\_\_\_  
Evcilik köşesi faaliyetleri \_\_\_\_\_ Kum oyunu \_\_\_\_\_  
Su oyunu \_\_\_\_\_ Tahta işleri \_\_\_\_\_

Boyama ve Başka Resim Etkinlikleri

Sulu boya \_\_\_\_\_ Parmak boyası \_\_\_\_\_ Çıkartma boyası \_\_\_\_\_  
Sabun boyası \_\_\_\_\_ Mum boya, tebeşir, boya kalem \_\_\_\_\_  
Rulo sarılmış ip baskı \_\_\_\_\_ Kumaşa boya damlatma \_\_\_\_\_  
Simetrik desen çıkartma \_\_\_\_\_ İpe dizme \_\_\_\_\_ Çizgi çizme faaliyeti \_\_\_\_\_  
Kesme yapıştırma işleri \_\_\_\_\_

2. Temsili Oyunlar

Evcilik köşesindeki oyunlar \_\_\_\_\_ dramatize edilen hikayeler ve  
oyunlar \_\_\_\_\_ Kukla oynatımı \_\_\_\_\_ Sembolik oyunlar \_\_\_\_\_

3. Müzik Etkinlikleri

Müzikli-müziksiz hareket \_\_\_\_\_ Çalgı çalma etkinliği \_\_\_\_\_  
Müzik dinlemek \_\_\_\_\_ Şarkı söylemek \_\_\_\_\_

4. Doğa ve Fen Bilimleri Etkinlikleri

Fizik çevreyle ve konularla ilgili örnekler:

Taşıtlar \_\_\_\_\_ Tabiat hareketleri \_\_\_\_\_ İletişim araçları \_\_\_\_\_  
Denge tartı \_\_\_\_\_ Hava durumları \_\_\_\_\_ Duyusal dereceler \_\_\_\_\_

Canlılarla ilgili Doğa Bilgisi Örnekleri:

Hayvanlar \_\_\_\_\_ İnsanlar \_\_\_\_\_ Bitkiler \_\_\_\_\_ Yiyecekler \_\_\_\_\_

5. Bedensel Etkinlikler (Açık hava ve Oyun Odasında)

Top oyunları \_\_\_\_\_ Engelli oyun uygulaması \_\_\_\_\_  
Çizginin üzerinden yürüme \_\_\_\_\_ Karenin Ortasına basma \_\_\_\_\_  
Oyun alanını, bahçeyi temizlemek \_\_\_\_\_

Cambazlık ya da cimnastik minderi hareketleri \_\_\_\_\_  
Kolay cimnastik uygulamaları-bedeni çalıştırma oyunları \_\_\_\_\_  
Açıkhavada organize olmuş oyunlar oynanması \_\_\_\_\_

6. Dil Geliştirme Etkinlikleri

Kitap okuma \_\_\_\_\_ Kitap hazırlama \_\_\_\_\_ Masal öykü anlatma \_\_\_\_\_  
Öyküleri canlandırma \_\_\_\_\_ Kukla oynatma \_\_\_\_\_ Parmak oyunları \_\_\_\_\_  
Pazen kaplı tahtada öykü anlatma \_\_\_\_\_ Resimli anlatma \_\_\_\_\_  
Bilmeceler \_\_\_\_\_ Tekerlemeler \_\_\_\_\_ Şiir \_\_\_\_\_

7. Geziler Tertipliyor musunuz? (Sorulabilir)

Hayvanlarla ilgili gezi yerleri \_\_\_\_\_  
İnsanlar ve çevreleri \_\_\_\_\_ Doğaya ve mevsimlere göre canlıların, bit-  
kilerin gelişmesini, büyümesini izlemek \_\_\_\_\_  
Taşıtlar ve makinalar \_\_\_\_\_ Konuk çağrımı \_\_\_\_\_  
D. I. Çocuklar yeni bir etkinliğe grup halinde mi başlıyorlar/bir di-  
ğer etkinliğe grup halinde mi geçiyorlar \_\_\_\_\_  
II. Öğretmenler çocukları kesin tavırlara yöneltiyorlar mı, yoksa  
çocuğu kendi seçimini yapmakta serbest bırakıp gerektiğinde mi  
önerilerde bulunuyorlar \_\_\_\_\_

## APPENDIX 3

### SORULAR I

Bugün size sadece birkaç şey sormak istiyorum.

1. Oğlunuzun/Kızınızın adı \_\_\_\_\_ değil mi?

\_\_\_\_\_ yaşında değil mi?

2. Doğum tarihi neydi?

(AŞAĞIDAKİ TABLOYA İLK SIRAYA İŞLEYİN)

3. Başka çocuğunuz var mı?

Hayır ----- 1

Evet ----- 2

Kaç tane?

1 Başka Çocuksa

1 den fazla ise

Onun adı ne?

En büyüğünün adı ne?

(ADINDAN BELLİ DEĞİLSE) Kız mı Erkek mi?

Kız mı Erkek mi?

Kaç yaşında? Doğum tarihi ne?

Kaç yaşında? Doğum tarihi ne?

Bu evde mi oturuyor?

Bu evde mi oturuyor?

(TABLOYA İŞLEYİN)

(HER BİRİNİ TABLOYA İŞLEYİN)

B. CİNSİ-  
YETİ

C. DOĞUM  
TARİHİ

D. YAŞI

E. OTURUYOR

F. STATÜ  
Evlat Edi-  
nilmiş, Ön-  
ceki Evli-  
likten, vs.

A. ÇOCUKLARIN İSİMLERİ  
(İsteğe Bağlı)

	Kız	Erkek	Ay	Yıl	Evde	Başka Yerde
(1)	1	2			2	1
(2)	1	2			2	1
(3)	1	2			2	1
(4)	1	2			2	1
(5)	1	2			2	1
(6)	1	2			2	1
(7)	1	2			2	1
(8)	1	2			2	1

4. Evinizde evlat edirmiş olduğunuz ya da evlat gibi baktığınız başka çocuk var mı? Mesela bir akraba çocuğu var mı?

Veya önceki bir evlilikten doğma olan var mı?

(TABLODA BELİRTİN. SÖYLEDİKLERİNDEN BAŞKA BÖYLE ÇOCUK VARSA TABLOYA EKLEYİN)

5. Bu evde oturan başka kimler var? Bunlar \_\_\_\_\_ in nesi oluyor? Bunlar içinde evli olan veya daha önce evlenmiş olan var mı? (BÜYÜK ANNE/ BÜYÜK BABALARIN ANA YA DA BABA TARAFINDAN OLDUĞUNU NOT EDİN) (BÜTÜN BİLGİLERİ TABLOYA İŞLEYİN)

AKRABALIK BAĞI

MEDENİ HALİ

(01)	_____	_____
(02)	_____	_____
(03)	_____	_____
(04)	_____	_____
(05)	_____	_____
(06)	_____	_____
(07)	_____	_____
(08)	_____	_____
(09)	_____	_____
(10)	_____	_____

(TABLODA KOCASINI BELİRTMEDİYSE)

6. Kocanızla beraber mi oturuyorsunuz?

Evet ----- 1

Hayır ----- 2

Ayrı ----- 1

Boşanmış ----- 2

Bazen evdedir bazen ----- 3

Uzakta (işte vs.) ----- 4

Ne kadar zaman uzaktadır, ne kadar evdedir? \_\_\_\_\_

7. Siz \_\_\_\_\_ de çalışıyor sunuz değil mi? Hangi kısımda çalışıyorsunuz? Ne yapıyorsunuz?

8. Kaç yaşındasınız? \_\_\_\_\_

9. Kaçınıcı sınıfa kadar okudunuz? \_\_\_\_\_

10. Kocanız kaçınıcı sınıfa kadar okumuş? \_\_\_\_\_

11. Kocanız kaç yaşında? \_\_\_\_\_

12. Kocanız çalışıyor mu?

Çalışıyor ----- 1

Çalışmıyor ----- 2

A. Ne iş yapar? (NE TİP BİR İŞTE ÇALIŞIR, NE YAPAR GİBİ SORULARLA AYRINTILI BİLGİ ALIN VE NOT EDİN. ÖRNEĞİN, KENDİ İÇİN Mİ, BAŞKASI İÇİN Mİ ÇALIŞTIĞI, İŞİNİN SEVİYESİ -İŞÇİ, USTA GİBİ- İŞYERİNİN BÜYÜKLÜĞÜ -KÜÇÜK İMALATHANE, FABRİKA GİBİ- BELLİ OLSUN. TARLA İŞİYSE, İRGAT, SAHİBİ GİBİ FARKLILAŞMALARINI ORTAYA ÇIKARTIN)

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B. (NE İŞ YAPTIĞI AÇIK DEĞİLSE) Biraz anlatır mısınız/açıklar mısınız?

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13. Çocuklarınız içinde eve yardım için çalışan veya para kazanan var mı?

Evet ----- 2

Hayır ----- 1

14. Ne yapar? (Ne yaparlar?)

15. Para kazanmak için evin dışında bir iş yapıyor musunuz?

Evet ----- 2

Hayır ----- 1

16. Ne (yapıyorsunuz/yapıyordunuz)? (NE TİP BİR İŞTE ÇALIŞIYORSUNUZ, NE YAP-IYORSUNUZ GİBİ SORULARLA DETAYLI BİLGİ ALIN VE NOT EDİN. ÖRNEĞİN, KEN-Dİ İÇİN Mİ, BAŞKASI İÇİN Mİ ÇALIŞTIĞI, İŞİNİN SEVİYESİ -İŞÇİ, USTA GİBİ- İŞYERİNİN BÜYÜKLÜĞÜ -KÜÇÜK İMALATHANE, FABRİKA GİBİ- BELLİ OLSUN).

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17. Devamlı mı çalışıyorsunuz, zaman zaman mı?

Devamlı ----- 2

Zaman zaman ----- 1

18. Yılda altı aydan az mı çalışıyorsunuz?

Altı aydan az ----- 2

Altı aydan fazla ----- 1

19. Siz isteyken çocuklarınıza kim bakıyor

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MÜLAKATÇININ NOTLARI

(MÜLAKAT YAPTIĞINIZ EVDEN AYRILDIKTAN SONRA DOLDURUN)

1. Anne ilgili ve sizi kabul edici miydi?

Evet, çok ----- 4

Evet, biraz ----- 3

Pek değil ----- 2

Hiç değil ----- 1

2. Kendisiyle oturup konuşabilmek için ikna etmek gerekti mi?

Evet ----- 1

Biraz ----- 2

Hayır ----- 3

3. Anne kısa mülakat süresince gergin, rahatsız, heyecanlı bir halde miydi? yoksa rahat mıydı? Eğer anne gergin idiye niye öyle olduğu hakkında düşüncenizi yazınız.

Çok gergin ----- 1

Biraz gergin ----- 2

Rahatça ----- 3

Çok rahat ----- 4

Düşünceleriniz \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Anne ile ilgili ilk izleminiz nasıl?

Uyanık, meraklı, ilgili ----- 4

Orta düzeyde ilgili ----- 3

İlgisizce, pek uyanık gözüküyor ----- 2

Çok ilgisiz, içine kayanık, hiç meraklı ve uya-

nık değil ----- 1

5. Anne, ev durumu veya mülakat durumu hakkında belirtmek istediğiniz özel noktalar var mı?

## APPENDIX 4

### A- SINIFLANDIRMA

#### İŞLEM I

"Şimdi seninle bir oyun oynayacağız. Önünde birçok kutular var. Birbirine benzeyen şeyleri biraraya koy".

#### İŞLEM II

"Burada yine bazı oyuncaklar var. Birbirine benzeyenleri biraraya koy".

#### İŞLEM III

"Birbirine benzeyen şeyleri bir araya koy"

- "Büyük kutular mı daha çok, kutular mı daha çok?"
- "Bütün kutular büyük mü?"
- "Büyük kutuları alırsak, başka kutu kalır mı?"

### B- SIRALAMA

#### ALİŞTİRMA

"Şimdi seninle başka bir oyun oynayacağız. Bu bebekleri en küçükten en büyüğe doğru sıraya koy".

#### İŞLEM I

"Şimdi en küçük sopayı seç ve sopaları en küçükten en büyüğe doğru sıraya koy"

#### İŞLEM II

"Bu sopaları en küçükten en büyüğe doğru diğerlerinin arasına yerleştir. Öyle koy ki bu yaptığın ilk sıralama bozulmasın" (ilk sopaları göstererek)

#### İŞLEM III

"Bebekler yürüyüşe çıkacak herbirinin kendine uygun bir sopası olması lazım, her bebeğe bir sopa seç".

"Her bebek için bir sopa seç".