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The Effects of Socioeconomic Status on Children's Categorization and Cross-classification Skills

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Abstract

Categorization and cross-classification are fundamental conceptual skills and help children to form a basis for structuring and organizing their world. Past studies assert that age and education effect children's categorization skills. This research was conducted in order to examine whether socioeconomic status (SES) effects children's categorization and cross-classification skills or not. The sample of the study consisted of 150 six-year-old children coming from low and middle income families. Children were presented categorization and cross-classification triads that contain food items. Each triad consists of a target, a choice categorically related to the target and a choice categorically unrelated to that target. Children's task in each triad was to find the item in the same category as the target. In addition, after each categorization triad, children were asked to elaborate on their choices. At the end of the research, it was revealed that children from middle income families performed better in categorization and cross-classification tasks. Besides, It was determined that while making categorization, middle income children mostly based on categorical relations whereas low income children based on non-categorical relations.

Keywords: *Early childhood, socioeconomic status, categorization, cross-classification*

1. Introduction

Categorization is the process in which ideas and objects are identified, diversified, and understood. Categorization means that objects are grouped into categories, usually for some specific purpose. Actually, a category clarifies a relationship between the subjects and objects knowledge (Miller, Vandome & McBrewster, 2010). Categorization is a tool of simplifying the environment, so it reduces the load on memory, which helps to store and recall information efficiently (Markman, 1989).

Categories serve lots of purposes which are essential to human cognition. Initially, categories provide cognitive economy by decreasing the complexity in the environment. They satisfy the need for permanent learning by letting people to recognize new instances as members of familiar classes rather than as unique entities. Categories divide the world into coherent and integrated classes and allow people to organize efficiently their memory or knowledge representation into meaningful units. Secondly, categories provide information that enable people to infer about unknown properties of instances (Lin, 1996). For instance, although you have never used a desktop computer before, you can use your category knowledge to predict that the desktop computer is probably like other desktop computer you have used (it has a monitor, a keyboard and a mouse). Your categorical knowledge about desktop computer permits this inference regardless of whether you have ever seen the particular desktop computer (Nguyen, 2003).

Categorization and Cross-classification in Young Children

Conceptual development researchers have determined that children may use some categorization types while classifying objects around them (Nguyen, 2003). One of them is taxonomic categorization. Taxonomic categorization comprises conceptual links of objects according to two variables: similarity and common properties which are shared by the objects in a hierarchical system (e.g. terrier, dog, domestic animal and mammal) (Di Giacomo, De Federicis, Pistelli, Fiorenzi & Passafiume, 2012).

Taxonomic categories consist of categories most of which are gathered by common names. For instance; chair, fish, fruit, television, flower and vehicle are taxonomic categories of which all members share definite characteristics. Briefly, taxonomic categories are based on shared characteristics or similarities among category members (Nguyen, 2003). Taxonomic categories are organized on three levels: superordinate (e.g., Animal), basic (e.g., dog) and subordinate (e.g., terrier, Dalmatian, Doberman). Basic level categories provide reconciliation between two different aims of categorization. Firstly, they maximize similarity between category members and, secondly, they minimize similarity between members of other categories. Superordinate categories are more general and include different objects. At subordinate level categories are more specific than basic and include quite similar objects (Belleville, 1996). Studies about conceptual development enounce that basic level is learnt at earlier ages and easier by children (Murphy, 2004). In other words children acquire concept of "apple" before acquiring concept of "fruit" which is in high level or concept of "golden" which is in low level. While traditional studies (Lucariello & Nelson, 1985; Nelson & Nelson, 1990; Lucarriello, Kyratzis & Nelson, 1992; Sell, 1992; Yu & Nelson, 1993) claim that young children are lack of taxonomic categorization, current studies (Nguyen & Murphy, 2003; Nguyen, 2003, 2008; Aslan, 2010) show that children may have taxonomic categories even very early ages.

Another type of categorization is thematic categorization. Thematic relations refer to the external or complementary relations among objects, events, people, and other entities that co-occur or interact together in space and time. For example, a dog and its leash form thematic pair, because they relate in a meaningful way, and they co-occur in the time and space. Many thematic relations are embedded in scenes and events. Thematic categories can include spatial (e.g., cap is on top of a bottle), functional (e.g., a board marker is used to write on a board) or temporal relation (e.g., bill typically comes after meals). In some cases, entities can share more than a type of thematic relation, as board marker and board are functionally related also share a spatial relation (Lin, 1996). Unlike members of taxonomic categories that are usually organized in hierarchies or taxonomies, members of thematic categories do not share any perceptual features (Sachs, Weis, Krings, Huber & Kircher, 2007). For example, board marker and board, dog and leash are in the same category not because of having perceptual similarities but because of having a functionally complementary role.

The next type of categorization is script categorization. Script categories deal with a role or roles that objects play in an event or in any routine activity such as "meals eaten at dinner" or "necessary equipments for playing football" (Nguyen, 2008). Script categorization is based on link of information and events without spatial and temporal contiguity (e.g. milk or orange as breakfast or a snack) (Di Giacomo et al., 2012). Contrary to taxonomic categories, items in the same script category do not have to share the same properties. What puts them together is their roles in the same routine activity. To exemplify; an egg and a sausage are in the same script category because of sharing the same role in a same routine (being eaten at breakfast) but not sharing the same properties (Nyugen, 2008). Additionally, script categories are a little different from thematic categories. In a thematic category, items are grouped together since they play complementary roles and co-occur in time and space (e.g. baby– pacifier) (Nguyen, 2007).

The last categorization type children can use in their daily life is evaluative categories. The items are classified into two groups as positive and negative in evaluative categories. To illustrate; the objects can be put into two as safe or dangerous; healthy or unhealthy. To make an assessment, individuals might examine an item's value, make content discriminations, relate the item to prior knowledge and experiences, etc. By engaging in this evaluative process, an individual is going beyond simply identifying an item as it is. For example, the evaluative category of healthy foods might include skim milk, carrots, and fish (Nguyen, 2008). In the related literature, the development of taxonomic, thematic and script categories have been investigated; whereas, it can be seen that the investigation of evaluative categories has been ignored (Nguyen & Murphy 2003).

Categorization is one of the basic conceptual skills for children in early years; however, entities around as generally do not belong to only one category and as we gain greater knowledge of the world, we become aware that a single entity can be perceived in different ways. For example, thinking a person as a woman, a mother, an adult, a teacher, a liberal citizen, a dancer, an extrovert person etc. is important for understanding complex behaviors of a single person. Thus it is necessary to cross-classify the items for understanding the world completely (Nguyen, 2003).

Categorization is based on putting one item into one category; whereas cross-classification is based on putting one item into multiple categories. According to cross-classification; for example, an ice-cream can be classified both as a dairy product (taxonomic category) and as a dessert (script category). Cross-classification is an important cognitive skill because we rarely encounter objects that are only in one category in our daily life. We should cross-classify them into different categories in order to understand these objects and develop appropriate responses. To illustrate; it is important for a lactose-intolerant person to categorize an ice-cream not only as a dessert but also a dairy product for his/her health as well (Nguyen & Murphy, 2003). In addition, cross-classification has been studied broadly in adults' conceptual development literature (e.g., Barsalou, 1991; Murphy, 1993; Ross & Murphy, 1999), but there is a limited number of studies about children's cross-classification skills (Blaye & Bonthoux, 2001; Nguyen & Murphy, 2003; Nguyen, 2008; Aslan, 2010).

The factors that effect children's categorization skills

Studies about conceptual development assert various factors that effect children's categorization skills. One of them is age. The traditional categorization theories state that children and adults make categorization in different ways (Belleville, 1996). There are many studies in conceptual development area describing a developmental shit from primitive or simpler conceptual structures to more sophisticated and abstract ones during the school age years (Nguyen, 2003). According to this view, children firstly tend to formulate script/thematic categories, however, these categories are replaced by taxonomic categories in the following school period including primary school (e.g. Vygotsky 1962; Inhelder & Piaget 1964; Greenfield & Scott, 1986; Nelson, 1988; Lucariello at al., 1992). For instance; in a study by Annet (1959), the participants were given some pictures; animals (e.g., a cow and a butterfly), plants (e.g., a tree, a flower), vehicles (e.g., a car, a plane) and some furniture (e.g., a chair and a table). Then, they were asked to group items that "go together". It was found that 6–8 year-old children tended to group items that shared a same theme (e.g., a flower and a butterfly). In another study, Smiley and Brown (1979) applied a forced choice triad task in their research and found the parallel results in a study with younger children. In this study, children were asked which of the two alternatives "goes best with" the target. The results showed that preschool children tended to choose the thematically related alternatives rather than taxonomic alternatives. On the other hand, current studies (Nguyen, 2003; Nguyen & Murphy, 2003; Nguyen, 2007; Nguyen, 2008, Aslan, 2010) show that taxonomic, script and evaluative categories start to develop in early years simultaneously. For example, Nguyen and Murphy (2003) found that children even at the age of 3 and 4 could categorize objects in taxonomic, script and evaluative categories.

Another factor that may effect the development of categorization skills is education. Some studies show that education might play some role in people's categorical choices. For example, Luria (1976) compared the categorization style of Russian villagers who didn't have any formal education with other Russians who had some. He found that villagers intended to classify items according to thematic relations though other group who had some formal education intended to classify same items according to taxonomic relations. In other study, Scrinber (1974) found that children never having attended school used thematic categories when grouping items whereas children who attended school used taxonomic categories.

On the other hand, many studies revealed that there were some differences derived from socioeconomic status in young children's cognitive skills (Jordan, Huttenlocher, & Levine, 1992; Jordan, Kaplan, Locuniak, & Ramineni, 2007; Jordan, Kaplan, Ramineni, & Locuniak, 2009). Socioeconomic status is

generally defined as the family income, the economical condition of the environment in which the child lives and the parents' educational levels (Clements & Sarama, 2008). Past studies found that children from low-income families were behind their peers from middle-income in some conceptual development areas such as problem solving, knowledge of counting, numerical relationships, spatial and geometric thinking, and measurement (Saxe, Guberman & Gearhart, 1987; Clements, Sarama & Gerber, 2005; Jordan, Kaplan, Olah & Locuniak, 2006; Jordan et al., 2007; Jordan, Kaplan, Ramineni & Locuniak, 2008; Klein & Starkey, 2011). This research was conducted to determine whether there was a same difference derived from socioeconomic status in children's categorization and cross-classification skills or not.

2. Method

Participants

This study was carried out with 150 six-year-old children whose families differ in socioeconomic status (SES). The children were selected via random sampling method to have equal number of children in each socioeconomic status. 75 of the participants (range: 59 to 72 months, main age: 66 months; 32 girls and 43 boys) were attending a public preschool that served low-income families and 75 of the participants (range: 58 to 72 months, main age: 65 months; 40 girls and 35 boys) were attending a public preschool that served middle-income families.

Educational level and profession of parents were different depending on their socioeconomic status. Most of the low income parents were graduates of elementary schools whereas most of the middle income parents were graduates of university. Almost all of the low income mothers didn't have any profession while middle income mothers had professions such as teacher, nurse or officer. The majority of low income fathers were workers whereas most of the middle income fathers had professions such as doctor, teacher or engineer.

Data Collection Tools

In this study, as a data collection tool, pictorial food triads were used. These triads, each 2 x 3 inch, were printed on A4 papers horizontally. Each triad consisted of a target and two choices.

Categorization triads were composed of a target (e.g., a green pepper), a choice categorically related to that target (e.g., an eggplant) and a choice categorically unrelated to that target (e.g., a wafer) (see Appendix, for a complete list of categorization triads). The categorization triads used in this study were 12 taxonomic, 8 script and 8 evaluative; totally 28 triads. Taxonomic triads were made up of a target (e.g., a cookie), a choice taxonomically related to that target (e.g., a bagel) and an unrelated choice (e.g., yoghurt). Script triads were composed of a target (a piece of cheese), a choice with a script relation to that target (e.g., olives) and unrelated choice (e.g., a peach). Lastly, evaluative triads consisted of a target (e.g., grapes), a choice with an evaluative relation to that target (e.g., spinach) and an unrelated choice (e.g., candy). While administrating the categorization triads, taxonomic, script, evaluative triads and related/unrelated choices were randomly given to the children. That is; a taxonomic triad –a target, a taxonomic choice, and an unrelated choice- was followed by a script triad –a target, unrelated choice, and a script choice.

Cross-classification triads consisted of categorization triads. In a cross classification triad, a taxonomic, a script or evaluative triads referring to the same target were given respectively. For instance; a taxonomic triad composing of a target (e.g., milk), a taxonomically related choice (e.g., pudding) and an unrelated choice (e.g., watermelon) was followed by a script triad composing of a target (e.g., milk), a choice with a script relation to that target (e.g., olives) and an unrelated choice (e.g., eggplant) (see Appendix, for a complete list of cross-classification triads). When a child matched the milk and the pudding in the first triad and matched the milk and the olives in the second triad, it was accepted that the child made a cross-classification. In cross-classification triads, as well as taxonomic, script and evaluative triads, related and

unrelated choices were presented to the children randomly. For example; a taxonomic triad in which the related choice was put as a first choice was followed by a script triad in which the unrelated choice was put as a first choice.

In this research, the domain of food was decided as a testing area for two main reasons. Firstly; the food is a field that children may encounter rich experiences in their daily lives. Secondly; it is quite probable to find items for each category (taxonomic, script, evaluative) and for each sub-category (e.g., breakfast food, vegetables, unhealthy food etc.). Previous research findings also show that the domain of food has strong script, taxonomic and evaluative categories (Ross and Murphy, 1999; Nguyen and Murphy, 2003). It should not; however, be forgotten that cultural content play an important role in forming script and evaluative categories. For example, items of a script category in one culture may not be composed in a script category of another culture. To exemplify; in Middle East culture, olives are an indispensable part of breakfast items but they may not be one of the most crucial breakfast items in the European cultures. However; it is important that children take into account their own cultural context.

Development of the Measurement Tools

While developing the measurement tool, parents and teachers were given a form in order to determine the types of food that children are familiar with. They were asked which of the food items from each category (taxonomic, script and evaluative) and from each sub-category (e.g., food eaten at dinner, fruit, pastry and healthy food) their children knew. For instance; the parents were asked some questions as in the following examples: “As an unhealthy food, what kind of food does your child know?”, “as a breakfast food item, what kind of food does your child know?” In addition to that, some children at the age of 4-6 who were out of the sample of this study and who were attending a preschool were talked about what kind of food they knew in the subcategories of taxonomic, script and evaluative categories (e.g., what is made from milk? what is eaten at breakfast?, what are the unhealthy foods? etc.).Then, their answers were recorded. According to these data, the types of food that children were familiar with were chosen and food triads were formed.

While composing of triads, it was taken as a principle that in categorization triads, there was no categorical or non-categorical relation (e.g., color, shape or amount etc.) between the target and the unrelated choice. Also, it was aimed that there was only one categorical relation between the target and the categorical choice (e.g., only a taxonomic relation but not script or evaluative relation). Therefore; in each triad, one correct choice and only one categorical relation between that choice and the target were tried to provide.

Validity and reliability studies. Various analyses were conducted in order to test the reliability and validity analyses of the measurement tool. Firstly; some experts’ ideas on the conceptual appropriateness of test items were taken. Then, they were asked whether test items were convenient for preschool children. The measurement tool was introduced to 6 instructors of the Early Childhood Education Department and their feedback was taken into account. Furthermore; food triads were presented to a professor from the Food Science and Human Nutrition Department and she was asked whether each item was appropriate enough for the related category. Then, the measurement tool was revised in line with the feedback received.

Next, the measurement tool was given to 10 university students. They were asked to grade the perceived similarity between the target and choices in each triad. They were reminded to skip their conceptual knowledge about these items and to focus on the perceived similarity among them. They were asked to give a score to these perceived similarities according to a scale from 1 (no similarity) to 5 (completely similar). By this way; it was aimed to reduce the probability of children’s classification based on perceived similarity among food items. As a result; it was found that the rate of perceived similarity was below 1,8.

Another 10 university students were asked to grade each test item about its appropriateness for the category, itself. For instance; to what extent are green bean (target) and tomato (categorical choice) convenient for vegetables category? How appropriate is an egg (unrelated choice) in this triad as an unrelated choice? The students graded the category appropriateness of each item according to a scale from 1 (not convenient) to 5 (completely convenient). The grading showed that all items were highly representative of their relevant category.

Following these steps, the measurement tool was administered to 15 preschool children as a pilot study. Based on this pilot study, some triads were taken out of the tool and the administration procedure of the measurement tool was finalized.

The KR-20 coefficient was calculated in order for the internal consistency reliability of categorization and cross-classification triads. The KR-20 value of the categorization triads was found to be .70 and that of the cross-classification triads was found to be .72.

Data Collection

Firstly, the school administration was informed about the aims of that research and was given extra information about interviews. Then, required permission was got. The data was based on individual interviews with the children in a quiet room of the preschool. As an initial step, the children were given 3 warm-up triads. In the first warm-up triad, the children were presented a white rose (target), a red carnation (taxonomic choice-flower) and a square (unrelated choice). Next, they were asked which of these had a same type with the white flower. In the second warm-up triad, the children were introduced a bus (target), a whale (unrelated choice) and a backpack (script choice-school time). Following that, they were asked which of these was at the same type with the bus. As for the third warm-up triad, the children were given a lighter (target), a plug (an evaluative choice, a dangerous substance), and a baby doll (unrelated choice). Then, they were asked which of these was at the same type with the lighter. When the children could not give the correct answer, their errors were corrected. The warm-up phase continued until the procedure was very clear for the children.

In the next step, the categorization triads were introduced to the children. While presenting each triad, the names of the food items were told to the children and then, they were asked which food item was at the same type with the target. For example; the children were given a categorization triad; a chicken (target), a sausage (taxonomic choice-meat) and a piece of cheese (unrelated choice). Then; they were asked which of these –a sausage or a piece of cheese- was the same type of food with the chicken. When the child told his answer, researcher asked to the child the reason of his/her choice. The children's responses were recorded in the interview form. Later, the children were asked cross-classification triads in one day intervals, following the same method.

The children's correct choice in categorization triads were scored as "1", incorrect answers as "0" into the interview forms. In cross-classification triads, if the children could classify one item into two categories, they were given "1". In case of other responses, they were given "0". Furthermore, the children's rationales about their categorization in categorization triads were written down in the interview forms.

Data Analysis

In this study, KR-20 analysis was used for the reliability of the measurement tool. Moreover; t-test was conducted in order to see if there was a meaningful difference among the children's categorization skills in categorization and cross-classification triads according to socioeconomic status.

The content analysis was carried out on the children's qualitative data about their categorical choices (correct choices) in categorization triads. Each response was carefully examined and coded. Then, the codes were compared to each other and very similar codes were unified under a superior code. The children's categorization choices were classified into three superior groups as "categorical", "non-

categorical" and "other category". Categorical responses based on categorical relation between the target and choice. For example, the responses in taxonomic triads such as "both are fruit", "both are made from milk", the responses in script triads such as "both are eaten for breakfast" or the responses in evaluative triads such as "both are healthy" were accepted as categorical responses. Non-categorical responses consisted of the responses which didn't have taxonomic, script or evaluative relations such as "both have same color" or "I like both of them". The responses of other category were the ones belonging to the categories apart from the test categories. For example, in a taxonomic triad, such as milk (target), pudding (categorical choice) and soup (unrelated choice), the child put pudding and milk into the same category and when the reason asked if s/he said "both are healthy", this response was classified as other category. Because that response refers to evaluative category rather than taxonomic category.

3. Findings

Table 1: Categorization Means for Low and Middle Income Children

	SES			
Task	Low	Middle	t	df
Categorization	18,54	22,56	6,97**	148
	(4,06)	(2,88)		

Note: * = p < .05, ** = p < .001. Standard Deviations appear in parentheses below means.

An independent-samples t-test was conducted to compare the categorization scores for low and middle income children. This test was found to be statistically significant, t(148)= 6.97, p < .01; d =.24. The effect size for this analysis (d = .24) was found to exceed Cohen's (1988) convention for a large effect (d = .14). These results indicate that middle income children had higher scores in taxonomic categorization (M=22,56, SD=2,88) than low income children (M=18,54, SD=4,06).

Table 2: Distribution of the children's responses about the reasons of correct choice in categorization triads according to socioeconomic status

Type of responses	SES			
	Low		Middle	
	f	%	f	%
Non-categorical response	667	48	351	21
Categorical response	382	28	999	59
Response about other category	228	16	272	16
I don't know	113	8	70	4
Total	1390	100	1692	100

Responses given by children about the reasons of their correct categorization in the categorization triads according to socioeconomic status can be seen in the table 2. When the children's responses were analyzed, it was seen that the low income children's responses consisted of 48% non-categorical, 28% categorical and 16% other category whereas the responses of children from the middle income consisted of 59 categorical, 21% non-categorical and 16% other category. Besides, 8% of low income children's responses and 4% of middle income children's responses were "I don't know".

Table 3: Cross-Classification Means for Low and Middle Income Children

	SES			
Task	Low	Middle	t	df
Cross-Classification	5,17	8,01	5,96**	148
	(2,98)	(2,84)		

Note: * = p < .05, ** = p < .001. Standard Deviations appear in parentheses below means.

In order to compare low and middle income children's scores in cross-classification task, an independent-samples t-test was conducted. This test was found to be statistically significant, $t(148) = 5.96$, $p < .01$. The effect size for this analysis was high (d=.19). These results indicate that middle income children had higher scores in cross-classification triads (M=8,01, SD=2,84) than low income children (M=5,17, SD=2,98).

4. Discussion and Comments

This study was conducted to investigate children's categorization and cross-classification skills according to socioeconomic status. The results of study indicated that low income children performed behind those of their middle income peers on categorization and cross-classification triads. Furthermore, while categorazing the items, middle income children mostly used categorical relations, but low income children mostly used non-categorical relations. Consequently, the study showed that there were differences in children's categorization and cross-classification skills according to socioeconomic status. These findings were consistent with the earlier studies that suggested children form low income families lag behind their middle income peers in many conceptual development areas (Ginsburg & Russell, l98l; Hughes, 1986; Saxe, Guberman, & Gearhart, l987; Jordan, et al. , l992; Starkey & Klein, l992; Jordan, Huttenlocher,& Levine, l994; Griffin, Case, & Siegler,1995; Mpofu & Van de Vijver, 2000; Starkey, Klein, & Wakeley, 2004). For example, Mpofu & Van de Vijver (2000) found that among Zimbabwean children social class predicted the frequency with which children used taxonomic rather than functional classification strategies. Higher social class membership was significantly related to more frequent use of taxonomic rather than functional classification strategies. The difference between low income children and their higher income peers is broad and encompasses other cognitive abilities such as informal numerical knowledge, spatial/geometrical abilities, knowledge of patterns, arithmetic, patterning, calculation and measurement skills (Jordan, et al., 1992; Klein & Starkey, 2004; Starkey, et al., 2004; Clements et al., 2005).

The reason for this gap seems to be that children from low income families receive less support in their home and school environments (Saxe et al., 1987; Blevins-knabe & Musun-Miller, 1996; Holloway, Rambaud, Fuller & Eggers-Pierola, 1995; Clements & Sarama, 2007). Some studies showed that experiences provided by the preschools serving low income families were different from those provided by preschools serving middle income families (Starkey et al., 2004; Clements & Sarama, 2008; Klein, Starkey, Clements, Sarama & Iyer, 2008). For example, Clements and Sarama (2008), found that public preschool programs serving low income families tend to provide fewer learning opportunities and supports for cognitive development than ones serving middle income families. On the other hand, a number of studies showed that the socioeconomic status of the parents affect the existence of experience support for the children at home and the support around the home is lower in families from low socioeconomic status (Saxe et al., 1987; Blevins-Knabe and Musun-Miller, 1996; Holloway et al., 1999; Gersten & Chard, 1999; Starkey, Klein, Chang, Dong, Pang, & Zhou, 1999; Starkey et al., 2004; Clements & Sarama, 2007; Ivrendi & Wakefield, 2009; Aslan, Aktas Arnas & Hayta, 2012). The socioeconomic status differences in the support which the parents give for their children's conceptual development might be deriving from various reasons. Reasons such as the limited educational level of the parents, the pressure of inadequate financial resources, unfulfilled spiritual needs, discomfort about the parents' own conceptual knowledge and the lack of awareness about the importance of early conceptual development of the children can result from socioeconomic status differences.

5. Conclusion

The results of the research show the significant difference between low and middle income children against the low income children in categorization and cross-classification tasks. Moreover middle income children are based on categorical relations more than low income children.

Categorization and cross-classification skills are quite essential to organize our cognitive area in a good way and to give correct responses towards events, objects and situations in our daily life, so children's conceptual development, especially low income children's, should be supported. The two principal environments that can support early conceptual development are the home and preschool. To eliminate the conceptual development gap between low income and middle income children, low income children should be supported more at school and home environment. For this purpose preschool teachers of low income children can be trained to support children's conceptual development. Programs and learning environment of the schools to which low income students attend can be enriched in order to support the conceptual development of children. Besides, parent involvement activities can be organized to support conceptual development of low income children.

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APPENDIX

Categorization Triads

Kinds of Category		Target	Category Choice	Unrelated Choice
Taxonomic Category (Taxonomic Triads)	Beverages	Water	Juice	Quince
	Beverages	Buttermilk	Tea	Orange
	Grains	Cookie	Bagel	Yoghurt
	Grains	Cake	Savoury pastry	Green bean
	Diary	Pudding	Milk	Tea
	Diary	Milk	Yoghurt	Mushroom
	Fruits	Watermelon	Orange	Chips
	Fruits	Plum	Banana	Savoury pastry
	Meats	Fish	Kebab	Cherry
	Meats	Chicken	Sausage	Cheese
	Vegetables	Green bean	Tomato	Egg
	Vegetables	Green Pepper	Eggplant	Wafer
Kinds of Category		Target	Category Choice	Unrelated Choice
Script Category (Script Triads)	Breakfast Foods	Cheese	Olive	Peach
	Breakfast Foods	Sausage	Egg	Rice
	Lunch and Dinner	Meatball	Macaroni	Cake
	Lunch and Dinner	Rice	Meatball	Chocolate
	Birthday Foods	Soda pop	Biscuit	Eggplant
	Birthday Foods	Cake	Cola	Cucumber
	Snacks	Wafer	Ice-cream	Chicken
	Snacks	Chocolate	Chips	Yoghurt
Kinds of Category		Target	Category Choice	Unrelated Choice
Evaluative Category (Evaluative Triads)	Healthy Foods	Grapes	Spinach	Candy
	Healthy Foods	Buttermilk	Apple	Chips
	Healthy Foods	Fish	Strawberry	Wafer
	Healthy Foods	Egg	Watermelon	Chocolate
	Junk Foods	Wafer	Chips	Orange
	Junk Foods	Chocolate	Candy	Banana
	Junk Foods	Soft Candy	Soda pop	Milk
	Junk Foods	Cola	Sweet	Pear

Cross-Classification Triads

Target	Category Choice	Unrelated Choice
Milk	Pudding (Diary)	Watermelon
Milk	Olive (Breakfast)	Eggplant
Cheese	Buttermilk (Diary)	Kola
Cheese	Egg (Breakfast)	Spinach
Chicken	Fish (Meats)	Apple
Chicken	Rice (Lunch / Dinner)	Cake
Sausage	Meatball (Meats)	Ice-cream
Sausage	Egg (Breakfast)	Sweet
Bagel	Bread (Grains)	Fish
Bagel	Cheese (Breakfast)	Macaroni
Ice-cream	Cheese (Dairy)	Tomato
Ice-cream	Cake (Snake / Dessert)	Bread
Cola	Buttermilk (Beverages)	Strawberry
Cola	Macaroni (Lunch / Dinner)	Olive
Banana	Watermelon (Fruits)	Cheese
Banana	Cake (Snacks)	Chicken
Spinach	Tomato (Vegetables)	Bagel
Spinach	Soup (Lunch / Dinner)	Pasta
Green Bean	Potato (Vegetables)	Pear
Green Bean	Meatball (Lunch / Dinner)	Banana