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*Studying noun categorization in Persian children's story books*

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# **Chapter 1**

## **Introduction**

### **1.1 The object and significance of study**

The object of study throughout this thesis is the focus on Eleanor Rosch's principles of noun categorisation within Persian children's storybooks. Rosch's research of the internal structure of categories and conceptual hierarchies will be the initial point of focus. These matters have numerous cognitive categories that are arranged, especially those of objects. The central notions that are widely known in this context are "prototype" and the "basic levels" of categorisation. Even though linguists that are not working within the field of cognitive linguistics have given the notion of prototype considerable recognition, the idea of basic level categorisation has not been as acknowledged until recently. Only during the last decade have many linguists gained concern with aspects that are related to the basic level of categorisation, and contended that it is more prominent than the other levels of categorisation when considered cognitively.

A children's book is an artistic endeavour of putting words together to form a story, reading this artistic product leads to children's mental growth and a process of applying an appropriate language which leads to a better knowledge and understanding of the surrounding world. Following this, scientists such as Piaget (1968), gain an understanding the world of children and Piaget believes that children's literature would only be accepted as appropriate if it applies the specific rules that are necessary for communicating with children. He further added that literature for children should be an effort that is thoroughly considered in order to enhance their lingual abilities and mental development.



Studies carried out on children's thinking and mental ability and the way they observe the outside world, confirm that their learning process should be linked to the specific way they tend to observe and understand their surroundings. In this thesis I study how Persian children's storybooks and the way they are written, follow a special noun categorisation in line with the way children's thinking abilities and mind functions. If followed, such stories for children of ages three to seven can have positive influential effects on their ability to choose between right and wrong and to further develop their abilities.

More specifically, this thesis focuses on the study of representation of the superordinate, basic and subordinate levels that are present within the Persian storybooks for children aged between five to seven years old. This may help us to understand what writers of Persian children's books are confronted with when trying to categorize nouns in children's storybooks. The existence of multiple levels of classification would seem to be a natural consequence of this attempt to organise large amounts of information. This hierarchical organization is a fundamental property of the way that humans structure their classification systems.

Considering this, children that are very young are surrounded by and confronted with a huge array of objects that are all new and unfamiliar. The purpose for these numerous amounts of object are difficult for a young child to foresee and even begin to grasp, there are multiple kinds of animals, plants and other natural phenomena that is yet to be learnt. Each specific kind of object presents itself in copious amounts of sizes, shapes and colours, all having the possibility of being encountered in an array of positions or activities. This results in abundant ways of grouping or classifying these objects, something that even adults may find incomprehensible. With this in mind, how is it possible that children can rapidly grasp what we consider to be reasonable categories?

Categorisation is one of the dominating ways in which children endeavour to make sense of their surrounding environment. Bruner, Goodnow and Astin (1956) highlighted that if each object that was made apparent to us was responded to as if it were a unique individual, this information would be overwhelming due to the complexity of our environment. Throughout this thesis, the study will focus on how categorisation is used within Persian storybooks and how it is a means of simplifying the environment, reducing the tenuous pressure on memory, and aiding us to store and retrieve information efficiently. The point has been highlighted many times by investigators that categorisation is a primary cognitive process which is involved in virtually every intellectual endeavour. Categorisation plays a major role in the cognitive process of identifying objects, perceiving two things as similar, recalling information, solving problems, learning new information, attaining and using language and more. This formation of categories is also one of the predominant ways in which we learn from experience.

The difference of human categorisation from other animals is most apparent when constructing the systems of categories. These include class-inclusion hierarchies, which are not only customary in human categorisation but may also be unique to it. These hierarchies are present in habitual concepts such as “table/furniture”, “cat/animal” and “truck/vehicle” and are found in cultures and subcultures that range from primitive societies to advanced technical scientific communication.

This thesis is concerned with the question: to what extent does Persian culture influence the categorisation that is used within these storybooks. On the descriptive side, I wish to demonstrate that the issues in categorization with which I am primarily concerned, have to do with explaining the categories found in a specific culture and how it is coded by the language of

that culture at a particular point in time; and when we speak of the formation of categories, we mean their formation within the culture.

On the theoretical side, I wish to follow the interesting and inspiring literature on the noun categorization in children's storybooks. Firstly, to show that basic-level categorisation is the highest frequency level which is used in Persian storybooks (that is fitting with Eleanor Rosch's categorization principles). Finally, to acquire the conventional classification system of their culture, children must learn both the categories that are deemed important or useful and the category terms that their language contains. Both of these inductive tasks pose many challenges to young children, who must categorize objects in a ways that are culturally conventional, despite the enormous number of ways that are theoretically possible.

## **1.2 Research questions**

This research is raising the following questions in order to study of noun categorization in Persian children's storybooks:

- 1- To what extent does the use of nouns in children's text books overlap with basic level categorizations in Rosch's sense, and what is the order suggested for the representation of superordinate, basic level and subordinate in the children story books in order to get better understanding by children aging between five to seven years old?
- 2- Will the basic level include more concrete and fewer abstract nouns than the other levels?
- 3- Does the culture influence categorization?

### **1.3 Research Hypothesis**

- 1- Noun in children's text books overlap in high frequency with basic level categorization in Rosch's sense. And the categorization order suggested in the story books is basic-level, superordinate then subordinate.
- 2- Basic-level categorization and concrete nouns overlap each other in high frequency in Persian story books.
- 3- Culture influences categorization.

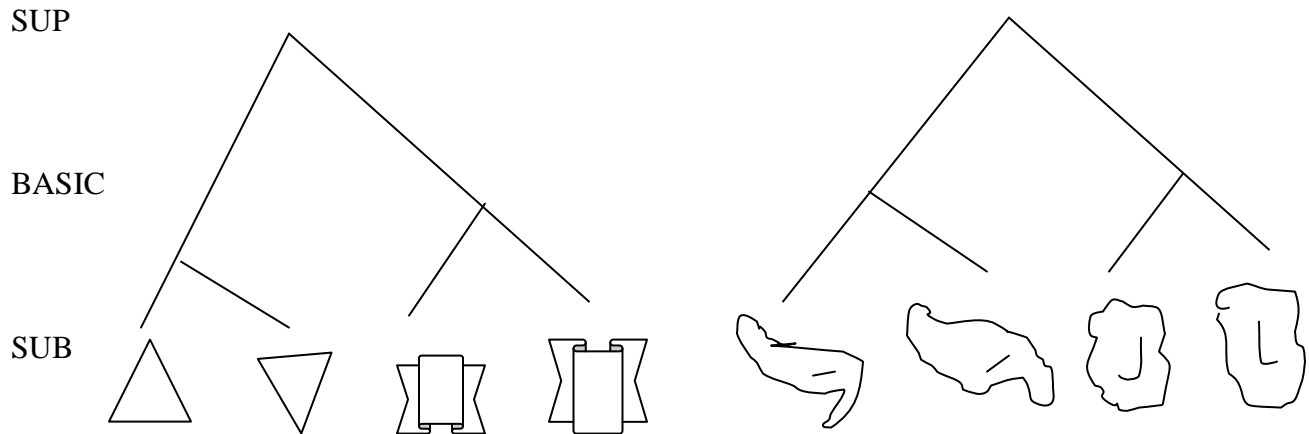
### **1.4 Research Method**

This study will make use of the descriptive and analytic method of research as it is aimed in the evaluation of pre-school children story books in application of noun categorization. So according to structuralism and based on linguistic stylistics intended to demonstrate the frequency of nouns in tables and graphs.

The method of this study is based on library study. The books have been selected by random sampling from eight different decades in Persian children literature starting from 1920s when the first children's books have been published. Fifty-one pre-school children's story books in Farsi have been selected and four to seven pages of each book have been analyzed accordingly.

Children storybooks which are written by the best and most famous writers for ages between four to seven years old are selected randomly. Then a noun framework list is established for different levels of noun categorization, by preparing noun lists according to superordinate, basic and subordinate level. There are separate columns for concrete and abstract noun in order to distinguish the related ratio between concrete nouns and nouns on the basic level

categorization in children story books. Then the overall frequency of used nouns in different level of categorizations will be determined. The representative stimuli used in this study is as following figure :



The list of categories which were found in the story books which are studied are as follow:

Superordinate	Basic level	Subordinate
animal	cat	persian cat
beverage	tea	African tee
bird	eagle	golden eagle
body	hand	mother's hand
building	house/tower	Eifel Tower
clothes	trousers	jeans trousers
fabric	wool	ship wool
fish	salmon	blueback Salmon
food	cheese	Capak cheese
fruit	apple	red apple
furniture	table	dinning table
footwear	shoes	running shoes
instrument	piano	acoustic Piano
insect	water fly	pink water fly
locality	city	Norway
people	mother	Ali's mother
plant	tree	River birch
season	spring	spring 1999
tool	hammer	ball-peen Hammer
time	year	1996
vehicle	car	sport car

Table 1 . List of categories

Finally appropriate tables, charts and figures along with the conclusion chapter are included in the final report to show the mean frequency of category levels and also to present Framework for the Application of Nouns (FAN) in writing of children's books.

## **1.5 Outline**

This thesis is organized as follows . In chapter 2, "Review of Related Literature " , focusing on works that concern noun categorization in children's literature and giving an overview of previous research in this field. I start off with a presentation of the traditional view in noun categorization. I then describe the theoretical framework adopted in the thesis ( Eleanor Rosch noun categorization ) and different aspects of the basic-level categorization. Finally a theoretical account of cultural influences on categorization is given .

In Chapter 3 , "Data Analysis " , I present the different types of data in noun categorization that make up the empirical basis of the subsequent chapters, and the various methods used to collect them . In order to select the story books , I use of children library searches, web searches, and acceptability judgments in addition to introspection , and underscore the importance of converging evidence from different data sources . I further draw out and analyse all the nouns from the selected story books and put them in an organized chart. Finally, I introduce and analyse all the data in columns and pie-charts.

Chapter 4 , "Conclusion", is concerned with the interpretation of all results and sums up the thesis.

## **Chapter 2**

### **Review of related literature**

#### **2.1 Theoretical framework**

The theoretical framework adopted in this thesis is that of prominence of basic level categorization in children, as first presented in Eleanor Rosch's research (1975). Its framework is based on Ellen Markman (1989) and numerous works by many researchers including Lakoff (1987), Taylor (1989) and Brown (1957).

#### **2.2 Traditional view**

The argument in classical theories is that children of a very young age lack the essential cognitive abilities to acquire categories. Piaget (1968) believes that concrete operations needed in order to coordinate the extension and intension of categories is not present within children. This differs from the views of Bruner, Olver, Greenfield et al. (1966). They have the view that young children do not have the necessary symbolic abilities. To determine which abilities children lack and what the developmental course of classification is like, extensive research has been carried out. However, even the average three year old has thoroughly classified their surroundings, despite being years away from logical and symbolic operations that Piaget and Bruner propose. Hundreds of categories of objects have been formed, objects are recognisable and the action needed to carry out its purpose is known, regardless of whether they know the term for that object. For example recognising a novel tricycle as a tricycle or some kind of vehicle and attempting to ride it. Even if objects are the same shape or colour, these would not be

confused with one another. There would be no mistaking a tricycle for a tomato because both were red or a book and a slice of bread because both were the same shape.

In traditional theories, the child, inventing ways to classify, is viewed as their assumption that categories are essentially arbitrary. This is because the amount of ways to form object categories is indefinite and each of these possibilities of forming categories all have the same validity (Markman 1989). Bruner, Goodnow and Austin (1956) pose and answer the question “do such categories as apples, cats, atoms and animal exist? Insofar as they have been invented and found applicable to instances of nature, they do. They exist as inventions, not as discoveries.” From this, it can be concluded that categorisation reflects the order that humans impose upon the world and not the structure of the external, physical world.

### **2.3 Noun Categorization: Basic-level, Superordinate and Subordinate level**

However, Rosch’s view (1973) contradicts these previous theories and argues that the combination of arbitrary features should not be the reason for defining them into the allotted categories. She is influenced by the Gibsonian view (Gibson 1979) of categories and argues that humans perceive and use a structure of correlation in order to construct category systems. Vehicle categories are not invented by starting with a list of features such as “has motor, has wheels, has pedal” and then deciding from this how these features should be combined. A category would not be defined as “vehicle with motor and pedal”, despite this being a plausible possibility resulting from combining these features. Instead she suggests that the world provides us with vehicle that has motor, wheels, steer, and can move. We, as individuals and through our culture, discover these correlations and form categories on that basis. Thus there is a non-arbitrary quality to many of our categories which should aid children in discovering them.



Descriptions of the principles determining the most useful level of categorization have been furthered by Rosch and her colleagues (Rosch et al. 1976). They have distinguished the levels of categorizations as the basic, superordinate, and subordinate levels:

- Basic level: The basic level category consists of objects such as a cat. According to Rosch (1976) there is a similarity between all different types of cats but they are significantly different from other kinds of animal such as dogs, lions and bears.
- Superordinate level: The superordinate level category consists of names that are more general than in the basic level category. At this level it is more difficult to get the similarities between objects in the same category. For example, Animal includes objects as diverse as cats, dogs, lions, and bears.
- Subordinate: The subordinate level category consists of objects that are more specific than in the basic level category, and includes objects of a similar form. The term “dining table” is considered within this category as they are more similar to one another than tables are in general. This gain in similarity however, means that the subordinate categories are easily confused with each other due to a lack of contrast. Thus, although dining tables are similar to each other, they can also be confused with kitchen tables, and so on.

It can be concluded that basic level categories provide a clear understanding between two different goals of categorization: maximizing the similarity between category members and minimizing similarity with members of other categories (Rosch 1976).

## 2.4 Preference for Basic level categorization in children learning

Increasing evidence indicates the special status of basic level categories as follows (Maris and Rosch 1981):

- Natural level: the basic level seems the most natural level at which to label objects as there is a willing to label an object “table” instead of using the subordinate term “kitchen table” or the superordinate term “furniture”.
- High ratio between concrete objects and objects on the basic level categorization: it means, it is also the highest level that experimental subjects have formed concrete images of objects.
- Distinguish faster: identification that a picture belongs to the basic level category happens faster than assigning the picture to other levels. The subject is faster at saying that a “kitchen table” is a “table” than saying that it is furniture (Rosch et al. 1976).

### 2.4.1 Sharing many features

#### 2.4.1.1 Tversky and Hamenway discussion

Tversky and Hemenway (1984) have a different opinion and contend that what separates the basic level from the other two levels is that instead of sharing features with one another; they have multiple parts in common, meaning that the basic level is the most general level where objects have parts in common with one another. This can be explained through taking the categories “clothing”, “trousers” and “levies”. Clothing, which is the superordinate level contains items such as shirts, trousers and socks. All of which do not have many parts in common. However at the basic level, “trousers” contains a variety of different definitions including levies, dress trousers and double night trousers all of which possess a waist and two legs with many

features similar such as bottoms, clasps and pockets. At the superordinate level, sharing parts in common does not gain anything but rather acts as adjustments of these parts such as straight-legged trousers in comparison to bell-bottom trousers.

The citations of numerous related sources carry Tversky and Hemenway's research (1984), and as predicted, experimentation subjects have a tendency to list parts at the basic level rather than at the superordinate level. This is also true for the subordinate level and instead features that are not included within the groupings have a tendency to distinguishing subordinate categories from one another.

It is known that children tend to identify towards attaining basic level categories prior to the identification of superordinate and subordinate level categories. Considering this knowledge, the previous analysis raises a developing question that is worthy of noting: is the rapid identification of objects at this level due to the fact that components have shared properties? This question was investigated by Tversky's classification study (1983). Within this study, fifteen objects were revealed to four and five year olds. These objects could be divided in to five categories: animals, clothes, furniture, tools and vehicles. This study contained two circumstances; the first was that the objects presented did not share many elements with one another but were considered to be a good representative of the members of that category. The second circumstance was that the objects presented shared many elements with one another but were not considered to be a good representative of the members of that category. This can be explained using the category "animals"; one group of children were presented with a cat, fish and snake; animals that do not have many components in common. Whereas another group of children were presented with a bear, cow and deer; animals that do have many components in common. The children were shown the objects from both circumstances one after the other.

Children were found to be able to group together objects better when they shared elements with the other objects within that category.

Therefore, these data suggests that the parts of each object included within the category play a significant role when children are evaluating these objects; they also suggest that having these parts in common is related to a number of other characteristics. This can be furthered when considering that if a selection of objects have numerous elements in common, then the overall composition of the object will be similar to each other, a factor that Tversky and Hemenway (1984) have regarded. Thus, this could lead to the opinion that the overall composition as whole is what governs the children's decision in classifying that object and is what is focused on the most rather than focusing on each part within this object. This also means that if there are parts in common from object to object, the probable usage of each object is likely to be the same. However, basic level categories have a tendency of being too resolute which is illustrated in the issue above. Thus, a conclusion could be drawn that the level is defined as basic due to significant criteria joining here, rather than because any one of these is a fundamental criteria.

These findings are following Rosch et al. idea's (1976) that what separates the basic level from the superordinate and subordinate levels of categorization is that the objects classed in the basic level share multiple features with each other whilst sharing few features with the other contrasting categories.

#### **2.4.2 Having highest Cue Validity**

The above conclusion is strengthened through further attempts to differentiate the basic level from other levels within the hierarchy. This is done by Rosch et al.'s (1976) argument, which

asserts that two criteria that are balancing to one another ascertain the level of use that category will be:

- The basis of categorisation should be unproblematic to identify, one should promptly be able to distinguish the connections between objects that are classified under the same category.
- It should also be unproblematic when identifying a member of a category and not mistaking it within other categories, categories should be clearly distinguishable from one another.

From this, it can be deduced that the basic level categories are significantly valuable as they encompass cooperation between the two criteria outlined above. Although in Medin's (1983) view, this study does not have a definite suggestion in how it is achieved but Rosch et al (1976) and Rosch and Mervis (1975) are opposed to this view and contend that the basic level category should make best use of the cue validity of the category. The definition of cue validity in this case is the probability of which an object will be classified within that category over other categories, as long as an object possesses a particular trait. For example the feature "flying" leads to the conclusion that it is more likely for this entity to be classed as a bird rather than animals that do not fall under this class. The likelihood of this object that possesses the feature of flying being a bird, is high, but at the very least it is likely to be an animal. This point is contested by Murphy and Medin (1985) who argue that this evaluation is flawed as it assign the optimum cue validity scored to the most general categories. Murphy and Medin (1985) consider the previous point as he notes that although cue validity is important in categorization, it cannot be the singular basis for defining a component's utility.

### **2.4.3 Similarity in the categories and contrast between categories**

Within Rosch et al.'s (1976), the study with the similarity between objects of the same category and the study with the differences between objects of different categories are not attained with cue validity. Tversky (1977) states that it is not possible to expand the two areas concurrently, but to expand a certain function within these two descriptions. Medin (1985) illustrates that there are two types of issues with this criterion through assessing the attempts made to achieve this :

- Firstly, selections of the logical sequences are counterintuitive when attempting to expand similarities within each category and minimize similarities between categories.
- Secondly, these representations make large conjectures about the combination of information, how the component features are autonomous and additive. Smith and Medin (1981) consider that there are grounds in which to question these conjectures.

The fact that these categories are not defined by a subjective combination of attributes, but alternatively reveal a formation of correlation within characteristics that exist in the world, was highlighted by Rosch and Mervis (1975). For example, animals that possess feathers will also have beaks and claws instead of having mouths and paws; on the other hand, the possibility of animals with fur possessing beaks, claws or wings is negligible.

Rosch and Mervis (1975) asserted that objects within the basic level expose the structure of correlation of the surroundings and are the most inclusive categories to expose this. Evidence proves that categories that occur naturally have a tendency to contain traits that are simultaneous with one another; and subjects of experiments in learning artificial categories have been discovered to rely on these associated traits when forming categories (Murphy and Medin 1985). However, Murphy and Medin (1985) contend that people do not rely on this associated

information, but that this association provides a foundation for primitive theories, making some categories more logical than others.

## **2.5 More Debates**

Rosch et al. (1976) theorize that the first category terms that children attain should be the basic level terms when basing this on their investigation of hierarchical levels. This prediction is considered crucial by Markman (1989) and alternative theories that predict other conclusions are also due consideration. If one makes the assumption that the more similar the objects are to one another in each category, the easier the category would be to learn, thus predicting that the easiest category to learn would be the subordinate category. Following this theory, a child would find the subordinate category “Volkswagen” easier to learn than the basic level term “car” as a Volkswagen is more similar to each other than cars are. The “Semantic features hypothesis” by Clark (1973), is an additional premise of how children acquire terms. This hypothesis states that the fewer features that the child needs to notice, the easier the expression will be to learn. Superordinate terms contain fewer defining characteristics as they refer to categories that are more general, when considering this hypothesis, the category “vehicle” would be required before “car” as the superordinate term vehicle has fewer characteristics in common than the basic term car. However, Rosch (1976) contradicts this hypothesis, calculating that basic level terms should be attained first by children. Of course not dismissing the fact that superordinate terms are bound to be learnt as well as basic level terms, the expectation however, would be that basic level terms would be the main category in which a child would learn words. Additionally, at least some of these would be acquired before subordinate and superordinate terms are learnt for that specific hierarchy.

## **2.6 Children's Vocabulary Acquisition**

### **2.6.1 Rosch Study**

Some evidence of the developmental progress that has been discussed above has stemmed from the studies of vocabulary within young children. A child that participated in Roger Brown's extensive longitudinal study of acquisition was then examined by Rosch et al. (1976) in regards to their vocabulary, to see what the affect of this participation would be. The findings demonstrated that the majority of words that were first attained were basic level terms. Clark's review (1973) of the studies of vocabulary development supports these findings as he suggests within the first fifty words that children learn the majority are basic level terms. Furthermore, Rosch et al. (1976) carry out an experiment asking three year old children to name the objects when presented pictures of them, and when presented with them, they used basic level labels almost solely. Evidence from studies of categorization also support these hypotheses, children were exposed to objects and were asked to place together the objects that were similar to one another. Generally these studies require children to place together all objects that fall under the categories of furniture, clothing, animals and so on which is sorting at the superordinate level; however this level proves difficult for children of five or younger to sort.

A comparison between three and four years old's abilities to classify objects at the superordinate levels against the basic levels using an oddity procedure was carried out by Rosch et al. (1976). Three objects were revealed to the children, two objects from the same category and one anomaly. Objects from the same category when considering the basic level were two dogs or two cars. Objects from the same category when considering the superordinate level were animals, a dog and a worm, and both vehicles, a car and a plane. Three and four year olds were



nearly always able to choose the two category members at the basic level of categorization having the percentage of 99% and 100%. However, at the superordinate level the three year olds did noticeably worse as were only able to choose the two category members 55% of the time whereas four year olds were able to correctly choose the two category members 96% of the time. Rosch et al. (1976) carry out a further study that requires a more complex sorting procedure. From the categories, four exemplars were mixed and children were requested to sort the related objects into groups with one another. Both five and six year olds sorted the objects nearly perfectly when at the basic level, whereas both found it complex when sorting objects at the superordinate level. There must be further evidence in order to consider that the basic level categories are dominant over subordinate or superordinate categories after researching vocabulary growth and early categorisation. Clark (1973) highlights that an error within the vocabulary statistics is that children may oversimplify the definition of certain terms and therefore may use a basic level category term “dog” when referring to “four-legged mammals”, a more common term. This amount of overgeneralization could be used as evidence for what might perhaps be the most likely level of categorization when there is no chance of overlapping with the “basic level” as Rosch et al. (1976) term it.

These interpretations of overgeneralisations would need to be tackled, as many problems are likely to arise (Huttenlocher 1974). Supposing that these problems were tackled, consider that instead of forming a high or low-level category, children rather have the capacity to form a category including porcupines and hedgehogs. This then should be over generalized so that the category “porcupine” includes the animal hedgehog. However, there may not always be a single basic level to encompass all of the intended conditions and Rosch et al. (1976) have necessitated a tracheotomy on what is most probable in being a convoluted hierarchy of categories.

### **2.6.2 Anglin Study**

A further problem that occurs when inferring the vocabulary acquisition information is that when speaking to children, adults incline towards the use of basic level terms (Anglin 1977). Even when parents began teaching their children superordinate category terms, Callanan found that parents labelled objects using the basic level instead of just the superordinate level. When the term “machine” was being taught to children, parents would label the objects with the categories such as “blender” or “sewing machine” instead of “machine” and this occurred when basic level categories were unknown to children. It materialized that parents were aware that basic level categories have the potential of being easier for children to gain an understanding of. In contrast, children might attain basic level terms first not because they are easier to attain but because this is what adults teach them first. Therefore a control of what children are taught is needed in order to ascertain if basic level categories are easier for children or not. The deconstruction of the frequency of exposure through experimental studies to form a category term can evade this problem due to its simplification.

### **2.6.3 Horton and Markman study**

Evidence from concept information studies by Bourne, Ekstrans and Dominowski (1971) is summarized by Horton and Markman (1980). These studies impose on the difficulty of superordinate categories in contrast to basic level categories. Within superordinate categories, all members of the category share few similar features to one another, so in this respect superordinate categories are comparable to disjunctive categories. The usual requirement of the experimentally created disjunctive concept is that only one feature in common with another member of the category is necessary in order to become a member.

There is a larger pool of feature to select from within the family resemblance structure of natural superordinate categories in comparison to the sample disjunctive categories, and an object must possess a number of them in order to be eligible for a place as a member of that category. Regardless of this, superordinate categories should be more difficult to learn than basic level categories when considering the similarity between disjunctive and superordinate concepts. Consequently some of the qualities that characterize superordinate categories cause these concepts to be more complicated to learn, which can be seen through the indirect proof of these studies of concept learning.

## **2.7 Learning of other Categorization by children**

### **2.7.1 Mervis and Crisafi's view in level of categorization:**

Mervis and Crisafi (1982) have carried out experiments to give further evidence for relevant explicitly of basic level terms for children; within this study the children were taught artificial categories that were designed to be at different hierarchical levels. Again, children were more able to learn the basic level category instead of the superordinate or subordinate category. But this was not the main intention of this study however, it was to compare the relative difficulty between learning superordinate and subordinate categories. The prediction was that superordinate level terms should be attained last, so the order in which they range from the simplest to most complex is basic level, superordinate level followed by subordinate level.

The scale of differentiation of the categories from one another should predict the order in which they are attained. Differentiation in this case, is a measure that is established from the relationship of similarities that are within categories and of similarities that are between categories. Measuring the scale of differentiation is done by averaging adult's ratings of object

similarity, this being subject to criticism by Murphy and Medin (1983) as previously discussed. Describing the category as highly differentiated would mean that members within that category are akin to one another but not alike to members of other categories at the same level.

Mervis and Crisafi (1982) consider the superordinate category to be differentiated to a higher degree than the subordinate level categories. At the subordinate level, the increase in similarity of the members that are within the category, seemingly cannot compensate for the large similarity at the basic level when considering the similarity between category members. Considering this, if the similarity within the category at the superordinate level decreased, this would be compensated for by the small amount of similarities between categories within the different superordinate level categories. However, in contrast to this, there could perhaps be the expectation that the differentiation of the subordinate and superordinate categories would differ for each specific category and may also be circumstantial to how many levels of hierarchy there are.

Mervis and Crisafi's investigation is relevant when considering certain categories. There is a very slight difference between a kitchen table and a dining room table, so one would expect these categories to possess a low differentiation possibility; also the distinction between Levi's and double knit trousers seems minimal and therefore more complex for children to identify. Their investigation also presents the fact that such subordinate categories' differentiation score is lower than the superordinate categories of furniture and clothing within adult ratings. However there are some distinct differences in characteristics in some subordinate categories. For example, a daschund and a sheep dog are vastly different from one another, so these categories would therefore have a high differentiation; this is also true with subordinate categories such as a robin and a flamingo, and a Volkswagen and a Sedan. Consequently, although the level of

differentiation may predict the order of attaining these categories, it is not apparent that subordinate categories will necessarily be more distinguishable than superordinate categories. Mervis and Crisafi (1982) taught two, four and five year old children categories of abstract figures that were defined by their shape as a whole. Within the basic level categories, the overall shape was incredibly similar to each other. The subordinate level categories were similar to the basic level categories with the exception of differing from a minor detail. A basic level category contained two triangular objects, all possessing three extra small points and one dark bar jutting out from each of them. This consisted of two subordinate categories where the difference was the arrangement of one of the points and the bar. The superordinate level categories' definition was angular in comparison to curved figures. The construction of these categories meant that the subordinate category was less differentiated than the superordinate category, which was verified by adult subject's ratings. As predicted, the subordinate category was significantly more complex than the superordinate category for children to learn.

### **2.7.2 Horton and Marksman's view in level of categorization**

A training study by Horton and Markman (1980) provides further verification for the superiority of basic level objects. Their argument follows the opinion that as the exemplars that a person views will be perceptually familiar, they should therefore find it simple to learn basic level categories just through viewing some of these exemplars. However this differs to the approach needed towards the superordinate level, as the similarity between members of these categories diminishes; therefore the ability to perceive the similarities would mean that a child might not be able to infer the aspects needed when classifying a member of this category. Considering this, additional means of classifying the necessary criteria must be required in order to attain the relevant concepts. This can be done through the use of language when drawing attention to that

object. For example, one could help a child understand the term marsupials; as koalas, possums and kangaroos all have a pouch in which they carry their young.

In order to acquire categories, if the linguistic specification of the criteria is an important aspect within this, then this suggests another reason why the accumulation of superordinate categories occurs after those of basic level terms. Meaning that younger children may not be able to exercise linguistic description as well as older children in regards to classification of objects. In order to use this to correctly classify exemplars, the child must maintain the descriptions and methodically evaluate each object with the set of aspects that have been presented. However, in alternate contexts Anglin (1977) has found that these comparisons have proved complicated for children to grasp. Efficient processing abilities must be possessed by the child, and if not then there is a possibility that they will mainly rely on the similarities that they are able to detect just through analysing exemplar-based information.

In summary by Horton and Markman (1980) of the aforementioned predictions, just through the presentation of example of categories, children should have the ability to learn basic level categories that are new to them. When the commonalities are more complex to detect, describing the features should enable children to learn new superordinate categories. Lastly, despite its value when learning superordinate categories, the use of linguistic information is not as accessible to younger children as it is to older children.

In a study that Markman (1989) represented, children were taught categories of artificial animals, two at the superordinate level and two at the basic level of categorisation. These categories were formed from natural biological categories, such as ungulate as a category at the superordinate level and salamander as a basic level. The overall shape of the body from the

natural animal was retained with the addition of novel features such as; in the ungulate category the “horse” possessed horns, a feathered tail, and a specific type of feet. Despite this, the artificial animal was still identifiable as a horse due to the overall shape of the body and head being retained. There was a variation in size, body position and markings between each member of the basic level category to maintain individuality.

There were two ways that the children were taught these categories, the linguistic training condition and the exemplar training condition. When taught within the linguistic training condition, verbal descriptions were used that referred to the characteristics of the criterion. For example, the description to the child was “here is a danker with horns on the top of its head and a tail made of feathers”. When taught within the exemplar training condition, children were instructed to concentrate closely on the exemplars but were not told which specific characteristics to look for. Children from preschool, nursery and first year were informed that they would be shown animals from another planet. They were then introduced to a doll that was designed to look like a zookeeper and told that by learning about these animals, this would help him find the ones that were supposed to live in the zoo. As predicted, the results indicated that basic level categories were easier to learn for young children. When just learning the superordinate categories, telling the children what characteristics defined the categories was helpful. This was not helpful for either of the basic level categories. The children from preschool did not benefit from having linguistic descriptions and, even when told what characteristics were relevant only the children from nursery and first year were more capable of learning the superordinate categories.

One reason that accounts for young children’s trouble when learning categories at the superordinate level, is their failure to benefit from the use of linguistic information about criteria

features, as this is one effective way in which to learn superordinate categories. There are of course alternate ways that the superordinate categories can be learnt. Non-linguistic ways is a method where the criteria can be drawn to their attention such as “function” objects being viewed whilst in use. It is perhaps not necessary to extract out relevant features, having lists of exemplars is a method that is effective for superordinate categories in particular. For example, similar to the exemplar-based model proposed by Brooks (1978) and Kossan (1981), one may learn that chairs, tables, lamps and so on, are all types of furniture and not need to extract the characteristics that define it as a piece of furniture. This process of learning would account for the acquisition figures and would have a prediction that as superordinate concepts are defined by the terms of basic level concepts, it would be necessary to primarily attain basic level concepts. Rather than on their possession of defining characteristics, the admittance of new exemplars could be on the consideration of their similarity to one or more of the basic level categories considered under the superordinate category.

Despite this research only comparing basic and superordinate level categories, as Markman (1989) added, the research could also apply when attaining subordinate categories. Information about the defining characteristics might be helpful at the superordinate level as the contrast between categories is more complicated to distinguish. These defining characteristics are often included within the category labels, outlining the relevant criterion such as armchair or rocking chair; meaning that there would be an expectation of children to benefit from specific information about relevant contrast when discussing the superordinate level.



## **2.8 Superordinate categories are difficult for learning by children**

### **2.8.1 Ad hoc and goal-derived categories**

Within the research of Barsalou, he has investigated two types of categories that relate to each other, terming them “ad hoc” (Barsalou 1983) and “goal-derived” (Barsalou 1985). These could aid in explaining why children have difficulties when analysing superordinate categories. Categories that are goal-derived have their function when people are attempting to achieve goals. “Things to take on holiday”, for example include the exemplars a suitcase, novel, suntan lotion and a plane ticket; these are grouped together due to them achieving a goal or function and not because they are similar to one another. Categories that are ad-hoc have functions of achieving an unfamiliar goal that is created at that specific moment in time. Both of these categories, ad-hoc and goal-derived, include objects within their category that would originally be considered within different categories.

Ad hoc categories are similar to common categories in that they reveal the same kind of characteristics within their internal structure. Subjects were asked by Barsalou (1983) to rate exemplars of ad hoc and common categories according to their archetype. In this case, ad hoc categories were discovered to be similar to common categories as both included typically gradient and unclear cases. This same range of values was used when rating exemplars of ad hoc and common categories to establish the integrity of both categories. Furthermore, subject’s judgements had an equally integral consistency when considering to what extent that exemplar was representative of a category and whether it was an example from an ad hoc or common category.

There are imperative differences between how ad hoc and common categories are represented despite both possessing a similar internal structure; these differences may lead to the paralleling of the developmental contrasts in the representation of categories. The contrasts that are most significant are in how explicitly each category is embodied. Common superordinate categories are most likely to be represented explicitly or through association with their exemplars, whereas ad hoc categories are more likely to be implicitly represented. Common categories, at least for adults, are quite easy to categorise as one promptly thinks of a chair as a type of furniture. This is a direct contrast when given an object than can be cross-classified in to an indeterminate selection of alternate categories. As described by Barsalou, a “table” can be cross-classified to be included within ad hoc categories such as “things to hold a door open with” and “things that can be sold”. The likelihood that this indeterminate selection of classifications is explicitly embodied in memory is negligible; instead Barsalou (1983) contends that the majority of ad hoc categories are most likely to be implicitly embodied. The information about the exemplars of objects deduces the associations or categories that they will be related to. When considering that ad hoc categories are only implicitly represented, this leads to the hypothesis that they should be less accessible within memory in comparison to common categories.

Barsalou (1983) predicted from this analysis that, ad hoc categories would not be as effective as common categories in mnemonic devices. In order to test this hypothesis, subjects were asked to learn a list of words. In one group, the subjects learnt a list that was organised so that each word belonging to the same common superordinate category was in a section with others that were alike. In the second group, the subjects learnt a list that was organised so that each section was illustrative of words belonging to the same ad hoc categories. In the third group, subjects learnt a list of words that were unrelated to each other. Subject from each group

were then asked to recall all the words that they had learnt and remembered. This revealed that subjects who had words ordered in to common categories, recalled more categories than those that had words ordered in to ad hoc categories. Common category subjects also recalled more exemplars per category in comparison to subjects of the ad hoc categories. Subjects who had learnt the list of words ordered in to ad hoc categories did not seem to benefit in any way from this organisation of categories; in fact they recalled no more than the subjects who had learnt unrelated words, the control subjects. This finding was then researched by Horton (1982) who noted that this was reminiscent of a common development contrast in how effective common categories are when considered as mnemonic devices. Older children have more possibility of benefiting from this category structure than younger children do.

Furthering this, Barsalou (1983) argues that ad hoc categories are not well established in memory, therefore they may only surface when prompted by a context that is relevant. One may think of a chair as something to stand on to reach the ceiling only when you are trying to change a light bulb that is initially out of reach. To test this hypothesis, a group of subjects were given lists of items belonging to ad hoc or common categories and were requested to label each item with a category that they thought was appropriate. A brief history was described to half of the subjects that primed the appropriate category and half of the subjects were left to consider the categories with hearing no background. Predictably, the adults who were primed had no difficulties when coming up with labels for the common categories and did not require a context in order for the relevant category to be prompted, and furthermore, agreeing on the assigned labels. In contrast, it proved difficult to find labels for subjects within the ad hoc categories when they did not have a context to base anything on and subjects who were given a relevant context promptly determined the categories and agreed on which categories these were. Finally, subjects

who were required to categorise without hearing the context, found it taxing to think of a category that included all of the diverse items that were presented to them and also disagreed on the labels that they did manage to produce.

Markman (1989) considers that this finding has an analogue within developmental literature. There are similarities between the classification task and this labelling task described above which are that subjects have to make the decision of what connects various objects. Young children have difficulties in the categorisation of objects at the superordinate level and organise them in an idiosyncratic way, whereas older children have the ability to organise objects with a respectable agreement when considering the foundation of the customary taxonomic agreement. From this, one of the reasons that young children find the superordinate level of categorisation complex may be that these categories function for them as ad hoc categories. Superordinate categories are exposed to older children and adults to the extent that they become explicitly represented; however for young children the categories remain implicit and therefore be inferred by the child when it is necessary, this is a hypothesis that is tested by Horton (1982).

For example, a young child could possibly be familiar with the category “kitchen utensils”, however they might not know each object that is classed under this category individually and not be able to recognise an eggbeater, spatula, knife and so on. These objects would be found to be difficult to group together by the child, as there is likely to be trouble in identifying the similarities between them; despite this, the child would agree when asked, that each object is used in the kitchen. Horton (1982) argues that a significant reason why children are unable to complete tests of their knowledge of superordinate categories is that generally this knowledge is only implicit. Inevitably, we should not conclude that from children’s failure to store tasks, their ability to learn and represent categories is different qualitatively from the ability

of adults; any more that we should not come to the same conclusion from adults' inability involving ad hoc categories. As we know that adults have the capability to represent and utilize superordinate categories, conceivably the same may be true for children.

The prediction of this argument is that a child should have the ability of displaying two alternate ways of dealing with superordinate categories, which is dependant for the child on whether the categories are explicitly represented. Subsequently, the prediction of Barsalou is furthered that due to the contextual priming of the implicit categories, children should have an enhanced ability to solve categorisation tests just as the adults managed with the ad hoc categories.

These predictions were tested by Horton (1982) with two alternate scenarios of children's awareness of categories. Tasks were chosen so that they represented the either end of a continuum, ranging from tasks requiring explicit knowledge of categories, systematic and deliberate strategies in order to find the solution; to tasks perhaps requiring only implicit knowledge of categories, that were automatic and non-strategic. The object classification procedure was the first task, something that is comparatively complex for children; and the measure of release from proactive inhibition is the second task; something that will be described further on.

Although the importance of the categories to be unfamiliar to the children was necessary, the individual examples of the categories ought to be familiar. In this study, in order for a category to be used, the examples were required to be familiar even to young children and that when asked, there had to be an agreement on the classification of the superordinate levels. For instance, if the category "food" was to be used, children had to have a knowledge of each

individual object within this category, such as “apple”, and had to agree with one another that it was something that people eat. Before allowing children to participate within the classification study, the determination of which categories were viewed as implicit and which were explicit for each child had to be carried out by Horton. Children ranging from three to seven years old were pretested on their knowledge of the categories before they could participate in the study. If the child could explicitly supply the relevant defining criterion or give an accurate label for that category, only then would this category be considered as explicitly represented for that child. If the child showed little explicit knowledge about that category and they cannot explain how the objects were alike, then this category would be considered as an implicitly represented category for that child.

In the final experiment, children were presented with four objects that came from each of the three or four categories and requested to put the objects together that were similar to one another. There were two types of storage that occurred for children, categories that were explicit for them and categories that were hypothesised to be implicit for them. There were two instructional conditions that could be compared. Within the nonprime condition, children were only given the basic instruction to place objects together that were similar to one another. Within the primed condition, children were told that they would hear a secret that would aid them and were given a label and description of each category, such as “some of these things are food – things that people eat”. In summary, there were two main predictions, that children should be able to classify categories that have been explicitly represented better than those categories that are only implicitly represented; and that if children are primed, this should help in classifying the implicit but not the explicit categories.

The first prediction was supported to a high extent; at both ages children were able to sort categories better that were explicitly represented rather than those that were implicitly represented. Therefore, it can be deduced that even three and four year olds have some amount of capacity in representing categories that belong to the superordinate level of categorisation. The second prediction's results were more complex. The finding supported the prediction for older children, who organised explicit categories efficiently regardless of whether they were primed or not. However, when they were given a description of an implicit category, they were more able to use the category as a basis of classification. Younger children did not demonstrate this pattern; priming helped them organise the explicit categories but not the implicit ones and in fact, their ability to organise implicit categories was impaired by telling them what the categories were. The two findings that demonstrate the younger children's approach must be accounted for.

Horton (1982) proposes that the cause of this pattern may be from an inadequacy of processing ability in young children. As can be construed from the pre-test statistics, even three and four year old children understand the categories descriptions provided they were presented one at a time for each object. However, it may be the case that children were unable to first remember the descriptions of the four unfamiliar categories and then apply these systematically to the objects presented to them. Horton also mentions that this evidence is consistent when regarding several alternate types of studies, these being studies of concept acquisition (Horton and Markman 1980), classification (Anglin 1977), referential communication (Asher 1978) and discrimination learning (Gholson, Levine, and Phillips 1972). Young children have difficulties in using linguistic information for tasks that entail a systematic evaluation of information against a particular series of objects. Thus, this additional information disrupted their performance due to having to maintain another piece of information rather than aiding them in the discovery of the

implicit categories. Horton's theory may also help to explain the benefit of priming when organising explicit categories for younger children. The children may have found the organising task confusing to some extent despite the categories being explicitly represented as they were given a range of twelve or sixteen objects all from different categories that needed to be sorted systematically. Priming the children could not only have helped the access of relevant information but also helped the process of deciding the most efficient strategy in order to solve the classification task. This task was selected as it was considered necessary to require knowledge of the categories in order to solve it. The second task was a memory procedure that involved measuring the build-up and release of proactive inhibition, as it involves no conscious strategies, therefore providing a sufficient contrast to the requirements of the classification procedure.

Subjects are given a short list of words in order to study the build-up and release of proactive inhibition, that have to be remembered and recalled over a series of examinations. When words from the same category are recalled trial after trial, the subjects start to recall fewer words, which demonstrates the build up of proactive inhibition. Through recalling words from the same category, if on a following trial the category is changed, then the assumption is that there would be a release from this constraint of proactive inhibition, which would increase the amount of words that are recalled. Within using this procedure to demonstrate the measure of category knowledge, it can be shown that the build up and release of proactive inhibition relies on recognition of the categories to a certain extent.

A similar study was carried out by Horton (1982), in which four year old children were requested to remember lists of words over a time period of several alternate experiments. Words from explicit categories were learnt by one half of the children participating and words from



implicit categories were learnt by the other. Similar to the first study, children were pretested to determine which categories were explicitly known and which were implicitly known for each individual child. For both cases, half of the children participated in a control group and the other half participated within the experimental group. Words were learnt from the same category spanning over several trials and in certain trials the category was switched within the experimental group. Words were learnt from different categories on every trial within the control group.

As predicted, the results for the explicit categories demonstrated that children illustrated a clear build up of inhibition of trials and a release from these trials when the category was changed. Due to the children's sensitivity towards explicit categories, this had the expected affect on their memory and ability to recall. However, the results regarding the implicit categories were considerably more ambiguous. Despite the pattern of recall looking as though there may have been a slight build up of proactive inhibition and then a slight release from it, the results of this were not significant. The pattern only significantly differed between the experimental and control groups when considering the explicit categories.

The synopsis for this is that Horton (1982) found a similar pattern of results, using two very different tasks, one with the requirement of deliberate strategies in order to find the solution and one where the effects are automatic and nonstrategic. It is possible to find superordinate categories that have been explicitly represented even by three and four year old children with their performance resembling those of older children and adults. However, when considering categories that they have only managed to implicitly represent, their performance is more emblematic of the finding of young children. Horton's (1982) results suggest that, in correlation with Barsalou's findings of adults dealing with ad hoc categories, children's failure on tests of

classification at the superordinate level is not only due to structural variations between superordinate and basic level terms, but also due to the finding that they are generally forced to deal with categories that, specifically for them, are only implicitly represented.

### **2.8.2 Superordinate as collections**

Murphy and Wisniewski (1985) have the opinion that superordinate terms differ in a further way by the possibility of containing relational information. The interpretation of superordinate category terms can be confused and thought of as collections instead of their role as classes by children. Collections such as “pile”, “family” and “forest” refer to objects that are related to one another by some aspect, for example, by spatial proximity. Callanan and Markman (1982) found that when a child interprets the superordinate category term “toy” as a collection rather than a class, they would agree that a group of toys that includes a doll are called “toys” but when the doll is on its own will not refer to it as a “toy”. Therefore, rather than relating to a single object that fits the criteria in order to be a category member, the category term refers to the group of associated objects. As Murphy and Wisniewski (1985) suggest, there is a possibility that relational meanings are remnant within an adult’s depictions of superordinate categories. Despite adult’s not necessarily defining the categories as collections, relational information could be raised as an element of the description of the category. If this is the case, Murphy and Wisniewski then argue that supplying an amount of relational background would aid adults in accessing superordinate categories, however these should not be required when approaching basic level categories. Additionally, they found that surrounding objects within scenes that were relevant helped the subjects when classifying objects at the superordinate level but not at the basic level.

### **2.8.3 Commonalities at superordinate level**

An alternative interpretation of the distinctions among superordinate, basic and subordinate categories is that of Murphy and Smith (1982). They contend that instead of the basic level, it is the superordinate level that is distinctive. The superordinate categories differ from the basic and subordinate categories, as at these levels, members of each category are relatively similar to one another and considering them, as this is easily evident and at the superordinate level it is increasingly complicated to locate commonalities between the objects and function as a criteria gains much more significance.

### **2.8.4 Children do not use mutual exclusivity at superordinate/ subordinate levels.**

Superordinate terms may be more complex to learn because of one final reason; they violate the terms of mutual exclusivity. Rosch argued that in addition to the taxonomic constraint on word meanings, another is that children have the assumption that category terms are mutually exclusive, meaning that each individual object should only have one category label. This is generally true at the basic level of categorisation, “cat,” “dog” and “rabbit”; “chair”, “table” and “sofa” are not coinciding, mutually exclusive categories. As children attain basic level terms first, this will mean that superordinate and subordinate terms will violate this mutual exclusivity. If a child knows that an object is a dog, they will then be troubled or confused when allegations are made that it is a poodle or an animal.

A large amount of developmental literature suggests that young children rely on superficial perceptual properties when carrying out cognitive tasks such as classification, free recall, free association and word definitions (Manifest 1977). Markman (1989) believes that the

characterisations “concrete” and “perceptually bound” have referred to young children, meaning that their process of acquiring knowledge is captured by appearances. An example that is well known is that of the Piagetian conservation problems. A task that involves the conservation of numbers, such as two equal rows of objects, such as beads, are lined up with a one to one correspondence. The child makes a judgement that each row includes the same amount of beads; the row is then spread out as the child is watching. Even though they have watched this happen, they still make the judgement that the row with the longer length contains more beads. An interpretation of this result gives the reason that children are unable to overlook the deceptive perceptual cue of the length of the row. Therefore, their judgment of equality or inequality is based not on the actual quantity but on the perceptual information that is available. Tversky (1985) discovered that young children have a desire of grouping objects together on the basis of colour or shape instead of common category membership. Nouns refer to kinds of natural categories such as “bird”, arbitrary categories such as “square” and abstract categories such as “danger” and so on.

According to Huttenlocher and Lui, concrete nouns are closely related to and organized in to hierarchical class-inclusion associations; this organisation follows from arguments of richness information. Presuming that one possesses knowledge of the category, then there will be an ability to move up and down the hierarchy, therefore not just producing subordinate and superordinate categories but also other properties and relations to other categories.

## **2.9 Concrete and Abstract**

Barsalou (1983) define physical concepts as referring to perceivable and spatially implanted entities whereas abstract concepts refer to entities that “are neither purely physical nor spatially

constrained” (Barsalou 1983). Although the difference between these two, such as “cat”, a concrete entity and “death” an abstract entity is evident on perceptive grounds, this difference is not so evident is the development and organisation of conceptual knowledge.

Traditionally, the distinction between the concrete and the abstract entity has been mainly dealt with in relation to linguistics. Through analysing a body of nouns that were produced by children of a school age, researcher Roger Brown (1957, reported in Schwanenflugel, 1991) discovered that out of the most frequently produced words, 75% of these consisted of concrete entities. Schwanenflugel (1991) reviewed Rinslad’s (1945) body of children’s language that was then used by Brown (1957). Through reviewing this body of language, the demonstration is of the presence of nouns most frequently used by adults that surface in a child’s language. There is an assumption that if the word surfaced twice when analysing that specific age group, then they would have knowledge of this word. A vast difference was found by Schwanenflugel (1991) between older and younger children. Whereas children in first year had already grasped a predominant amount of concrete nouns most frequently used by adults, adolescents were the only age group to master the majority of the abstract nouns. Within the attainment of reading a similar trend was discovered by Markman (1989, reported in Schwanenflugel 1991). While learning to read, difficulties surfaced for children that are more often to do with abstract words rather than concrete words.

Paivio (1971, 1986) has explained this irregularity between concrete and abstract words by using the Dual Code Theory. This ensures that words that refer to concrete terms are more easily accessible than those that refer to abstract terms. This is due to the information that concrete terms convey relying on both a verbal and an imagery code, whereas the information that abstract terms conveys relies only on the verbal code. Schwanenflugel and Shoben (1983)

also consider another angle from a different perspective through the study of word context accessibility. They have demonstrated that it is more complex to find an appropriate context for abstract terms in contrast with concrete terms.

Keil (1989) has highlighted within the conceptual grounds the distinction between the natural, artefact, and nominal kind of concept present within children's conceptual development. Regardless of the emphasis on continuity between children's concrete and abstract nominal kind concept, the focus of researcher's has predominantly been on the attainment of the differentiation between natural and artefact kinds of concepts, and characteristics. The natural and artefact kinds can be demonstrated through concepts referring to objects (e.g Mandler 1992, Mandler, Bauer, & McDonough 1991, Mandler & McDonough 1993, 1996, Markman 1989) and characteristics through the work of Keil, Smith, Simons & Levin (1998). The comparative lack of attention on abstract conceptual knowledge development is most likely due to the commonly held postulation that abstract knowledge is attained later on due to the "thematic to taxonomic shift" (Lucariello, Kyratzis, & Nelson 1992, Lucariello & Nelson 1985, Nelson, 1977, 1986).

Early conceptual knowledge organisation is thematic in nature according to this view, due to the supposition that it relies on scripts that are derived from the events of which children are involved in. In comparison to this, taxonomic conceptual knowledge organisation has been regarded as the consequence of further progression in the attainment of the abstract hierarchical relations. These hierarchical relations structure conceptual knowledge according to the "cognitive economy principle". However, the notion of this has been the foundation of extensive queries such as Sloman's (1998). Research has recently illustrated that when nursery children are effectively interviewed, they are able to deal with taxonomic information thus demonstrating their ability to grasp abstract knowledge (Waxman & Namy 1977).

Research by Waxman and Namy (1977) has shown that nouns that refer to abstract concepts extract less exemplars than concrete concepts. Additionally, the ratings of both intra-category and inter-category were less for abstract concepts in comparison to concrete concepts. For instance, the examples and the categories of abstract concepts were less distinguishable than those of concrete concepts. This research suggested that the superordinate level of abstract concepts could be associated to “ad hoc” categories. Even if they have also acknowledged that the established foundation of abstract concepts is grounded on thematic information, these depend on task requirements. .

## **2.10 Cultural influences on categorization**

The systematic exploration has begun in recent years by psychologists in to the ways that how people think and perceive their world is due to cultural effects. Through the gain of empirical attention, the influence of culture on cognition is becoming apparent. There are statistics that indicate cultural differences are present and exist, despite there being minimal research on cultural differences within categorisation. Norenzayan, Smith, Jun Kim, and Nisbett (2002) carried out one of the few experimental studies that examine cultural differences within categorisation. Based on research by Nakamura, (1988) and Nisbett, Peng, Choi & Norenzayan (2001) that suggests that East Asian’s thought process is more holistic and Westerner’s thought process is more analytic, for East Asian’s, there is a greater influence from contextual elements in a situation in comparison to Westerner’s influence (Masuda and Nisbett 1999). In comparison, East Asian’s also prefer dialectical solutions such as “middle-way” resolutions (Peng and Nisbett 1999). It was also hypothesised by Norenzayan et al, that there is a greater reliance on intuitive, experienced based reasoning for East Asian’s than Westerner’s, and that instead, Westerner’s rely on formal, rule based reasoning. From the findings of one experiment,

Norenzayan et al. (2002) stated that East Asian participants were significantly prone to respond on a family resemblance base whereas Western participants were significantly prone to respond with a uni-dimensional rule based response. Therefore, proposing that when basing similarity judgements, East Asian's will base these on holistic features of the stimuli while Westerner's will base these on the individual components of the stimuli.

According to Chiu's research (1972), the differences in categorisation were examined through Chinese and American children viewing pictures of airplanes, vehicles and animals. Within this examination it became apparent that American children were significantly more liable to respond using descriptive-analytic categorisations, inferential-category and descriptive-whole categorisations; in contrast to Chinese children were significantly more liable to respond using relational-contextual categorisations. These results imply that whereas the willing of Chinese children to categorise is through identifying relationships among objects, the willing of American children is to categorise through indentifying similarities among objects.

Therefore, the results of these studies of categorisation by Chiu (1972) and Norenzayan et al. (2002), support the theories that Nisbett and his colleagues have suggested in order to clarify the differences between East Asian and Western cultures in categorisation and other areas of cognition (Choi, Nisbett & Smith 1997; Masuda & Nisbett 1999; Nisbett et al. 2001; Peng & Nisbett 1999). The most fundamental point in relation to these ideas is the assertion that East Asian's employ a holistic thought process whereas Westerner's employ and analytical thought process.

Logan (1986) presents a proposal that language can be used in order to account for differences in reasoning styles due to cultural differences. Contending "learning how to read and



write with the alphabet has brought us more than literacy and a model for classification. It has provided us with conceptual framework for analyses and has restructured our perceptions of reality” (p.18). He continues with the idea that the phonetic alphabet is alleged to have supplied a basis for abstract, logical and systematic (Western) thought. This aids in explaining why science began in the West and not in the East, despite Chinese technology surpassing the West from ancient times to around the 16<sup>th</sup> century. The difference in systems of writing is partially due to the absence of Western style abstractions and classification formats in Chinese culture. The use of drawn concrete characters is the foundation of the Chinese writing system, which reflects itself throughout the thought process. It dissuades the development of the abstract notions of codified law, abstract science and deductive logics, all of which are required in order for science to progress. The variations between the English alphabetic language and the Chinese symbolic alphabetic language would be a significant aspect that would highlight the differences between Americans and Chinese in reasoning styles including categorisation preferences if Logan’s theory proves to be accurate.

## **Chapter 3**

### **Data Analysis**

In this chapter, Fifty-one pre-school Persian children's story books are selected randomly for the ages between five to seven years old. Four or six pages of each book will be analyzed accordingly. In this section noun framework lists are represented for different level of noun categorizations - superordinate, basic and subordinate level. Then the overall frequency of used nouns in different levels of categorization will be determined.

#### **3.1 Noun analyzing of story books**

The following analyses will be based on "kind of" and "part of" relations. So relating if X represents the group of birds and Y the group of animals, then group Y includes group X and group X includes group Z. The Z class's name is subordinate, the X class's name is basic level and Y class's name that includes the other is superordinate.

Property inheritance leads to one of the defining characteristics of basic level: one way entailment. *This is a car*, for instance, entails *this is a vehicle*: This is an X entails this is a Y, but on the other side this is a Y does not entail this is an X.

Furthermore, an X is a kind of /part of Y and Z is a kind of /part of X, is a general way in this thesis for distinguishing superordinate, basic level and subordinate from each other. And the nouns that have the properties of {+ part of} or {+ kind of} or both of them , they have been settled in one level up ( superordinate or basic level) . For example: vehicle {+ kind of}, and furniture {+ kind of, + part of}.

*Car is a kind of vehicle.*

*Not\*car is a part of vehicle.*

*Chair is a part of furniture.*

*And also chair is a kind of furniture.*

And at the basic level:

*Valper is a kind of dog*

*Not \*Valper is a part of dog.*

### 3.1.1 Curious dog

In the story of “Curious dog” the way of noun analyses are as follow:

- At superordinate level: time {+ part of}, locality {+ part of, + kind of}, human {+ kind of}, building {+ kind of, + part of}, clothes {+kind of} and fruit {+kind of}.
- At basic level: {+ kind of}: dog, father, mother, head, foot, bench, duck, house, clock, room.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
dog (2)		X		X	
time	X				X
father		X		X	
mother		X		X	
Eskatland			X	X	
locality	X			X	
human	X			X	
hazelnut			X	X	
head		X		X	
foot		X		X	
bench		X		X	
duck		X		X	
room		X		X	

house		X		X	
clock		X		X	
building	X			X	
clothes	X			X	
fruit	X			X	

### 3.1.2 Playful cat

In the story of “Playful cat” the way of noun analyses are as follow:

- At superordinate level: tool {+kind of}, animal {+kind of}, furniture {+kind of}.
- At basic level: {+ kind of}: rabbit, nail, board, cat, table, goat, cow, horse.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
rabbit ( 8)		X		X	
nail ( 5)		X		X	
board ( 2)		X		X	
tool (4)	X			X	
cat ( 4)		X		X	
table (2)		X		X	
goat ( 5)		X		X	
animal (5)	X			X	
cow (2)		X		X	
horse (2)		X		X	
furniture (5)	X			X	

### 3.1.3 Goat with feet bells:

In the story of “Goat with feet bells” the way of noun analyses are as follow:

- At superordinate level: building {+kind of, + part of}, animal {+kind of}, beverage {+kind of}, tool {+kind of}, building {+kind of, +part of}.
- At basic level: {+ kind of} : goat, child, desert, grass, milk, door, wolf, house, iron, teeth, day, square, father, bath, woman, stomach.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
goat ( 7 )		X		X	
feet bell ( 5 )			X	X	
building (3)	X			X	
child (5)		X		X	
animal (2)	X			X	
desert		X		X	
grass		X		X	
milk		X		X	
beverage (5)	X			X	
door (2)		X		X	
wolf ( 8 )		X		X	
house ( 4 )		X		X	
iron (2)		X		X	
tool (3)	X			X	
teeth (2)		X		X	
building (3)	X			X	
day		X			X
square (2)		X		X	
father		X		X	
bath		X		X	
woman		X		X	
stomach		X		X	

### 3.1.4 Small monkey:

In the story of “Small Monkey” the way of noun analyses are as follow:

- At superordinate level: plant {+kind of}, animal {+kind of}, bird {+kind of}, tool {+kind of}.
- At basic level: {+ kind of}: monkey, lion, snake, nest.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
monkey ( 2 )		X		X	
plant	X			X	
lion (2)		X		X	
animal	X			X	
snake		X		X	

nest (2)		X		X	
bird	X			X	
tool	X			X	

### 3.1.5 In spring season:

In the story of “In spring season” the way of noun analyses are as follow:

- At superordinate level: human {+kind of}, time {+part of}, plant {+kind of}, bird {+kind of}, animal {+kind of}.
- At basic level: {+ kind of}: girl, spring, mother, father, flower, water fly, branch, window, room, nest, egg, chicken.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
human	X			X	
girl		X		X	
Sara (5)			X	X	
time (3)	X				X
spring (3)		X			X
mother		X		X	
father		X		X	
plant (2)	X			X	
flower (5)		X		X	
water fly (2)		X		X	
branch (2)		X		X	
bird	X			X	
window		X			
room		X		X	
nest		X		X	
egg		X		X	
chicken		X		X	
animal (3)	X			X	

### 3.1.6 Small bear in school:

In the story of “Small Bear in School” the way of noun analyses are as follow:

- At superordinate level: tool{ +kind of}, body{+part of}, food{ +kind of}, beverage{ +kind of}, building{ +kind of, + part of} , human{ +kind of}, locality{ +kind of, +part of}.
- At basic level: { + kind of} : clock, morning, bear, school, hand, face, water, towel, bread, cheese, tea, milk, butter, jam, school, teacher, afternoon, friend, house, day.

Noun	Superordinate	Basic level	Subordinate	Concrete	Abstract
clock ( 2)		X		X	
morning		X			X
tool (2)	X			X	
bear (4)		X		X	
school		X		X	
hand		X		X	
face (3)		X		X	
water		X		X	
body (3)	X			X	
towel		X		X	
food (2)	X			X	
bread		X		X	
cheese		X		X	
tea		X		X	
milk		X		X	
butter		X		X	
beverage (2)	X			X	
jam		X		X	
school (2)		X		X	
teacher (2)		X		X	
building (3)	X			X	
afternoon		X			X
friend		X		X	
human	X			X	
house		X		X	
locality	X			X	
day		X			X

### 3.1.7 Barfak and jobs:

In the story of “Barfak and Jobs” the way of noun analyses are as follow:

- At superordinate level: furniture {+kind of, + part of}, human {+kind of}, food {+kind of}, tool {+kind of}, plant {+kind of}.
- At basic level :{ + kind of}: painter, house, map, truck, factory, doctor, patient, stick, girl, teacher, book.

Noun	Superordinate	Basic level	Subordinate	Concrete	Abstract
Barfak (4)			X	X	
painter		X		X	
house(2)		X		X	
furniture	X			X	
map (2)		X		X	
human	X			X	
truck		X		X	
factory		X		X	
doctor		X		X	
food (3)	X			X	
patient		X		X	
stick		X		X	
tool	X			X	
girl		X		X	
teacher		X		X	
blackboard			X	X	
book		X		X	
plant	X			X	

### 3.1.8 Healthy train – DODO CHICHI

In the story of “Healthy train – DODO CHICHI” the way of noun analyses are as follow:

- At superordinate level: time {+part of}, human {+kind of}, tool {+kind of}.
- At basic level: {+ kind of}: father, school, mother, teacher, foot, clock, present.



Noun	Superordinate	Basic level	Subordinate	Concrete	Abstract
father		X		X	
Arash (6)			X	X	
school		X		X	
time	X				X
mother		X		X	
teacher		X		X	
foot		X		X	
human	X			X	
clock		X		X	
present		X		X	
tool	X			X	

### 3.1.9 Frightened squirrel and elephant:

In the story of “Frightened squirrel and elephant” the way of noun analyses are as follow:

- At superordinate level: time {+part of}, building {+kind of +part of}, plant {+kind of}, body {+part of}, animal {+kind of}.
- At basic level: {+ kind of}: day, jangle, squirrel, house, nest, man, head, tail, elephant.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
day		X			X
time	X				X
jangle (2)		X		X	
squirrel(6)		X		X	
house(2)		X		X	
building(2)	X			X	
plant	X			X	
nest(2)		X		X	
man		X		X	
body	X			X	
head		X		X	
tail		X		X	
elephant(2)		X		X	
animal (3)	X			X	

### 3.1.10 Curious Copol:

In the story of “Curious Copol” the way of noun analyses are as follow:

- At superordinate level: locality {+part of, +kind of}, fish {+ kind of}, human {+ +kind of}, body {+part of}, Time {+ part of}, animal {+ kind of}.
- At basic level: {+ kind of}: day, sea, mother, night, child, man, worm, crab, shark, hole, dolphin, head, mother, wish, whale.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
day		X			X
sea		X		X	
locality	X			X	
fish(3)	X			X	
mother(3)		X		X	
night		X			X
child		X		X	
Copol(6)			X	X	
man		X		X	
worm		X		X	
crab		X		X	
human	X			X	
shark		X		X	
hole		X		X	
dolphin		X		X	
head		X		X	
body	X			X	
mother		X		X	
time	X				X
wish		X			X
whale		X		X	
animal	X			X	

### 3.1.11 Everybody has house:

In the story of “Everybody has house” the way of noun analyses are as follow:

- At superordinate level : insect{+ kind of}, fruit {+ kind of}, plant { + kind of} animal { + kind of } , tool { + kind of } , human { + kind of}, plant{ + kind of}.
- At basic level: {+ kind of}: ant, seed, house, land, eagle, apple, orange, grove, bee, hive, village, hammer, boy.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
ant (2)		X		X	
seed(2)		X		X	
insect (2)	X			X	
house (3)		X		X	
land(2)		X		X	
eagle(2)		X		X	
fruit	X			X	
apple		X		X	
orange		X		X	
lion(2)		X		X	
plant(2)	X			X	
grove		X		X	
animal (3)	X			X	
bee(2)		X		X	
hive		X		X	
village		X		X	
tool	X			X	
human	X			X	
hammer		X		X	
plant	X			X	
boy		X		X	

### 3.1.12 Worms:

In the story of “Worms” the way of noun analyses are as follow:

- At superordinate level: plant {+ kind of}, time {+ part of}, locality {+ kind of, + part of}, Fruit {+ kind of}.
- At basic level: {+ kind of}: worn, leaf, pig, man, earth.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
worm		X		X	
plant	X			X	
leaf		X		X	
fig(3)		X		X	
man		X		X	
time	X				X
earth		X		X	
locality	X			X	
fruit	X			X	

### 3.1.13 Parviz chicken:

In the story of “Parviz chicken” the way of noun analyses are as follow:

- At superordinate level: Human {+kind of}, furniture {+ kind of + part of}, Animal {+ kind of}.
- At basic level: {+ kind of}: day, grandmother, chicken, house, seed, rooster, hand.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
day (4)		X			X
grandmother(3)		X		X	
human (3)	X			X	
furniture	X			X	
chicken(4)		X		X	
house(2)		X		X	
Parviz			X	X	
seed		X		X	
rooster(3)		X		X	
hand		X		X	
animal (3)	X			X	

### 3.1.14 Noghli 1:

In the story of “Noghli 1” the way of noun analyses are as follow:

- At superordinate level: plant {+kind of}, building {+kind of + part of}, vehicle {+kind of}.
- At basic level :{ + kind of}: village, plain, motorcycle, sea, grandfather, car.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
Noghli (4)			X	X	
plant	X			X	
village		X		X	
building	X			X	
plain		X		X	
motorcycle		X		X	
sea		X		X	
vehicle	X			X	
grandfather		X		X	
car		X		X	

### 3.1.15 In spring :

In the story of “In spring” the way of noun analyses are as follow:

- At superordinate level: tool {+kind of}, plant {+ kind of}, fruit {+ kind of}, body {+ part of}, time {+ part of}.
- At basic level: {+ kind of}: winter, day, father, garden, spring, flower, peach, eye, game.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
winter		X			X
day(5)		X			X
father(3)		X		X	
Ali(4)			X	X	
tool	X			X	
plant(4)	X			X	
garden(2)		X		X	
spring(2)		X			X
fruit(4)	X			X	
flower(4)		X		X	
body	X			X	

peach(2)		X		X	
eye		X		X	
time	X				X
game		X		X	

### 3.1.16 When I am going to school?

In the story of “When I am going to school” the way of noun analyses are as follow:

- At superordinate level: time { + part of}, human { + kind of}, tool { + kind of}, cloth { + kind of}, fabric { + kind of}
- At basic level: {+ kind of}: school, mother, house, door, bag, book, pencil, hand, head, cotton.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
Bahareh (3)			X	X	
time	X				X
school (3)		X		X	
mother (5)		X		X	
house		X		X	
door		X		X	
human	X			X	
bag		X		X	
book		X		X	
notebook			X	X	
pencil		X		X	
tool	X			X	
hand		X		X	
cloth (3)	X			X	
head		X		X	
cotton		X		X	
fabric	X			X	

### 3.1.17 Panirak story:

In the story of “Panirak story” the way of noun analyses are as follow:

- At superordinate level: food {+ kind of}, fish {+ kind of}, insect {+ kind of} cloth {+ kind of}.
- At basic level :{ + kind of}: night, eye, nest, cat, pocket.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
night		X			X
Golak(2)			X	X	
Zangolak(2)			X	X	
Panirak(7)			X	X	
food	X			X	
eye(3)		X		X	
fish	X			X	
nest		X		X	
insect	X			X	
cat		X		X	
pocket		X		X	
cloth	X			X	

### 3.1.18 Mazan:

In the story of “Mazan” the way of noun analyses are as follow:

- At superordinate level: footwear {+ kind f}, animal {+ kind of}, fabric {+ kind of}, Bird {+ kind of}.
- At basic level: {+ kind of}: fawn, shoes, rooster, wolf, monkey, ant, tiger, wool.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
Mazan			X	X	
footwear (2)	X			X	
fawn(2)		X		X	
shoes		X		X	

animal	X			X	
rooster		X		X	
wolf		X		X	
monkey		X		X	
ant		X		X	
fabric	X			X	
tiger		X		X	
wool		X		X	
bird	X			X	

### 3.1.19 My dream and my animal dream:

In the story of “My dream and my animal dream” the way of noun analyses are as follow:

- At superordinate level: animal {+ kind of}, plant {+ kind of}, body {+ part of}, food {+ kind of}, time {+part of}, fish {+ kind of}, human {+ kind of}, tool {+ kind of}.
- At basic level: {+ kind of}: father, jangle, horse, giraffe, head, branch, child, father, mother, owl, night, snake, eye, horse.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
animal (2)	X			X	
father		X		X	
jangle(2)		X		X	
horse		X		X	
giraffe		X		X	
head		X		X	
branch		X		X	
plant(2)	X			X	
body	X			X	
child(2)		X		X	
father		X		X	
food	X			X	
mother		X		X	
owl(2)		X		X	
night		X			X
time	X				X
snake(3)		X		X	
eye(2)		X		X	



horse		X		X	
fish	X			X	
human	X			X	
tool	X			X	

### 3.1.20 Red overcoat:

In the story of “Red overcoats” the way of noun analyses are as follow:

- At superordinate level: cloth {+kind of}, body {+part of}, footwear {+kind of}, fruit {+kind of}, building {+ part of + kind of}.
- At basic level: {+ Kind of}: hat, head, mother, foot, hand, summer, cat, woman, seed, yard, chicken, tree.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
Parviz(3)			X	X	
cloth(3)	X			X	
overcoat(2)			X	X	
hat		X		X	
head		X		X	
mother(3)		X		X	
foot		X		X	
body	X			X	
footwear	X			X	
hand		X		X	
summer		X			X
cat(3)		X		X	
woman		X		X	
fruit	X			X	
seed		X		X	
yard		X		X	
chicken		X		X	
tree		X		X	
building	X			X	

### 3.1.21 Seven days of week:

In the story of “Seven days of week” the way of noun analyses are as follow:

- At superordinate level: tool {+ kind of}, time {+ part of}, body {+part of}.
- At basic level: {+ kind of}: leaf, paper, box, week, day.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
friday			X		X
leaf (2)		X		X	
tool	X			X	
paper(2)		X		X	
box(2)		X		X	
watercolor (2)			X	X	
week		X			X
time(2)	X				X
Saturday			X		X
Sunday			X		X
Monday			X		X
Tuesday			X		X
Wednesday			X		X
Thursday			X		X
body	X			X	
day		X			X

### 3.1.22 Sparrow:

In the story of “Sparrow” the way of noun analyses are as follow:

- At superordinate level: animal {+kind of}, plant {+ kind of}, bird {+ kind of}, locality {+ part of, + kind of}, tool {+ kind of}, body {+ part of}.
- At basic level: {+ kind of}: sparrow, road, branch, eye, pit, water, morning, earth, hill, mouse, hole, beak, feather, wing.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
sparrow(5)		X		X	
animal	X			X	
road		X		X	
branch (2)		X		X	
plant(2)	X			X	
bird(4)	X			X	
eye		X		X	
pit(2)		X		X	
locality	X			X	
water (2)		X		X	
morning(2)		X			X
earth(2)		X		X	
hill(3)		X		X	
mouse		X		X	
hole		X		X	
beak		X		X	
tool (2)	X			X	
feather		X		X	
wing		X		X	
body (3)	X			X	

### 3.1.23 Trees dialogue:

In the story of “Tree dialogue” the way of noun analyses are as follow:

- At superordinate level: time { + part of}, plant {+ kind of}, beverage { + kind of}, cloth { + kind of}, fruit { + kind of}, season { + kind of } , furniture{ + kind of + part of}.
- At basic level: {+ kind of}: spring, hat, head, light, earth, jam, syrup, pear, jangle, arrange, winter.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
spring		X			X
time	X				X
plant	X			X	
beverage	X			X	
Norouz 80			X		X

Cloth	X			X	
Hat		X		X	
Head		X		X	
Light		X		X	
Earth		X		X	
Sour cherry			X	X	
Fruit	X			X	
Jam		X		X	
Syrup		X		X	
Pear		X		X	
Season	X			X	
Jangle		X		X	
orange		X		X	
Winter		X			X
Furniture	X			X	

### 3.1.24 My family:

In the story of “My family” the way of noun analyses are as follow:

- At superordinate level: human {+ kind of}, fabric {+kind of}, vehicle { + kind of}, food { + kind of}, plant { + kind of}, fruit { + kind of}.
- At basic level: {+ kind of}: cotton, mother, brother, sister, man, uncle, woman, aunt, apple.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
human	X			X	
cotton(2)		X		X	
Hassan			X	X	
mother(2)		X		X	
fabric	X			X	
brother		X		X	
Ali			X	X	
vehicle	X			X	
sister		X		X	
Golnaz			X	X	
man		X		X	
uncle		X		X	

woman		X		X	
aunt		X		X	
food	X			X	
apple		X		X	
plant	X			X	
fruit	X			X	

### 3.1.25 Shepherd:

In the story of “Shepherd” the way of noun analyses are as follow:

- At superordinate level: insect {+ kind of}, plant {+ kind of}, animal {+ kind of}.
- At basic level: {+ kind of}: shepherded, sheep, village, desert, grass, stone, water fly, hill, wolf, animal.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
shepherd(5)		X		X	
sheep(2)		X		X	
insect (2)	X			X	
village		X		X	
desert(2)		X		X	
grass		X		X	
plant	X			X	
stone		X		X	
water fly		X		X	
hill		X		X	
wolf		X		X	
animal(2)	X			X	

### 3.1.26 Wolf and fox:

In the story of “Wolf and fox” the way of noun analyses are as follow:

- At superordinate level: animal {+ kind of}, locality {+ part of + kind of}, tool {+ kind of}, food {+ kind of}.

- At basic level: {+ kind of}: day, wolf, jangle, stick, rabbit, fox.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
animal	X			X	
day		X			X
wolf (3)		X		X	
jangle		X			
locality	X			X	
stick(2)		X		X	
tool(2)	X			X	
rabbit		X		X	
food	X			X	
fox(5)		X		X	

### 3.1.27 Wise rabbit and foolish wolf:

In the story of “Wise rabbit and foolish wolf” the way of noun analyses are as follow:

- At superordinate level: animal {+ kind of}, fruit {+ kind of}, plant {+ kind of}, body {+ part of}, season {+ kind of}.
- At basic level: {+ kind of}: year, rabbit, jangle, house, wall, water, leaf, stomach, head, wolf, present.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
year		X			X
rabit(8)		X		X	
jangle		X		X	
animal(3)	X			X	
house(2)		X		X	
wall(6)		X		X	
water(3)		X		X	
fruit(3)	X				
leaf		X		X	
plant (4)	X			X	
stomack		X		X	
body (2)	X			X	
head		X		X	

wolf(4)		X		X	
season	X				X
present		X		X	

### 3.1.28 Friendship:

In the story of “Friendship” the way of noun analyses are as follow:

- At superordinate level: time {+ part of}, plant {+ kind of}, insect {+ kind of}.
- At basic level: {+ kind of}: water fly, leaf, branch, friend, head, face, wing.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
water fly(6)		X		X	
time (3)	X				X
leaf(3)		X		X	
plant(2)	X			X	
branch		X		X	
friend(3)		X		X	
head		X		X	
face		X		X	
wing		X		X	
insect (2)	X			X	

### 3.1.29 Mamoosh day:

In the story of “Mamoosh day” the way of noun analyses are as follow:

- At superordinate level: beverage {+ kind of}, tool {+ kind of}, food {+ kind of}.
- At basic level: {+ kind of}: child, window, breakfast, table, bath.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
Mamoosh(5)			X	X	
child		X		X	
beverage	X			X	
window		X		X	
breakfast		X		X	

table		X		X	
tool	X			X	
bath		X		X	
food	X			X	

### 3.1.30 Topol, Mopol and Dasteyegol:

In the story of “Topol, Mopol and Dasteyegol” the way of noun analyses are as follow:

- At superordinate level: plant {+ kind of}, fruit {+ kind of}, furniture {+ kind of, + part of}.
- At basic level: {+ kind of} : jangle, wolf, month, day, rabbit, woman, child, carrot, nest, door, man.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
jangle (2)		X		X	
wolf(3)		X		X	
month		X			X
day		X			X
plant (3)	X				
rabbit(3)		X		X	
woman(2)		X		X	
child(2)		X		X	
fruit (2)	X			X	
Mopol(3)			X	X	
Dasteyegol (3)			X	X	
carrot		X		X	
nest		X		X	
furniture (3)	X			X	
door		X		X	
man		X		X	

### 3.1.31 Shangol and Mangol:

In the story of “Shangol and Mangol” the way of noun analyses are as follow:



- At superordinate level : human { + kind of } , bird { + kind of } , body {+ part of } , fabric { + kind of } .
- At basic level: {+ Kind of}: goat, child, story, wool, winter, wool, eye, horn, foot, milk, dish, stomach, wolf.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
human (3)	X			X	
goat(5)		X		X	
child(2)		X		X	
bird(2)	X			X	
Mangol(2)			X	X	
Habeye angoor(2)			X	X	
winter		X			X
wool		X		X	
eye		X		X	
body(2)	X			X	
horn(2)		X		X	
foot(3)		X		X	
milk(2)		X		X	
dish(2)		X		X	
fabric (3)	X			X	
stomach(2)		X		X	
wolf(2)		X		X	

### 3.1.32 Alibaba and forty robbers:

In the story of “Alibaba and forty robbers” the way of noun analyses are as follow:

- At superordinate level: human {+ kind of}, building {+ kind of + part of}, tool {+ kind of}, plant {+ kind of} , body {+ part of}.
- At basic level: {+ kind of}: town, brother, avenue, house, ass, mountain, jangle, bread, guest, businessman, oil, manager, robber, head, husband.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
town(2)		X		X	
brother(2)		X		X	
human (3)	X			X	
Alibaba(3)			X	X	
avenue		X		X	
house		X		X	
building	X			X	
ass		X		X	
mountain (3)		X		X	
jangle(2)		X		X	
bread		X		X	
tool	X			X	
guest		X		X	
businessman		X		X	
oil		X		X	
manager(3)		X		X	
robber(3)		X		X	
head		X		X	
plant(2)	X			X	
husband		X		X	
body(3)	X			X	

### 3.1.33 Oven

In the story of “Oven” the way of noun analyses are as follow:

- At superordinate level: insect {+ kind of}, food {+ kind of}, body {+ part of}, plant {+ kind of}, bird {+ kind of}, beverage {+ kind of}.
- At basic level: {+ kind of}: ant, flea, day, friend, house, heart, wheat, water, soil, mother, daughter, oven.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
ant (3)		X		X	
flea		X		X	
insect(3)	X			X	
day		X			X
friend(2)		X		X	

house		X		X	
heart		X		X	
food (2)	X			X	
wheat		X		X	
water(3)		X		X	
body	X			X	
plant(4)	X			X	
soil(2)		X		X	
mother(2)		X		X	
daughter(5)		X		X	
bird	X			X	
beverage	X			X	
oven (3)		X		X	

### 3.1.34 Beetle and mouse:

In the story of “Beetle and mouse” the way of noun analyses are as follow:

- At superordinate level: human {+ kind of}, locality {+ kind of + part of}, cloth {+ kind of}, tool {+ kind of}.
- At basic level: {+ kind of}: ant, beetle, father, day, uncle, daughter, husband, dress, trousers, man, mouse, town.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
ant(3)		X		X	
beetle(3)		X		X	
human (3)	X			X	
father ( 2)		X		X	
day(3)		X			X
Hamedan			X	X	
uncle		X		X	
locality	X			X	
Tehran			X	X	
daughter		X		X	
cloth(2)	X			X	
husband		X		X	
dress		X		X	
trousers		X		X	

man		X		X	
mouse		X		X	
town		X		X	
washing machine			X	X	
tool	X			X	

### 3.1.35 Farm animals

In the story of “Farm animals” the way of noun analyses are as follow:

- At superordinate level: animal {+ kind of}, plant {+ kind of}, building {+ kind of + part of}, tool {+ kind of}.
- At basic level: {+ kind of}: chicken, hen, mother, water, worm, dock, pig, tail, rabbit, cat, cub, dog.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
chicken(3)		X		X	
hen		X		X	
animal (3)	X			X	
mother		X		X	
water		X		X	
worm		X		X	
dock(2)		X		X	
plant	X			X	
swimming pool			X	X	
pig(2)		X		X	
tail		X		X	
rabbit(2)		X		X	
building	X			X	
cat		X		X	
cub		X		X	
dog		X		X	
tool(3)	X			X	

### 3.1.36 Once upon a time

In the story of “Once upon a time” the way of noun analyses are as follow:

- At superordinate level: foot wear{ + kind of}, time { + part of}, bird {+ kind of } , tool { + kind of } , beverage {+ kind of } .
- At basic level: {+ kind of}: shoes, dog, cat, father, niche, garden, fire, cotton.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
Cupola			X	X	
footwear	X			X	
shoes (2)		X		X	
dog(3)		X		X	
cat(2)		X		X	
father(2)		X		X	
time(2)	X				X
bird	X			X	
Niche		X		X	
garden		X		X	
fire		X		X	
cotton		X		X	
tool	X			X	
Donme			X	X	
beverage	X			X	

### 3.1.37 Gole sorkh

In the story of “Gole sorkh” the way of noun analyses are as follow:

- At superordinate level: Foot wear {+ kind of}, food {+ kind of}, plant {+ kind of}, tool {+ kind of}.
- At basic level: {+ kind of}: sparrow, sneakers, foot, blade, oven, hand, lamp, pot, morning, flower.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
sparrow(4)		X		X	
footwear	X			X	
sneakers (3)		X		X	
foot(3)		X		X	
blade(2)		X		X	
oven(3)		X		X	
food(2)	X			X	
hand		X		X	
plant (4)	X			X	
lamp		X		X	
pot		X		X	
tool (3)	X			X	
morning		X			X
flower		X		X	
Gole Sorkh			X	X	

### 3.1.38 Horse riding

In the story of “Horse riding” the way of noun analyses are as follow:

- At superordinate level: fish {+ kind of}, human {+ kind of}, animal {+ kind of}.
- At basic level: {+ kind of}: girl, horse, dock, rabbit, goat.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
girl (3)		X		X	
horseman(2)			X	X	
horse(2)		X		X	
fish(2)	X			X	
dock(2)		X		X	
human	X			X	
rabbit		X		X	
goat		X		X	
animal	X			X	

### 3.1.39 Santa snow

In the story of “Santa snow” the way of noun analyses are as follow:

- At superordinate level: fish {+ kind of}, food {+ kind of}, fabric {+ kind of}, human {+ kind of}.
- At basic level: {+ kind of}: mountain, desert, sky, flour, snow, hand, grandfather, news, oven, bread, fire.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
mountain		X		X	
fish(2)	X			X	
desert		X		X	
sky		X		X	
food(2)	X			X	
flour		X		X	
snow(2)		X		X	
hand		X		X	
snowman(4)			X	X	
grandfather(3)		X		X	
news		X		X	
fabric	X			X	
oven		X		X	
bread		X		X	
human	X			X	
fire		X		X	

### 3.1.40 Elephant with long proboscis

In the story of “Elephant with long proboscis” the way of noun analyses are as follow:

- At superordinate level: locality {+ kind of + part of}, bird {+ kind of}, plant {+ kind of}, time {+ part of}.
- At basic level: {+ kind of}: day, jangle, elephant, lake, water, photo, woman, leaf.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
day		X			X
locality	X			X	
jangle		X		X	

elephant(4)		X		X	
lake		X		X	
water(2)		X		X	
photo		X		X	
bird(2)	X			X	
woman(3)		X		X	
plant	X			X	
leaf		X		X	
time	X				X

### 3.1.41 Kite

In the story of “Kite” the way of noun analyses are as follow:

- At superordinate level: locality {+ part of + kind of}, plant {+ kind of}, insect {+ kind of}.
- At basic level: {+ kind of}: stair, storage, day, box, door, kite, ring, color.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
Vahid(4)			X	X	
stairs(2)		X		X	
storage		X		X	
locality(2)	X			X	
day(2)		X		X	
box(3)		X		X	
plant	X			X	
door		X		X	
kite(3)		X		X	
insect	X			X	
earrings(4)			X	X	
ring		X		X	
color(2)		X		X	

### 3.1.42 Wolf and shepherd

In the story of “Wolf and shepherd” the way of noun analyses are as follow:



- At superordinate level: animal {+ kind of}, tool {+ kind of}, human {+ kind of}.
- At basic level: {+ kind of}: dog, shepherd, tooth, wood, head, wolf, herd, lion.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
dog(7)		X		X	
animal (3)	X			X	
shepherd(3)		X		X	
tooth		X		X	
wood(3)		X		X	
tool (2)	X			X	
head		X		X	
wolf(6)		X		X	
herd		X		X	
lion		X		X	
human (4)	X			X	

### 3.1.43 A peanut seed

In the story of “A peanut seed” the way of noun analyses are as follow:

- At superordinate level: building {+ kind of + part of}, tool {+ kind of}.
- At basic level: {+ kind of}: heart, dock, seed, mother, crow, bud.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
Ashi mashi(3)			X	X	
heart		X		X	
peanut(4)			X	X	
building(4)	X			X	
dock		X		X	
tool (2)	X			X	
seed(3)		X		X	
mother(3)		X		X	
crow(3)		X		X	
bud(2)		X		X	

### 3.1.44 Uninvited guests

In the story of “Uninvited guests” the way of noun analyses are as follow:

- At superordinate level: building {+ kind of + part of}, cloth {+ kind of}, animal {+ kind of}.
- At basic level: {+ kind of}: uncle, sparrow, rain, door, woman, water, beak, wing, room, voice, chicken, eye, cow, egg.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
uncle		X		X	
sparrow(2)		X		X	
building (4)	X			X	
rain		X		X	
door(3)		X		X	
woman		X		X	
water		X		X	
beak		X		X	
wing(3)		X		X	
room(2)		X		X	
cloth (4)	X			X	
voice(2)		X			X
chicken		X		X	
eye		X		X	
animal(2)	X			X	
cow		X		X	
egg		X		X	

### 3.1.45 Electrical elephant

In the story of “Electrical elephant” the way of noun analyses are as follow:

- At superordinate level: tool {+ kind of}, building {+ kind of + part of}, human {+ kind of}, vehicle {+ kind of}.
- At basic level: {+ kind of}: day, woman, vacuum cleaner, house, box, car, foot, pillow.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
day		X			X
woman		X		X	
vacuum cleaner(3)		X		X	
house		X		X	
tool (2)	X			X	
box(2)		X		X	
car (4)		X		X	
building	X			X	
foot		X		X	
pillow		X		X	
human	X			X	
vehicle (2)	X			X	

### 3.1.46 Woman cyclist

In the story of “Woman cyclist” the way of noun analyses are as follow:

- At superordinate level: furniture {+ kind of + part of}, animal {+ kind of}, body {+ part of}.
- At basic level: {+ kind of}: day, girl, cat, face, boy, way, dog, tooth, stick, needle.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
day		X			X
girl(2)		X		X	
bicycle(4)			X	X	
cat(2)		X		X	
face		X		X	
furniture(3)	X			X	
grandmother			X	X	
boy(2)		X		X	
animal (3)	X			X	
way(4)		X		X	
dog(4)		X		X	
tooth		X		X	
grandfather(3)			X	X	
stick(2)		X		X	
body (2)	X			X	

needle		X		X	
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### 3.1.47 Stars all over the sky

In the story of “Farm animals” the way of noun analyses are as follow:

- At superordinate level: bird {+ kind of}, tool {+ kind of}.
- At basic level: {+ kind of}: diamond, star, wing, flower, wind, name, painter, girl.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
diamond		X		X	
star (3)		X		X	
wing		X		X	
bird(2)	X			X	
flower		X		X	
wind		X		X	
name(3)		X			X
painter		X		X	
girl(2)		X		X	
tool (3)	X			X	

### 3.1.48 ladder with thousand steps

In the story of “Ladder with thousand steps” the way of noun analyses are as follow:

- At superordinate level: furniture {+ part of + kind of}, plant {+ kind of}, cloth {+ kind of}.
- At basic level: {+ kind of}: boy, ladder, money, day, fan, man, neighbor, step, glass, astronaut.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
boy(2)		X		X	
furniture (2)	X			X	
ladder		X		X	

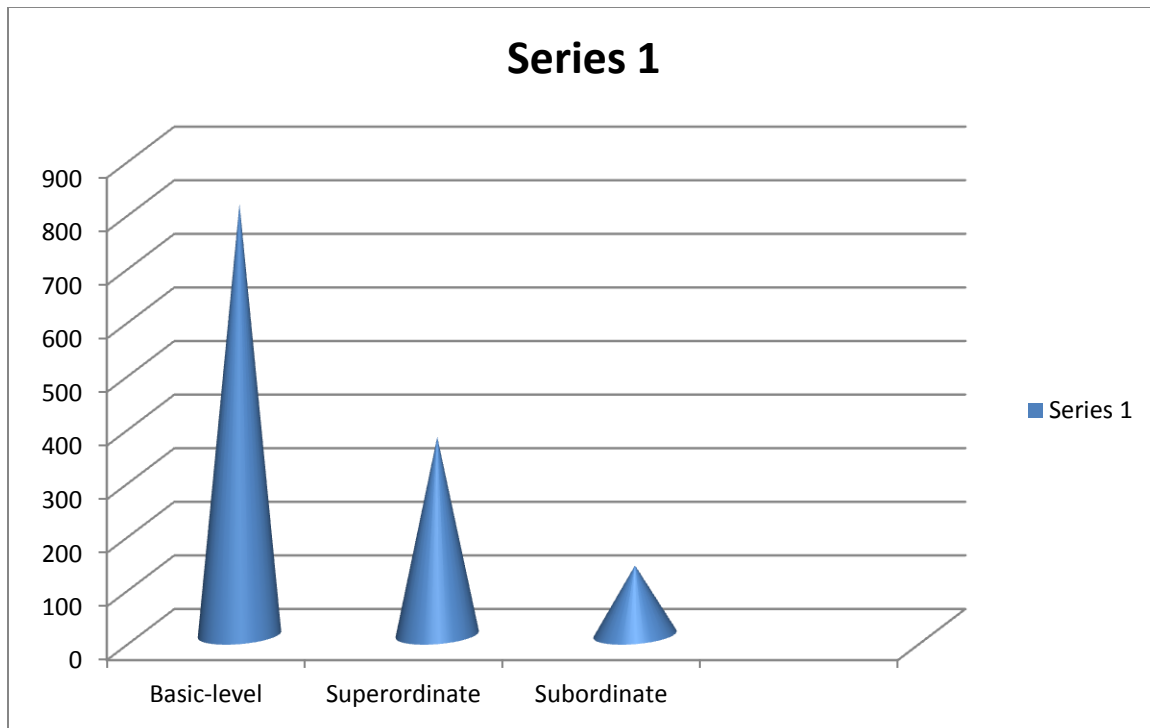
money		X		X	
day(3)		X			X
fan		X		X	
man		X		X	
neighbor		X		X	
step		X		X	
glass		X		X	
plant (2)	X			X	
astronaut		X		X	
clothe	X			X	

### 3.1.49 Hassani, sun and moonlight

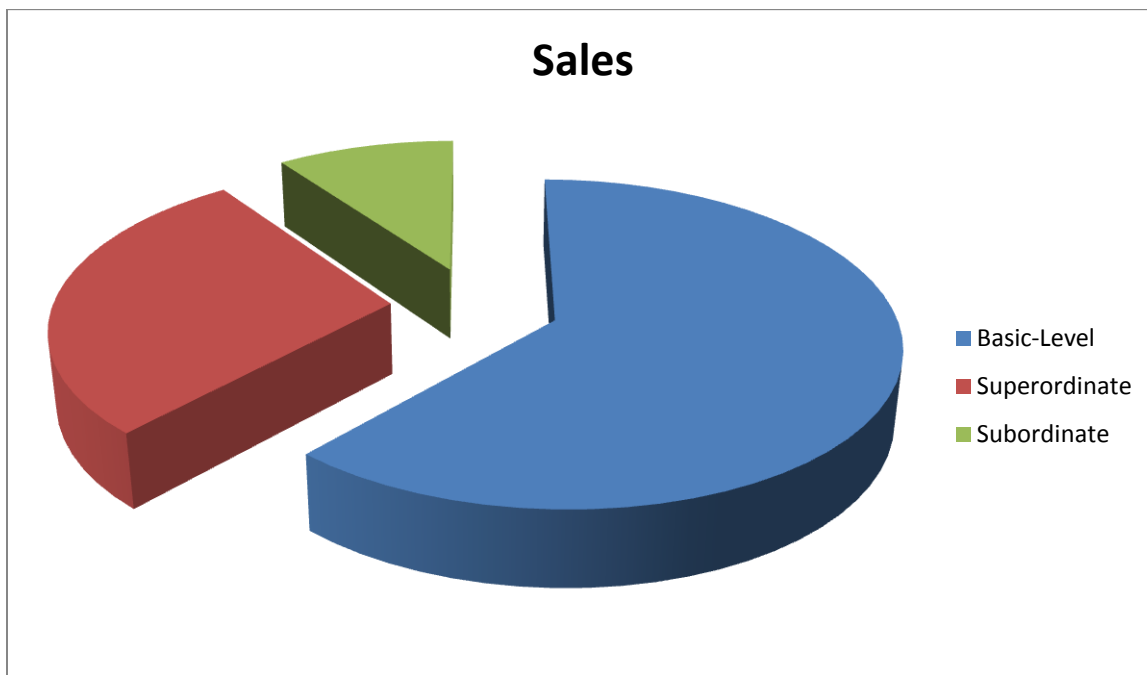
In the story of “Hassani, sun and moonlight” the way of noun analyses are as follow:

- At superordinate level: fruit {+ kind of}, tool {+ kind of}, plant {+ kind of}.
- At basic level: {+ kind of}: child, name, sun, moonlight, eye, stone, hand.

word	Superordinate	Basic level	Subordinate	Concrete	Abstract
child		X		X	
name		X			X
fruit (2)	X			X	
sun(2)		X		X	
moonlight(2)		X			X
alley			X	X	
eye		X		X	
Hassani			X	X	
stone(2)		X		X	
hand		X		X	
tool	X			X	
plant(2)	X			X	



**Chart 1: Order of categorization in pre-school story books**



**Pie- Chart 1: Order of categorization in pre-school story books**

### 3.2 Comparing one English story book with one Persian story book (Basic level – Super ordinate – Sub ordinate)

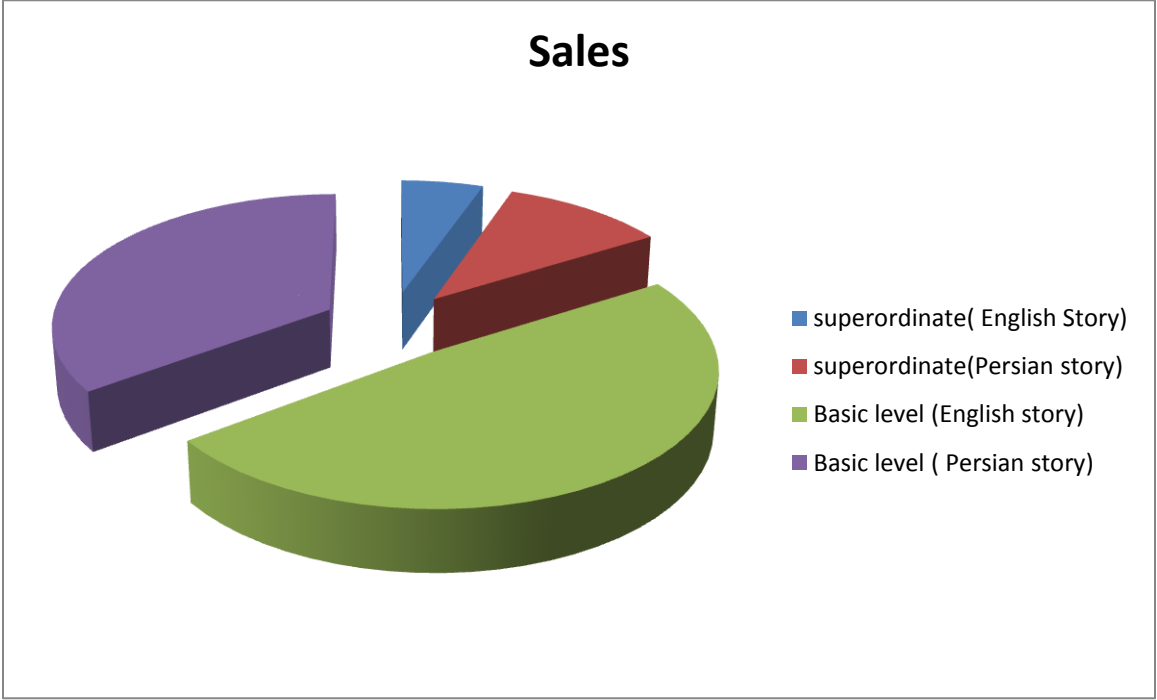
#### 3.2.1 English book ( The house that Jack build)

Word	Superordinate	Basic level	Subordinate
Jack			X
lad		X	
locality/place	X		
house(4)		X	
roof		X	
tile		X	
chimney		X	
window		X	
glass		X	
wood		X	
door		X	
concrete		X	
floor		X	
brick (2)		X	
wall (3)		X	
building	X		
hole( 2)		X	
spade		X	
glass		X	
window		X	

#### 3.2.2 Persian book (Beetle and mouse )

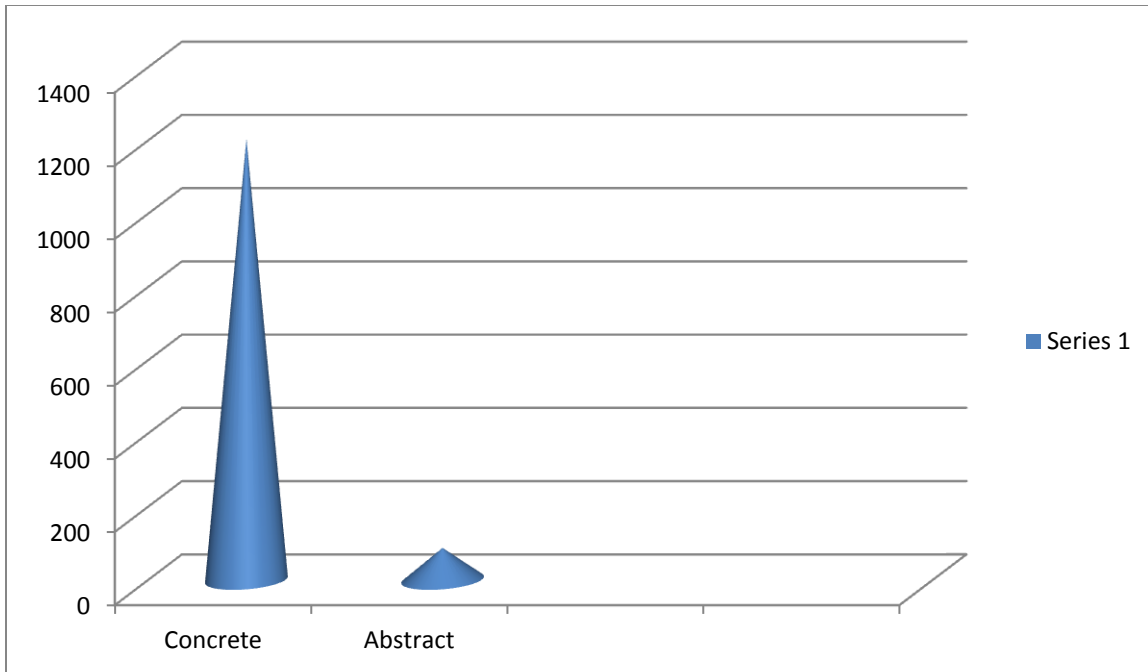
word	Superordinate	Basic level	Subordinate
ant(3)		X	
beetle(3)		X	
people	X		
Father (2)		X	
day(3)		X	
Hamedan			X
uncle		X	
locality	X		
Tehran			X
daughter		X	
cloth	X		
husband		X	
dress		X	
trousers		X	
man		X	

mouse		X	
town		X	
washing machine			X
tool	X		

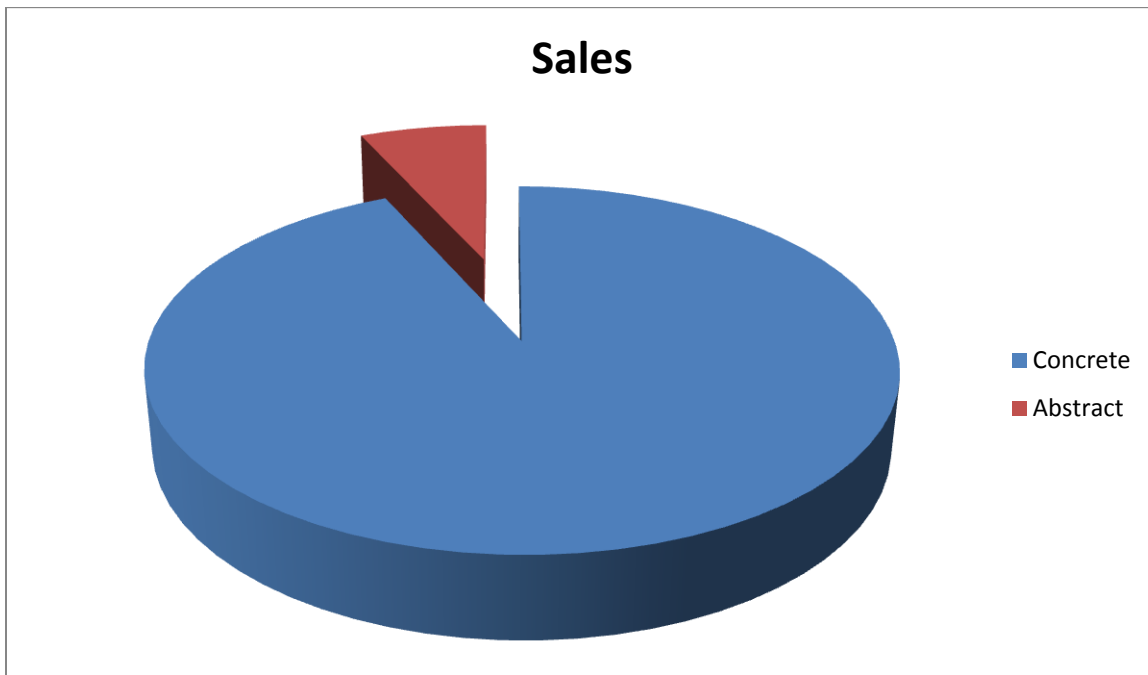


**Pie-Chart 2 : Ratio of basic level to superordinate categorization in English and Persian story books in one sample**

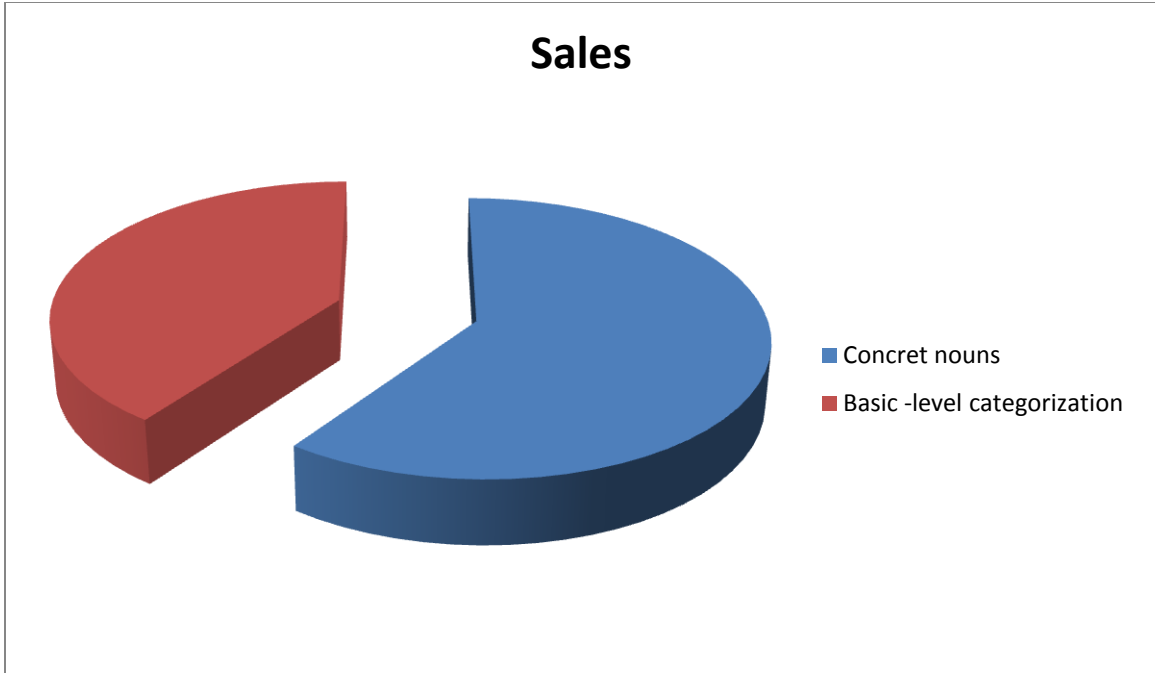




**Chart 2 :Frequencies between concrete and abstract nouns**



**Pie- chart 3: Frequencies between concrete and abstract nouns**



**Pie- chart 4: Ratio between concrete nouns and basic – level categorization**

## **Chapter 4**

### **Conclusion**

In studying noun categorization in Persian children's story books, the result supported research hypothesis as follow:

According to chart1 and table 2, the order of categorization ( superordinate – basic level and subordinate ) which was used in preschool story books in Persian respectively are first basic level , Superordinate and then Subordinate.

<b>Level of categorizations</b>		
Superordinate	Basic level	Subordinate
28%	62%	10%

*Table 2 : level of categorization*

This result corresponds with what Rosch said in describing the level of categorization (1976). She approved that preschool children first categorized name at the basic level, rather than at the superordinate or subordinate levels because the basic level is simpler to learn. This research also provides strong support for Rosch's claim and follows her order of representations in levels of categorization. Based on the data analysis and charts, it can be concluded that in the authors of Persian storybooks for preschools, children used objects and names at the basic-level rather than at either a superordinate or a subordinate level. This result is attributed to basic categories having more distinctive attributes and superordinate levels require an additional process in understanding for preschool children.

On the other hand, the result for the superordinate level is dissimilar from the findings of Rosch et al. (1976); I found that superordinate levels were processed almost in a high frequency when comparing them to basic categories, rather than being the smallest. Therefore, we can see that the superordinate level in these storybooks are much more frequent than what Rosch initially proposed, according to the difficulty for preschool children to learn the superordinate level. It also contends the idea of Miller and Johnson-Laird (1976, p.281) who believe that when a subject has learnt the superordinate level first, they could not code them in terms of lower-level categories, which may be the way people typically represent natural language superordinate levels. But according to the chart and table 1, there is not a large difference in frequencies between superordinate and basic level, however, based on Rosch’s ideas, this not should be the result.

When comparing one English storybook with one Persian storybook, in chapter 3 , it can be concluded that based on Rosch’s ideas, the ratio of basic level categorization to superordinate level is reasonable within English story books (basic level 18, superordinate 2), whilst in comparison there is more difference between the levels in Persian storybooks (basic level 13, superordinate 4).

<b>English story book</b>	<b>Persian story book</b>
Superordinate 2	Superordinate 4
Basic level 18	Basic level 13
Subordinate 1	Subordinate 3

*Table 3: Comparing level of categorizations in one English and one Persian story book*

So according to the results, it can be concluded that the use of nouns in Persian storybooks at superordinate level does not follow Rosch’s principles; the reason for this can be because of the

cultural affect on categorization and cultural differences between Asian people and Western people. This finding is supported by previous research (Norenzayan, Smith, Jun Kim, and Nisbett, 2002) and they have concluded that cognition and reasoning styles alter in different cultures. This is inline with the fact that Asian thought is more holistic (looking as whole and general) while western thought is more analytical (looking at details instead). Language acts as an organizer of knowledge and there is reason to accept that aspects of language have an effect on categorization. In this regard Whorf (1956) believed that the main issue was that culture, through language, affected people’s thinking, for example the linguistic patterns, such as grammar, in different languages have an influence on people’s habitual thinking. According to him, the differences in linguistic systems in different countries are influenced in habitual thought and behaviour, also special characters of a given language influence the way people perceive and remember and in some, culture and language are not separable.

According to the chart2 and table4, concrete nouns are in higher frequencies than abstract nouns when considering the noun categories which were chosen in order to write the preschool children’s storybooks.

<b>Concrete noun</b> Frequencies	<b>Abstract noun</b> Frequencies
93%	7%

*Table 4: Frequencies in concrete and abstract nouns*

And based on pie-chart4 and table 5, concrete nouns are in high ratio to nouns on the basic level categorization in children’s storybooks.

<b>Concrete Noun</b>	<b>Basic-level categorization</b>
Frequency	Frequency
93%	62%

*Table 5: Frequencies in concrete nouns and basic-level categorization*

These results are supported by some recent studies on the understanding that children acquire abstract words later and have more difficulty in reading them than concrete words (Schwanenflugel 1991). Studies on children of the different processing strategies of concrete and abstract words have shown that words referring to concrete objects are processed faster, learnt and remembered better than abstract words (Paivio, 1971, 1986). More generally, it is concluded that there is a high ratio between concrete nouns and nouns in basic level categorization within the style of writing for Persian preschool children’s story books, this is because according to the mentioned literature, both of them are learnt and understand sooner and faster by children between five to seven years old. Also the authors of children’s story books seem intuitively to use categories that are learnt and understood sooner and faster by children, although they may be totally unfamiliar with this research and its results.

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