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The Levels of Bilingualism Hypothesis:

Cognitive and Linguistic Developmental Aspects

by

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Abstract

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The goal of this study was to explore the Levels of Bilingualism Hypothesis (Diaz, 1985) relating language proficiency and performance on categorization tasks. Kindergarten and first grade Puerto Rican children were tested for English and Spanish proficiency using the Peabody Picture Vocabulary Test (PPVT). All groups (except for the English dominant group) were at appropriate language levels in their dominant language, while second language proficiency was lower. The PPVT was used to group the children: Kindergarten - Monolingual Spanish and Dominant Spanish; First Grade - Monolingual Spanish, Dominant Spanish, and English Dominant. The categorization tasks were: Forced Choice Picture Tasks, Cued List Constructions, and Word Associations.

In the categorization tasks, the Spanish-speaking groups followed the same patterns described by Nelson for monolingual English speaking children. Within the Forced Choice Task, the preference order was the same: Thematic, slot-filler, and superordinate. Given the Category Productions, all the children relied more on script-based subcategories in contrast to conventional subcategories. Given the Word Associations, most of the Spanish-speaking and the older English monolingual children

relied on Taxonomic Horizontal knowledge. However, the younger Lucariello, et al., (1992) sample relied on Thematic responses.

According to Diaz, children at the initial stages of bilingual development would exhibit positive cognitive effects. Superordinate responses were considered as the most complex categorization responses. In support of Diaz, when speaking in Spanish, the first grade Dominant Spanish children made significantly more superordinate choices than the first grade Spanish monolinguals, given both the Forced Choice Unlabeled and Labeled Tasks.

Cummins' would have predicted that the Dominant English group would exhibit negative consequences, because their language proficiency was not at age appropriate levels, in either language. However, the Dominant English group performed comparably to the other groups when speaking in English.

Overall, performance on the tasks was found to be language specific, such that better results were obtained when working in their dominant language. The children's dominant language, from which their scripts originated, served as the basis from which taxonomic classifications developed and thus best reflected more complex superordinate categorizations.

The results are discussed in terms of their implications for theories of bilingualism and cognitive development and in terms of their implications for educational policy.

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Introduction to the Problem

In this study, Diaz's (1985) Levels of Bilingualism hypothesis is evaluated as it is related to Nelson's Categorization Theory (1981). For this purpose, how children at different stages of bilingual development performed on the different categorization tasks is compared to how monolingual children typically responded on these tasks (Nelson, 1986).

According to Diaz (1985), children at the initial stages of second language acquisition should be at the point at which the beneficial aspects of becoming bilingual can be observed. Balanced bilinguals, on the other hand, may be at a point beyond which any positive effects can be documented. Children who are not yet balanced should be at the level at which the positive effects may be more easily seen.

Nelson's (1986) and Lucariello, Kyratzis, & Nelson's (1992) research indicates that younger children's categorization styles may best be characterized by relations which focus on taxonomic horizontal slot-filler knowledge and non-taxonomic thematic types of categorizations, both of which are embedded in the child's non-linguistic knowledge representations organized by scripted events. Older children are thought to have developed more complex horizontal taxonomic categorization styles characterized by superordinate relations which are more abstract and less contextualized than script type relationships.

More specifically, younger children have been found to use more slot filler type responses when given category production and word association tasks. Older children's categorization responses were characterized by superordinate and subordinate relations in category production tasks. The older children's categorizations in the word association task were characterized by slot filler, superordinate and subordinate relations, whereas the younger children's responses were more limited to slot filler relations. However, for the forced choice task the older and younger children showed a similar pattern characterized by a preference for the non taxonomic thematic type relations. An interesting response pattern was noted for the justification task. The older children's responses relied more on functional explanations; whereas the younger children's responses were characterized by more categorical explanations. It was hypothesized that the older children's responses relied more on functional relations because these children were attempting to create their superordinate categories by abstracting the commonalities in their different scripts. The unification of the different scripts served as the basis for the construction of more abstract taxonomic categorizations.

How does bilingualism (balanced bilinguals and dominant) fit within the proposed theory of categorization? Do all young school children with knowledge of two languages, perform with the more complex taxonomic relations (superordinate) type relations? Or do children at specific levels of bilingualism display the more complex taxonomic type of responses?

If the process of becoming bilingual affects the children's conceptual organization so that they are more cognitively flexible or have achieved a level of metacognitive awareness in comparison to the monolingual speakers (Vygotsky, 1962; Leopold (1949) cited by Romaine, 1989) then differences in how monolinguals and bilinguals respond to the categorization tasks should be noted.

Given the Diaz (1985) hypothesis, one should be able to connect the level of bilingualism to performance. Specifically, those children who are at the initial stages of second language acquisition should show more complex types of taxonomic (superordinate) levels of categorization strategies in comparison to the monolingual, balanced bilinguals, or dominant English speakers. However, the social values of the languages may also impact on performance. The language learning environments of the children, the home language support systems, and pride associated with the learning and use of the second language may impact performance.

With respect to categorization strategies, Nelson's research suggested that the younger children's categorization style was more congruent with script relations, while the older children's style was more characteristic of complex taxonomic categorizations. However, bilingualism may not have an overall effect across all categorization tasks, but how the children perform may vary according to the task given, the level of bilingualism, and ultimately it may relate to how bilingualism is measured.

Bilingualism

At the core of the research conducted in the area of bilingualism is Whorf's theory of linguistic relativity (1956) that attributes different languages with different ways of organizing/interpreting experiences.

> We cut nature up, organize it into concepts, and ascribe significance as we do, largely because we are parties to an agreement to organize it in this way - an agreement that holds throughout the speech community and is codified in their patterns of our language. The agreement is, of course, an implicit and unstated one, but its terms are absolutely obligatory; we cannot talk at all except by subscribing to the organization and classification of data which the agreement decrees. (Whorf, 1956, pp. 213-214).

The implication for bilingualism would be that different languages offer different thought pathways and these processes are dependent on the language being manipulated (Hakuta, 1986). Thus, a bilingual could have two different systems of thought corresponding to each of the languages (Hakuta, 1986). However, "to the extent that one's linguistic experience is seen as central in shaping thought, we can legitimately expect the experiences of the bilingual to result in a richer view of reality" (Hakuta, 1986, p. 78).

Vygotsky's theory places great emphasis on the primary influence of the socialization context and speech/language guiding thought. "Vygotsky (1935, 1962) argued that being able to express the same thought in two different languages enables the child to see his language as one particular system among many, to view its phenomena under more general categories, and this leads to awareness of his linguistic operations (1962, p. 110)" (in Homel, Palij & Aaronson, 1987, p. 57).

Although bilingualism is widespread, the cognitive and linguistic effects of bilingual development are not well understood. Results from different research programs are inconsistent. According to Leopold (1949) and Vygotsky (1962), speakers of more than one language acquire the ability to separate words/forms from referents/meaning and thus achieve cognitive flexibility and awareness which could promote abstract levels of thought not readily available to monolingual speakers (Leopold, 1949 cited by Peal and Lambert, 1962). Several researchers, basing their theories on Vygotsky (1962), propose that learning a second language increases flexibility in thought processes (Hakuta, 1986) and aids in memory, perception, and creativity (McLaughlin, 1984). Other studies posit the parallel and even superior performance in certain areas of cognition and language (Axelrod, 1974; Riely, 1972; Troike, 1972, cited by Lindholm, 1980; Ben-Zeev, 1977; Peal & Lambert, 1962). However, results reported by Doyle, Champagne, & Segalowitz 1977 (cited by Cummins & Swain 1986); Brown, Fournier, and Moyer 1977 (cited by Kessler & Quinn 1982) and Ben-Zeev (1977) also concluded that bilinguals were deficient or slower in language as well as in cognitive abilities in comparison to monolinguals.

According to Cummins (Cummins & Swain, 1986), a child must attain an upper threshold proficiency level in both languages in order to "avoid cognitive disadvantages and to allow the potentially beneficial aspects of becoming bilingual to influence cognitive growth" (p. 59). Thus, the claim is that for positive long term cognitive development a certain minimum age appropriate proficiency level in both languages must be achieved. If the language proficiency levels are unequal such that only one language is age appropriate, neither positive nor negative cognitive effects would be expected. However, if the language proficiency levels are low for both languages such that neither language is proficient at an age appropriate level then negative cognitive effects would be expected according to Cummins' theory.

Support for Cummins' theory is noted in the Cummins & Mulcahy (1978) and Cummins (1977) experiments. Cummins & Mulcahy (1978) investigated the performance of 5 and 7 year old English & Ukrainian, monolingual, and bilingual children on arbitrary word referent and a lexical (picture) ambiguity tasks. Among the balanced bilingual, monolingual, and limited bilingual groups only the balanced bilingual group performed better on the lexical picture ambiguity task. The task required the children to listen to an ambiguous sentence and choose the pictures that represented both meanings of the sentence. No differences were found between the monolingual and limited bilingual groups on this task. No differences were found among the groups with respect to the arbitrary word referent task.

Furthermore, Cummins (1977) investigated the performance of English and French monolingual and bilingual speakers on verbal and nonverbal tasks. The groups were divided according to the home language environment. The following were the three groups: English, French, and mixed English French. Language proficiency and bilinguality were assessed through a composite score of the following variables: word association, self ratings and teacher benefit ratings. Cummins found that for the English (home language) group which contained 12 balanced bilinguals and 11 limited bilinguals the balanced bilinguals performed better on the utility task which indexed fluency, flexibility, and originality. It should be noted that Cummins' theory was based on the comparison of balanced, limited, and monolingual speakers.

In support of the Cummins' Threshold Theory is Clarkson & Garbraith (1992) who noted that the children with higher and more balanced levels of English and Pidgin performed better on math tasks than children who had low proficiency levels in both languages. Moreover, Balkan (1970) noted that the balanced bilinguals were cognitively more flexible than monolinguals (cited by Kessler & Quinn, 1982). In addition, Ricciardelli (1992) noted that those children who were highly proficient in both languages performed better than the monolingual groups, the language dominant groups who had lower proficiency levels in both languages, and the groups with only high language proficiency in one language. The highly proficient balanced bilinguals outperformed the other groups on divergent thinking, imagination, grammatical awareness, perceptual organization, and reading achievement.

However, Diaz and Klingler (1991) stated that the "positive effects of bilingualism seem to occur more strongly for children at early stages of bilingual development and attenuate as children become more proficient bilinguals" (p. 177). Thus, at the initial stages of second language acquisition, positive cognitive effects would be expected. Moreover, increased proficiency levels did not necessitate increased positive cognitive effects. However, the positive effects of bilingualism are not expected to disappear with increasing proficiency.

The levels of bilingualism hypothesis was based on an investigation conducted by Diaz (1985) ~~on the cognitive and~~ linguistic performance of 100 5- and 7-year-old low income Puerto Rican children. The subjects were equivalent in terms of first language Spanish ability. All tests were conducted in Spanish. However, the subjects were divided into low (LEP= isolated English words) and high (HEP= complete English sentences) English proficiency groups, which referred to level of bilingualism. The children included in this sample were not balanced bilinguals. It was noted that only one or two children were balanced bilinguals. Language ability was assessed through the Peabody Picture Vocabulary Test (PPVT) (and substantiated by story recall measures).

The subjects were tested for cognitive and metalinguistic performance two times six months apart. The results indicate that at time one the HEP group did better than the LEP group on a spatial figure completion task, analogies, and separateness of language tasks. However, the observed cognitive differences between second language proficiency were attributed to socio economic status. Thus, once SES was controlled for the differences disappeared. At time two the initial differences between the groups decreased. The main significant finding was that the HEP group did better on a spatial figure completion task.

Thus, positive effects were noted in a group which was not yet balanced in their language abilities. However, because these results were not compared to a balanced bilingual or a monolingual Spanish speaking group the levels hypothesis is still in need of further evaluation. One cannot assume that because the HEP did better than the LEP on spatial figure completion that they would have done better than a balanced bilingual or the monolingual group.

In terms of causality, the English proficiency of the LEP group at time one predicted the cognitive performance on the Raven's test of cognitive ability and a separateness of language task at time two. For the HEP group, English proficiency at time one predicted the cognitive performance on the Raven's Progressive Matrices and a spatial completion task at time two.

Additional support for Diaz's hypothesis is observed in a study conducted by Bialystok (1988) which reported that dominant bilinguals performed similar to balanced bilinguals in word referent tasks while the monolinguals performed at lower levels. On tasks requiring more sophisticated language analysis, however, the balanced group outperformed the monolinguals whereas the dominant bilinguals did not consistently perform better than the monolinguals (cited by Yelland, Pollard, & Mercuri, 1993).

Yelland, et al. (1993) reported that "one hour of Italian instruction each week for 6 months was sufficient to provide the preparatory grade children with a significant advancement in the development of word awareness, relative to a matched group of children who received no second language training" (p. 438).

Kessler & Quinn (1979) compared monolingual children to dominant (nonbalanced) Italian-English 6th grade bilingual children on a task used to generate hypotheses to solve discrepancies (cited by Kessler & Quinn, 1982). The hypotheses were coded for quality and syntactic complexity. The dominant bilinguals (subtractive and not balanced) performed significantly better than the monolingual children.

By analyzing children at different levels of their second language acquisition one may be able to move the discussion from its focus on the effects as simply being positive or negative to a more specific view which would explore the possible differences in the processing strategies that develop according to the level of second language acquisition and the task given.

A further exploration of the basic questions of what one means by the term bilingualism, how bilinguality is measured, and what processes impact on the development of a bilingual child is needed.

How Bilingualism is Defined

According to Palij & Homel (1987), the different definitions and measurement of bilingualism contribute to the inconsistent findings regarding bilingual development. It was noted that at one point bilingualism was indexed by mere nationality and/or the surname of the child. Thus effects of the social environment were not taken into account. Having a Spanish surname does not ensure that an individual, let alone an entire family, was bilingual or even exposed to a second language. Moreover, while the parents may possibly have been exposed to a second language, their command of that language and what they have chosen to or not chosen to expose the child to is questionable given a society in which second language knowledge has not always been valued (depending on what is the second language). If how one acquires a second language affects performance in various tasks, then such information needs to be specified.

The process of becoming bilingual was taken into account with the compound - coordinate distinction first proposed by Weinreich (1953) and Ervin-Tripp & Osgood

(1954) (cited by Palij & Homel, 1987). A compound bilingual is one who learned both languages in the same environment from birth whereas a coordinate bilingual learned the languages in 2 different contexts possibly at two different times (Ervin-Tripp, 1973).

Vygotsky placed great importance on the interactional context, the way in which the languages are acquired. "If both languages were used for similar purposes - as in fully bilingual schools- then both would presumably be available and would afford the person a wider range of thought" (Hakuta, 1986, p. 80). However, "if the languages were learned and used for different purposes -if one were used at home and the other at school, for example- then it is unlikely that both would be available for any given purpose" (Hakuta, 1986, p. 79).

Both of these approaches however, failed to take into account the child's proficiency level in each of the languages as did Lambert's (1977) notion of additive and subtractive bilingualism and the threshold model proposed by Cummins (Cummins & Swain, 1986).

Additive bilingualism refers to the case where the first language is dominant and prestigious such that the second language does not compete with the first, thus allowing the favorable acquisition of the languages, characterized by higher levels of proficiency. Subtractive bilingualism is characterized by the case where proficiency in the less prestigious language is delayed or not accomplished.

Cummins and Swain's (1986) proposed three types of bilinguals: A was characterized as proficient bilingualism where language development was age-appropriate in both languages; resulting in positive cognitive effects. B was characterized as partial bilingualism where language development was age-appropriate in one language only; resulting in neutral cognitive effects. C was characterized as limited bilingualism where language development was poor in both languages (may be balanced or dominant); resulting in negative cognitive effects (Palij & Homel, 1987). Cummins never stated what the exact level of proficiency was, but it was noted that it depended on the social environment which was related to the basic interpersonal communicative skills and on the schooling environment which related to cognitive/academic language proficiency. Similar to other researchers, Cummins hypothesized that a number of other variables must be considered, such as intelligence, socio economic status, the specific culture-language relation, and the attitudes involved.

McLaughlin (1984) addressed the various possible types of input systems that a bilingual person may be subject to, differentiating the input of the home from that of the community/school which added another dimension to proficiency and the time when the language was learned (McLaughlin, 1984, p. 187). In addition, whether the language/s spoken was specific to one person or whether there was mixed usage of the languages by the individuals was also considered important.

The questions referring to measurement of bilingualism, proficiency, and dominance are crucial. McLaughlin (1984) stated that some tests rely on memory to assess dominance. For example, the Crane Oral Dominance Test characterizes one as dominant in a particular language if more words are recalled in one language than the other. However, the relationship between recall and dominance is questionable.

Basically, could children with better short term memory skills do better on this task irrespective of language dominance (and vice versa). Other tests such as the PPVT are not sensitive to the fact that domains may exist such that more or different words, or better syntax for example, are known in one language for particular domains than the other language.

McLaughlin (1984) noted that different tests may be administered orally or in written form. Again there are problems associated with each of these methods. First, some tests require that the child select a word which is read out loud from a number of written words. In this case, it is not clear if poor performance is attributable to lack of oral proficiency or literacy skills. Second, some tests require oral imitation of various words or sentences. In this case, how much of what the child repeated is actually understood is not clear. Third, some tests require the child to tell a story. In this case one must be aware of the fact that culture/personality has much to do with how one tells a story and what that story will consist of. Fourth, some tests focus on quantity of production and ignore repetitions and/or language complexity.

In conclusion, all the methods have reliability and validity problems. To aid in test selection one should note: First, tests should not rely on mere translations of the words children use in the various languages because the complexity may differ according to the language used. Second, the elements must be within the child's cultural knowledge. Third, the test should not require the child to talk in ways that are not conventional in the community. Fourth, the quantity and quality of the child's responses should be carefully analyzed. Fifth, norms for comparison must be made within the particular group in question. Sixth, tests should be psychometrically adequate, in terms of reliability, and validity (Burt & Dualy, 1978 cited by McLaughlin, 1984).

McLaughlin noted that there was a move away from the sole use of either discrete tests or integrative tests to an integration of the two methods. "Discrete-point tests consist of items designed to test a number of specific structures or rules-discrete points in the language system" (McLaughlin, 1984, p. 218). An integrative test obtains evidence of students' overall control of the language by having them produce connected discourse in some meaningful context" (Dieterich & Freeman, 1979, cited by McLaughlin, 1984, p. 218). The unification of the two approaches gives us the profile of the child in general as well as in specific areas of language proficiency.

In conclusion, a more sociolinguistic, ethnographic approach allows one to observe the various ways that languages are used in various settings. However, there are problems associated with this approach as well. First, there are a vast number of settings in which one can explore the various language rules. When is it safe to stop observing? And, can one relate varying rule uses to proficiency?

What is becoming increasingly clear is that a one shot, time limited, and scope limited test is not the most valid or reliable measure of one's proficiency. What should be considered is a multi-method language measure which will take into account the various aspects of a child's level of proficiency. While this will prove time-consuming, the measures in existence today are limited by a number of problems cited above, such that the results obtained are either unreliable, not valid, or simply too limited in scope

(McLaughlin, 1984).

Palij & Homel (1987) noted that it is most difficult to control for all of the possible variables that may be related to bilingualism. While matching does attempt to control the interacting components; matching may not always be possible. They stated that statistically one may control the effects of various variables, but that while mathematically this may make sense, ecologically it may not.

The prior use of the PPVT in studies of bilingualism (Argulewicz & Abel, 1984; Ben-Zeev, 1977, Doyle, Champagne, & Segalowitz, 1978; Rosenblum & Pinker, 1983; Serapiglia, 1978, cited by Umbel, Pearson, Fernandez, & Oller, 1992; Hakuta, 1987) is quite common. However, some studies such as Hakuta (1987) included a story recall measure; and others such as Yelland et al., (1993) included language comprehension test. However, what these specific tests are measuring is different (recall as opposed to comprehension), and thus the evaluation of the bilingualism theory may be dependent on the measures used. How results are interpreted as supporting or invalidating a theory may be specifically tied to what specific language ability was being assessed. Moreover how the different yet specific language tests relate to the dependent variable is an area left unanswered.

For example, Kuo (1974) studied how Chinese-English bilingual children's proficiency related to family/societal issues. Proficiency was measured only through the use of the PPVT. Kuo acknowledged this as one of the limitations of the study. The children's performance on other language skills such as language production, reading, or writing and how these measures might have related to the PPVT were not considered.

Moreover, studies are still conducted which ignore proficiency. Campbell & Sais (1995) found that bilingual English-Italian children had better phonological awareness than monolingual children. However, no measures of linguistic ability were administered. Koopmans (1990) studied Puerto Rican bilingual children to explore the effects of language proficiency and grade as it related to performance on syllogisms. Bilinguality was based on teacher ratings which indicated that the children "would be testable in both languages" (p.336). "Although Adetula (1989) found that Nigerian children could solve word problems across two languages, his failure to obtain direct evidence about the children's proficiency in either language did not allow him to explore whether there was a relationship between degree of bilingualism and problem solving" (cited by Secada, 1991, p. 218).

The cognitive and linguistic ramifications of bilingual development remain to be fully explored. Cummins & Swain (1986) and Diaz (1985) hold different perspectives with respect to how the positive effects of bilingualism are manifested. According to Cummins, to "avoid cognitive disadvantages and to allow the potentially beneficial aspects of becoming bilingual to influence cognitive growth" (p. 18), one must have balanced and age-appropriate levels of language development. For Diaz, the "positive effects of bilingualism seem to occur more strongly for children at early stages of bilingual development and attenuate as children become more proficient bilinguals" (p. 177). Both theories take a somewhat general-overarching perspective that given certain conditions (balance-imbalance) bilingualism may foster positive advances; neither theorist has entertained the possibility that different tasks may elicit different performance depending on the level of bilingualism.

Categorization

The purpose of this study was to investigate the relationship that exists between the development of categorization strategies and the development of bilingualism. Very little literature on the relation between bilingualism and categorization exists. Nelson's (1981) theory of categorization, which provided the basis for this investigation will be reviewed first. Second, the limited research that relates bilingualism and categorization will be reviewed.

Nelson (1981, 1985) proposed a developmental approach to children's organization of knowledge. She noted that the conceptual structure of the child included components of actions and actions upon objects that were functional in nature. Thus, objects were first understood in terms of their functional relationship in a given context. The conceptual system was nurtured by personal experience.

The development of scripts and slot-filler categories was based on a functional perspective. A script is a kind of schema from which the child draws from an event the temporal and causal sequence of actions and the corresponding objects that share the same functions. Slot-filler categories were derived from scripts, being composed of objects that share a common function such that all members can be substituted for each other within the same slots. Thus, the major classification component was not physical feature similarity, but that of equivalent function. The slots in scripts provide a kind of holding pattern for items from a category, eventually combined in a more general category under a verbal superordinate label.

Rosch's (1975) categorization theory was based on both physical similarity and motor activities (Rosch & Mervis 1975; Rosch et al., 1976). According to Rosch, (adults' and children's) categories are organized around prototypical exemplars. A prototype consisted of a schema which exemplified the most salient or important features of its category. In the bird category, a robin could be considered a prototypical bird. In this case, classifying a penguin as a bird would be more difficult because the target shared few features with the prototype. Rosch noted that the development of categorization skills began with the child's acquisition of basic level terms; after which hierarchical taxonomic knowledge developed which incorporated subordinate and superordinate terms. Basic level categories were those in which the members share many features in common, but relatively few features with other members at the same level.

Taxonomic categorization implies a hierarchical relationship among the items. (Lucariello & Nelson, 1985). However, at the superordinate level the feature commonalities characteristic of basic level categories are not present; thus, superordinate taxonomic categorizations may not be acquired as easily or quickly as simple categories based on basic level terms or slot filler categories. Subordinate level terms referred to specific types of basic level items. Thus, a poodle is a subordinate term for the basic level category of dog, which belongs to the superordinate animal category. The animal category includes the wide range of existing animals.

According to Nelson's theory, a child categorizes first in terms of functional relationships and only later develops the capacity to categorize taxonomically. Taxonomic categories are thought to depend on the organization of linguistic terms, in contrast to specific ties to particular events (Nelson, 1988). Thus, participation in various scripts does not necessarily produce taxonomic knowledge, but the use of superordinate terms and the reorganization of and extraction of script commonalities enabled the child to acquire this more advanced type of classification. The developmental sequence was supported by the results of the following empirical studies which demonstrated the existence of an initial functionally based categorization system (Nelson & Nelson, 1990; and Lucariello & Nelson, 1985).

Nelson and Nelson (1990) studied 5- and 7-year-old children's production of item members as cued by taxonomic (superordinate) versus script cues. For example, the children in the taxonomic condition were asked to name all the foods they could think of; in contrast, children in the script condition were asked to name all the foods they could eat for lunch, and for breakfast. It was found that the script condition allowed the 5-year-olds to produce more members. The 7-year-olds, on the other hand, produced more members when given the taxonomic cue. The script cues were more meaningful for the younger children, consequently it was believed that these children were working within a script type framework.

Lucariello & Nelson (1985) found similar results with respect to the recall of 3- and 4- year-old children on lists of 9 word types, each containing 3 categories of 3 words each from the following lists: Taxonomic consisted of food from different scripts; slot-filler consisted of lunch foods; and thematic consisted of contiguous relations like a plate and a sandwich. The following categories were used: clothing; food; and animals. The slot filler word list was recalled and clustered more than the other lists. Again, the slot filler word list (which was script based) was more meaningful for the young children.

According to Lucariello, Kyratzis, & Nelson (1992), children's categorization strategies are not limited to thematic relations, as was previously thought, but include taxonomic relations as well. It is noted that the overall use of taxonomic classifications by preschoolers may be restricted, but that the preschoolers exhibit some forms of taxonomic classifications more than others. However, the type of taxonomic relation used by younger monolingual children differs from that used by the older children. Based on Lucariello, et al., (1992) children's taxonomic categorization strategies developed from the more experiential event-based knowledge of how things happen in the everyday context. The development of the children's more complex taxonomic knowledge was based on the reorganization of slot filler relations into more general conventional hierarchically organized superordinate categories.

In contrast to Nelson, Markman & Hutchinson (1984), as well as Waxman & Gelman (1986), consider labeling as the contributing factor to children's taxonomic categorizations. Markman & Hutchinson (1984) conducted a study in which they looked at (4-5 year old) children's forced choices under two conditions. The children were shown a target picture and asked whether a thematic or taxonomic picture was the better match. In one condition, the target was not labeled whereas, in the other the target was labeled by a nonsense word. The results indicated that children made more taxonomic choices given the nonsense labeled task. However, in the un-labeled condition children made more thematic associations. According to Markman & Hutchinson (1984), the rise in taxonomic associations given the nonsense label was justified because, "when children hear a word, they focus on categorical relationships because of general knowledge of what nouns encode, and not because of specific knowledge about the word's meaning" (p. 10).

Waxman & Gelman (1986) conducted a series of experiments to assess the taxonomic categorization capacities of 3-year-old children. For example, the children were told that a puppet which came from another world wanted “dobutsus”. In the labeled condition the children are given Japanese terms for objects. This Japanese label condition served as a nonsense label because the children were not familiar with the Japanese names. The experimenter claimed not to know what that word meant but to know that the puppet liked such things as a dog, duck, and horse. The child was then asked to find other things that the puppet might want. Some of the other conditions were as follows: label, in which a superordinate label such as animals was used; instance, in which three specific members were named and the child was expected to name other things that the puppet might want. It was found that given a Japanese word and label condition the children sorted significantly better than if given the instance condition.

Lucariello, et al., (1992) attribute the reorganization of script knowledge as the basis for the development of the more difficult taxonomic types of categorizations.

According to Markman (1989), the acquisition of labels is related to children's assumption that the labels are referencing similar objects. "Children focus on [taxonomic] categorical relations because of the sheer presence of a word [nonsense or new], and not because of any particular knowledge about the meaning of the word" (Markman & Hutchinson, 1984, p. 17).

Bilingualism and Categorization Strategies

It is of interest to note whether all monolingual children perform in accordance with the patterns thus reported. More importantly, it will be of interest to note any variations on the part of bilingual children. How does a second language influence thought and categorization performance?

According to Vygotsky, having two language systems interacting simultaneously would foster meta cognitive awareness, such as the knowledge associated with understanding the arbitrariness of labels. Ben-Zeev (1977) conducted a study with Hebrew-English bilingual children (with a mean age of 7 years). There were four groups: Monolingual Hebrew, Monolingual English, Bilingual Hebrew-English in the U.S., and Bilingual Hebrew-English in Israel. A 15 item translation test was used to index proficiency levels in the languages. An 18 item word association test was used to index syntagmatic and paradigmatic associations. It was proposed that if experience was at the base of the more semantically advanced type of categorization, then bilingual children should not be expected to develop categorical ordering before monolingual children. "On the other hand, we can expect precocious appearance of categorical associations from bilingual children if the ability to associate words categorically is enhanced by the frequent experience of conflict in the interpretation of word meaning and sentence structure" (Ben-Zeev, 1977, p. 1010).

Semantic knowledge was tapped by a word association task of 18 words, primarily verbs and adjectives. The child was read a word and expected to respond, with the first word that came into thought. It was hypothesized that the bilinguals would have developed paradigmatic (as opposed to syntagmatic) type responses before the monolingual children. "... in general younger children give more syntagmatic responses on word association tests than do older children and adults, whose responses, especially to nouns, are very largely paradigmatic" (Nelson, 1981 p. 114). However, the results indicated that the bilingual children did not differ from the monolingual children. This result could have been due to the possible mixed composition of the groups. That is, information as to how the children acquired their language is unclear. Language development could have differed between and within the groups, such that children raised as "compound or coordinate bilinguals" were mixed. It could be argued that all children (bilingual and monolingual) possess basic paradigmatic/slot filler knowledge. However, is the rapid development of taxonomic categorizations more accessible when nouns are used in the tasks?

Differences as to taxonomic knowledge development were not thoroughly addressed by Ben-Zeev and remain to be explored. What is of particular concern is the overall categorization (taxonomic, slot filler and functional) capacity of bilingual children which may not be all that evident given verbs and adjectives. First, although one can argue that some verbs can be organized taxonomically, for the most part nouns are more hierarchically organized than verbs (Graesser, Hopkinson, & Schmid 1987). Second, if young children develop the categorical use of nouns before verbs, then a more appropriate test of precocity for younger children would address categorization strategies as used with nouns.

Proposed Questions

This dissertation examines the categorization performance of Puerto Rican children living in Puerto Rico, New York, and the New Jersey areas who are Spanish Monolinguals (MS), Dominant Spanish (DS), and Dominant English (DE). All come from Spanish-speaking homes in communities where both languages are used. The Dominant Spanish children attended bilingual program while the monolingual children attended regular English classes.

These groups were chosen to explore the Diaz (1985) levels of bilingualism hypothesis which states that it is at the early stages of integrating the two languages where one is more likely to note the positive effects of knowing two languages. Thus those who are at the initial stages of second language acquisition will exhibit the most evident positive cognitive effects. Children who have experienced both languages simultaneously (from an early age) are probably beyond the point at which the positive effects can be documented. Accordingly, the DS groups (not yet balanced) are expected to perform at higher levels of categorization strategies than the monolingual groups and the DE group. Because the children in the DE group did not achieve age-appropriate language levels is not clear that the DE will perform equal to, better, or worse than the MS group. If any knowledge of a second language at any point is thought to aid cognition, then the DE group will perform better than the MS.

Based on Cummins' theory, only those children who are at age-appropriate language levels in both English and Spanish should exhibit positive results over the monolingual children. Moreover, it would be predicted that the groups achieving an age-appropriate level in only one of the languages would not show any positive or negative cognitive effects. Moreover, in cases where the language levels are low and not age-appropriate, negative cognitive consequences are expected. More specifically, the following questions will be addressed:

> At what level of bilingual development can one observe positive cognitive performance on categorization tasks? According to Diaz, the DS groups will show advanced performance over the MS and the DE. According to Cummins, only the groups with age-appropriate language levels in both English and Spanish will demonstrate the positive cognitive effects.

> How do the monolingual and bilingual Spanish-speaking children's categorization strategies fit with Nelson's theory of development? Are the younger children categorizing with more thematic or slot-filler relations? Are the older children categorizing with more taxonomic relations?

> Does Markman & Hutchinson's labeling hypothesis make a difference in how the monolingual or bilingual children categorize? It may be that bilinguals at different stages of development are differentially affected by such a task. Thus, the more balanced may not change their responses based on the presence of a label, but the dominant bilinguals may use the target word as Markman & Hutchinson suggest, as a superordinate tag.

How do the different measures of bilingual proficiency relate to task performance? Is measuring a child's English and Spanish PPVT sufficient to index level of proficiency which would relate meaningfully to performance on various tasks? In particular how do the script constructions compare?

How do the children's responses in English compare to the children's responses in Spanish?

Chapter II

Method

Subjects

It should be noted that although 99 children participated in this study over 200 children were sampled. Most of the children interviewed received PPVT scores below their age levels and were thus excluded from this sample. To test the bilingual hypothesis, it was critical that the children included have their dominant language at their age-appropriate language level. The low performance of many of the children could have been related to a number of factors the most salient of which refers to the items included in the PPVT. In addition, first grade bilingual group including children which were at age-appropriate language levels in both Spanish and English would have been included, if a sufficient number of children could have identified through the PPVT, but only a handful were identified.

A total of 99 Puerto Rican children in kindergarten and first grade participated in this study. The mean age of the kindergarten groups was 5.6 years and for the first graders it was 6.7 years. The children lived in New York, New Jersey, and Puerto Rico (Guayama). All came from Spanish-speaking homes in communities where both English and Spanish are used. The Dominant Spanish children were in English and Spanish bilingual classes, while the Dominant English children attended regular English classes.

Based on their language proficiency and dominance, measured by the PPVT, and current school grade level, the children were placed into one of five groups: Monolingual

Spanish-Kindergarten (MS-K), Monolingual Spanish-First Grade (MS-1G), Dominant Spanish-Kindergarten (DS-K), Dominant Spanish-First Grade (DS-1G), and Dominant English-First Grade (DE-1G).

The language criterion used was that the children be at age-appropriate level for their dominant language while the weaker language was at a lower level. For example, with the dominant Spanish groups, of all the children sampled, the children with age appropriate Spanish levels and below English age-appropriate levels were included in the study. If for example a 6 year-old achieved a Spanish score of a 4 year-old and their English score was like a 3 year old they were not included in the Spanish dominant group, because their Spanish language level was below that of a six-year-old.

On the Spanish PPVT the kindergarten groups averaged 6.0 years and the first grade dominant and monolingual Spanish groups averaged 6.9 years. The English dominant first grade group averaged only 5.7 years on the English PPVT. (See Table 1.) In their weaker language the children performed as follows: DS-K in English 3.1 years, DS-1G in English 2.9 years, and the DE-1G in Spanish 4.4 years. The DS-K and the DS-1G groups are at about the same level of English acquisition.

Children's performance on the other language measures will be reviewed later. However, it should be noted that the children were placed into their groups solely on the basis of their PPVT scores, even though the other language measures may have demonstrated that they were more balanced in both of the languages.

The MS-K, MS-1G, DS-K, and DS-1G groups consisted of 20 children each, and the DE-1G group had 19 children. There were equal numbers of boys and girls in all the groups with the exception of the MS-1G group which had 9 boys and 11 girls, and the DE-1G group which had 7 boys and 12 girls.

Table 1

Age (Years) And Peabody Language Age Equivalents

GROUP	AGE	ENGLISH AGE EQ PPVT	SPANISH AGE EQ PPVT
Spanish Monolingual - K (MS-K)	5.8	----	6.8
Spanish Dominant - K (DS-K)	5.3	3.1	5.2
Mean - Kindergarten	5.6	3.1	6.0
Spanish Monolingual - 1G (MS-1G)	6.6	----	7.5
Spanish Dominant -1G (DS-1G)	6.7	2.9	6.2
English Dominant- 1 G (DE-1G)	6.8	5.7	4.4
Mean First Grade	6.7	4.3	6.0

Raven's Progressive Matrices test was used to evaluate differences among the groups on intelligence. (See Table 2.) The test contained 36 questions, the overall mean of correct responses for all the groups was 16. The raw scores ranged from 14 to 19, the percentile ranks range between 32-55. The groups scoring between 40-55 percentiles are in the average range. Although the DS-1G group scored at the 32 percentile, a one-way ANOVA revealed that there were no significant differences between the groups in terms of the Raven percentile ranks.

Table 2
Raven's Coloured Progressive Matrices
Mean Raw Scores And Percentiles

Group	Raven Mean Raw Correct	Raven Mean Percentiles
MS - K	17	55
DS - K	14	40
MS - 1G	17	43
DS - 1G	15	32
DE - 1G	19	52

In order to evaluate the groups in terms of SES, the ratio of rooms per person in the home was used (see Appendix B). The groups ranged from MS-1G=.75, MS-K =.76, DS-1G =.78, DE-1G=1.1, to DS-K=1.2 rooms per person. There were significant differences among the groups ($F=4.63$, $p<.003$). Scheffe's procedure identified the DS-K group as having significantly more rooms per person than the MS-1G and the DS-1G groups. The demographic and language data was completed by only 55% of the parents. In addition, depending on the nature of the questions some of these parents chose not to complete all the questions, namely those which referred to rooms per person, because they were thought to be too intrusive and were considered irrelevant.

Variation among the groups on indices of SES and intelligence were inconsistent. Their relevance to the evaluation of the cognitive hypothesis under examination is unclear.

Procedure and Materials

The tasks were administered on four days and were either given in English or in Spanish language. Half of the children were tested in English first and then in Spanish and half of the children were given the reverse order. Although the bilingual children were tested a maximum of 4 times, the monolingual Spanish-speaking groups were seen twice because they spoke only Spanish. Observations were spaced at one week intervals.

Order of Tasks

Visits One and Two (English/Spanish)

- PPVT
- Script Constructions (Birthday Party and Home from School)
- Flexibility (School, Home, Play)
- Raven's Progressive Matrices (Both Languages. Only in visit 1.)
- Unlabeled Forced Choice Picture Task
- Justifications

Visits Three and Four (English/Spanish)

- Story Recall (Grandmother and Park)
- Cued Category List Constructions
- Word Associations
- Nonsense Labeled Forced Choice Picture Task
- Justifications of Nonsense Labeled Forced Choice
- Socio-cultural Language Affect (In dominant language.)

Bilingual Language Measures

The PPVT was used to measure proficiency, however because it focussed only on vocabulary knowledge, other language measures were included to get a better sense of the children's linguistic abilities. A flexibility task similar Cummins (1977) was also used to evaluate the children. The children were asked to state as many words as they can think of that go with "school", "home", and "play" presented in random order for each child. The children were given at least 60 seconds to complete their list.

Other measures were designed to index language production in an attempt to better understand how the measures related to each other and to the bilingual domain. A story recall task was designed to ascertain children's ability to recall short stories in English and Spanish. The children were told that they were going to hear a story and that afterwards they were to retell the same story. The children were read the following stories about (a) a grandmother's visit and (b) a visit to the park.

(a) *Maria's/Jose's grandmother* came to *visit* her/him.
Maria was so *happy* to see her.
They spent the whole *day talking, playing* and *singing*.

(b) *My mami* took me to the *park*.
I *played* on the *swings* and on the *see-saw*.
When I got *tired* my mami took me *home*.

After the story was read, the children were asked to repeat the story exactly as it was told. The children's responses were coded for the recall of the main elements shown in italics. Each story contained 8 elements. The fluency measure attempted to capture the grammatical flow of the utterances. Fluency was rated on a 5 point scale (1 being least fluent and 5 being the most fluent). Discourse rated as a 1 consisted of 2 words or less, list-like; 2 consisted of 3 or more list-like words, incomplete sentences; 3 consisted of at least 2 sentences; 4 consisted of 3 or more sentences with errors; 5 consisted of a passage which matched what the researcher described. In terms of rater reliability in English, 30% of the subjects' responses were re-coded with an 81% agreement. In Spanish, 20% of the subjects' responses were coded with an agreement rate of 85%.

In addition, because neither the PPVT nor Flexibility test measured continuous speech, Script constructions were also obtained in English and Spanish. The children were asked to respond to two script: "What happens at a birthday party?" and "What happens when you come home from school?" After the children responded, they were asked, "What happens next?" What else?" and "Anything else?" The number of words, actions, and fluency in the different languages were coded. Fluency was rated on a 5 point scale in which 1 was the least fluent and 5 was the most fluent. A rating of 1 consisted of a list of 1-4 words. A 3 rating consisted of 1-3 sentences or listed words combined with sentences, with minor error. A rating of 5 contained 5 or more sentences with relatively no errors. In English, the rater agreement was 79% based on one-third of the bilingual subjects. In Spanish, the rater agreement was 81% based on one-fifth of the sample.

Categorization Tasks

Four main categorization tasks were administered: Unlabeled and Labeled Forced Choice Picture tasks, Justification of Forced Choice tasks, Cued List Constructions, and Word Associations.

Forced Choice Picture Task

The Forced Choice Unlabeled Picture task replicated the task used by Lucariello et al. (1992). The task consisted of 18 triads, with 2 target pictures from each of 9 slot filler categories: Breakfast, lunch, and dessert foods; clothes for the morning, outside, and bed; and zoo, farm, and pets. The children were shown a target picture, and told the following, "Now I'm going to show you pictures and I want you to tell me which pictures go best together. See this." (Target shown) "Which of these (two options shown) goes best with this one?" The children responded by pointing. Their two options consisted of combinations of a superordinate, slot filler, and thematic picture choice. Table 3 refers to the triad group types: Type 1= Slot filler vs Superordinate; Type 2= Thematic vs Slot Filler; and Type 3= Thematic vs Superordinate, and lists the items included in each.

In the Forced Choice Nonsense Labeled Picture task, the target pictures were labeled by nonsense words, based on Markman & Hutchinson (1984) who found that labeling increases children's choices of taxonomic responses. The triad types included in this task were: Type 1 which compared Slot filler and Superordinate choices and Type 3 which compared Thematic and Superordinate choices. The children were given the same instructions for this task with the addition of the nonsense label every time the target picture was referred to.

For the Forced Choice Unlabeled and the Nonsense Labeled Picture task, the children were asked to identify all pictures beforehand and any unknown pictures were labeled.

Table 3
Stimuli Triad Sets For Forced-Choice Task By Triad Type

Triad Type	Target	Choice 1	Choice 2
I. SF/SP	rooster cat cake cheese socks boots	cow goldfish ice cream peanut butter pants sweater	lion elephant cheese pancakes coat shirt
II. TM/SF	dog elephant pie pancakes pajamas coat	bone peanuts fork knife bed hanger	parakeet tiger cookie egg slipper hat
III. TM/SP	pig lion cereal hot dog nightgown shirt	barn cage spoon plate toothbrush dresser	cat dog cake cereal sneaker boots

Choice 1 is the first choice-type designated in the triad type listing.
Choice 2 is the second choice-type designated in the triad type listing.
SP=Conventional Superordinate category. SF=Slot-Filler category. TM=Thematic category.

Justifications

Of the 18 targets, the children justified 9 items for their preferred response and 9 items for the response not chosen following Lucariello, et al., (1992). Justifications were made after completing the forced choice task. Children were asked,"Now last time you said that this one and this one went together. That was right. But why?" and "Now last time you said that this one and this one went together. That was right. Now is there any way this one (not chosen) can go with this one (Target)?" With respect to the justifications made in the Nonsense Labeled Forced Choice condition all the instructions were the same with the additional use of the nonsense label each time the target picture was referred to.

The children's justifications for the objects were coded for the following properties:

1 Superordinate
2 Functional (action for)
3 Slot filler label
4 Thematic (complementary, situation, sequence)
5 Feature (perceptual)
6 None

Cued Category Production

This task examined the children's horizontal taxonomic relations. The children were randomly presented with superordinate labels and were asked to give as many category members as they could think of. The children were asked to “name all the foods (animals, and clothes) you can think of. Children were prompted, "Can you think of any more?" For practice, children named all the toys they could. Responses were coded for the total number of items generated, as well as the mean length of event-contexts and conventional subcategories mentioned.

Word Association

Lucariello, Kyratzis, & Nelson (1992) used a 27 word list composed of the 3 most frequent responses to category members for 9 slot filler categories (Breakfast, lunch, and dessert foods; clothes for the morning, outside, and bed; and zoo, farm, and house animals). The words used by Lucariello et al. are listed in Table 4.

Table 4
Word Association List
Lucariello et al., (1992)

Morning clothes	shirt	pants	sock
Outside clothes	sweater	jacket	coat
Bed clothes	pajamas	nightgown	bathrobe
Breakfast food	toast	waffles	eggs
Lunch food	cheese	peanut butter	hot dog
Dessert food	cake	pie	ice cream
Zoo animals	lion	tiger	elephant
Farm animals	cow	pig	chicken
Home animals	dog	cat	guinea pig

The words were presented randomly, with no two items from the same category presented contiguously. Responses were coded as follows:

1 Taxonomic vertical
- A Slot filler label
- B Superordinate label
- C Subordinate label

2 Taxonomic Horizontal
- A Slot filler category instance member
- B Superordinate category instance member
- C Subordinate category member

3 Noncategorical- thematic
- A Complementary
- B Function
- C Situation

In addition, no responses, and language transfers were also coded. Language transfers

refer to words given in the language not designated for that particular visit.

Socio-Cultural Affect

Children were asked how they felt about English and Spanish items in their dominant language. They selected the face that corresponded to how he/she felt. The 5 line drawing faces represented the following emotions: Very happy, happy, ok, sad, and angry. Every time a question was asked the faces were labeled. The questions were as follows:

How do you feel about yourself?
How do you feel about your skin color?
How do you feel about speaking English/Spanish?
How do you feel about English/Spanish music?
How do you feel about American/Spanish food?
How do you feel about speaking English/Spanish at home?

How do you feel about speaking English/Spanish with your friends?
How do you feel about speaking English/Spanish in the classroom?
How does your mom feel about you speaking English/Spanish at home?
How does your teacher feel about you speaking English/Spanish?
How do your friends feel about you speaking English/Spanish?

The results of this measure can be found in Appendix F.

Parental Information

The parents were asked to complete a consent form and a language and demographic questionnaire. The language questionnaire was designed to index how the languages were used and how the languages were acquired. Not all the parents completed the forms making the task of evaluating language experience among the groups unreliable. Moreover, parents often elected not to answer certain questions such as rooms per person, and may have found other questions about how the languages were learned hard to answer. Thus the results of this measure were placed in the Appendix A-E.

Chapter III.

Results: Language Measures

I. Flexibility

It was hypothesized that the PPVT was limited in terms of assessing linguistic knowledge, relying on answers which were graded solely as either wrong or right. The flexibility task allowed the children to name all the words they thought of that went with “school”, “house”, and “play”. Table 5 shows the mean number of words produced in response to school, home, and play, in Spanish and in English by language groups. It also shows total scores and the mean number of words transferred from one language to the other. One-way ANOVAs were used to compare language-grade groups on all measures. Scheffe’s test was used to note which groups were significantly different from each other.

As expected, the DE-1G group produced significantly more words, in the English Total Flexibility ($F=11.33$, $p<.001$) than all the other groups as reported by one-way ANOVAs. The Spanish Total Flexibility score indicated that the MS-K and the MS-1G groups gave significantly more words than the DE-1G group ($F=10.56$, $p<.001$). The MS-1G group also gave significantly more words than the DS-K and DS-1G groups according to Scheffe’s test.

More specifically, the MS-1G group also performed significantly better given the Spanish word for school, ($F= 11.47$, $p<.001$) than each of the other groups, based on a one-way ANOVA. The MS-1G group also produced more words given the Spanish word for play than DS-1G and DE-1G groups ($F=5.68$, p<.001). When speaking English, the DE-1G group gave more words about school and play than both the DS-K and DS-1G groups (F=14.03, p<.00; F=8.83, p<.001). In addition, the DE-1G group gave significantly more English home words than the DS-K group (F=4.91, p<.01).

Table 5
Word Flexibility By Group And Language
Mean Number Of Words Produced, Total Flexibility, And Language Transfers

	MS-K	DS-K	MS-1G	DS-1G	DE-1G	Total Means
School						
English	----	3.85	----	2.75	7.47	4.54
Spanish	4.26	2.80	7.42	3.00	1.38	3.82
House						
English	----	3.10	----	4.10	5.76	4.25
Spanish	5.11	3.95	6.21	3.25	1.69	4.11
Play						
English	----	2.81	----	2.50	5.00	3.35
Spanish	3.32	2.55	4.26	1.95	1.56	2.76
Total Flexibility						
English	----	9.95	----	9.2	18.18	12.14
Spanish	12.68	9.00	17.89	8.5	4.88	10.73
Language Transfer						
English	----	.37	----	.35	.29	.34
Spanish	0	1.00	0	.65	5.63	1.31

When speaking in Spanish, the DE-1G group gave more English responses (language transfers) than the other groups (F=10.56, p<.001).

Paired t-tests showed that the DE-1G group produced significantly more English words than Spanish words for school, house, play, and with respect to total flexibility (t=6.66, $p<.001$; t=5.13, $p<.001$; t=6.10, $p<.001$; t=6.96, $p<.001$). In addition, they produced more words in English when speaking in Spanish (t=2.34, $p<.03$). Thus it seems that the DE-1G group's English dominance by this measure is in agreement with that from the PPVT.

However, Paired t-tests for the DS-K and the DS-1G groups revealed that overall there were no differences between English and Spanish performance on the flexibility measures. This finding does not support the PPVT placement of the DS-K and the DS-1G groups as Spanish dominant but rather suggests that they are more balanced bilinguals. These comparisons support the proposal that the use of a single measure such as the PPVT captures only one dimension of a complex system.

II. Story Recall

The story recall task required the children to listen to two stories and immediately recall what was said. There were 8 elements in each of the stories which were targeted for recall. Recall was also rated for fluency from least to most fluent (1 to 5). See Table 6.

Table 6
Grandmother And Park Stories
Mean Recall And Fluency Ratings
By Group And Language

	MS-K	DS-K	MS-1G	DS-1G	DE-1G	Total Means
Grandma Recall						
English	----	3.06	----	2.95	4.73	3.49
Spanish	4.37	3.57	4.00	4.00	2.08	3.71
Park Recall						
English	----	4.35	----	3.55	6.33	4.62
Spanish	6.68	4.59	6.42	5.79	2.92	5.46
Total Story Recall						
English	----	7.00	----	6.50	11.10	7.96
Spanish	11.05	6.84	10.42	9.30	5.00	8.77
Total Fluency Rating						
English	----	2.92	----	2.60	4.03	3.11
Spanish	4.39	3.36	4.26	3.90	1.88	3.68

The total story recall includes the elements recalled in both the grandmother and the park stories.
The maximum number of elements that could be recalled in total is 16.
Each individual story contained a maximum of 8 elements to be recalled.
Fluency was rated on a 5 point scale, the most fluent of which is 5.

Total story recall combined the elements recalled from both the grandmother and the park stories. When speaking English, the DE-1G group recalled significantly more elements than the DS-K and the DS-1G groups ($F=6.95$, $p<.002$). For total recall in Spanish, the MS-K and the MS-1G groups recalled more elements than the DS-K and the DE-1G groups ($F=9.81$, $p< .001$). In addition, the DS-1G group recalled more elements than the DS-K and the DE-1G groups.

With respect to English Fluency, the DE-1G group was significantly more fluent than the DS-K and the DS-1G groups ($F=6.80$, $p<.003$). As expected, Spanish Fluency was significantly lower for the DE-1G group than the other groups ($F=13.86$, $p<.001$).

Paired t-tests revealed that the DS-K and the DS-1G groups were significantly more fluent in Spanish than in English ($t=2.71$, $p.<04$; $t=3.86$, $p<.001$). The DS-1G group was significantly better in total recall and park recall in Spanish in comparison to English ($t=2.60$, $p<.02$; $t=3.42$, $p<.003$). The DE-1G group had significantly higher total recall, total fluency, grandmother, and park recall in English ($t=4.38$, $p<.001$; $t=4.76$, $p<.001$; $t=4.52$, $p<.009$; $t=3.69$, $p<.004$). With respect to fluency, the DS-K, DS-1G, and the DE-1G groups corroborate the results of the PPVT. In terms of total story recall however, the DS-K group did not perform significantly better in Spanish than in English, thus the group seemed, once again, more balanced.

III. Script Constructions

Children were asked to tell what happens at a birthday party and what happens at home after school. The following results are based on the combination of the birthday and home scripts. (For the individual script data see Appendices G - I.) Table 7 refers to the total number of words, elements/acts, fluency, and language transfers. For the total number of words in English, the DE-1G group, as expected, produced significantly more words than the DS-1G or the DS-K groups ($F=14.37$, p<.001). The MS-K and the MS-1G groups produced more words in Spanish than the DE-1G group (F=7.94, p<.001). In addition, the MS-1G group produced more words in Spanish than the DS-1G group.

Table 7
Birthday And Home Scripts Combined
Total # Of Words, Acts, Fluency Rating, And Language Transfers
By Group and Language

	MS-K	DS-K	MS-1G	DS-1G	DE-1G	Total Means
Total # Words						
English	----	31.20	----	17.50	57.61	35.44
Spanish	43.83	33.40	52.74	22.05	15.94	33.59
Total # Acts						
English	----	4.65	----	5.00	6.75	5.47
Spanish	7.32	5.75	8.74	6.50	2.82	6.23
Total Fluency						
English	----	2.70	----	1.83	3.76	2.76
Spanish	3.61	2.68	3.47	2.43	1.18	2.67
Language Transfers Tot						
English	----	.40	----	2.55	0	.98
Spanish	0	1.35	0	.70	10.88	2.59

Children's responses across the birthday and the home scripts were combined.
Fluency was rated on a 5 point scale, the most fluent of which is 5.

When speaking Spanish, the DE-1G group mentioned significantly fewer acts in total in comparison to all the other groups (F=14.50, p<.001).

With respect to total fluency an ANOVA and Scheffe's test revealed that the DE-1G group was significantly more fluent in English than the DS-1G group

($F=10.06$, $p<.001$). In Spanish, however, the MS-K and MS-1G groups were significantly more fluent than the DE-1G and DS-1G groups ($F=16.46$, $p<.001$). In addition, the DS-K and DS-1G groups were significantly more fluent in Spanish than the DE-1G group.

Although the language transfers were infrequent, when speaking English the DS-1G group responded with more words in Spanish than the DS-K and DE-1G groups ($F=5.85$, $p<.005$). When speaking in Spanish, the DE-1G group produced more English words than all the other groups ($F=5.50$, $p<.001$).

Paired t-tests showed that the DS-1G group stated significantly more acts in Spanish than in English ($t=2.44$, $p<.02$). The DE-1G group produced significantly more words, acts, and were more fluent in English than in Spanish ($t=5.80$, $p<.00$; $t=3.58$, $p<.001$; $t=6.49$, $p<.001$). The DE-1G group also had more language transfers when speaking in Spanish ($t=2.38$, $p<.03$). Again, paired t-tests revealed no significant differences for the DS-K and DS-1G groups, bringing into question the lack of dominance in Spanish. With respect to script constructions, the DS-K and DS-1G groups did not seem to be more Spanish dominant.

Summarizing over the various language measures, the data provide evidence for questioning the use of a single, unidimensional approach to language assessment. Although the DS-K and the DS-1G groups were characterized as Spanish Dominant using the PPVT (as previous research had done), when other measures emphasizing language production and fluency were used, the groups (the DS-K group in particular) appeared more balanced rather than Spanish dominant.

This raises the possibility that measures of word knowledge and picture identification may only loosely relate to measures emphasizing discourse, fluency, and accessibility of elements. However, it should be noted that the PPVT is the only language measure used in this study which has been standardized and that it is widely used in studies of bilingualism.

Discussion

Children were classified into the different language groups through the use the PPVT. The PPVT identified the children who were at an age-appropriate level in their dominant language and at a lower second language level. Other measures were designed to index discourse, fluency, and words. Given these measures, some children who were classified as Spanish dominant seemed to be more balanced in both languages.

Diaz stated that the individuals at the initial stage of integrating two language systems would be more likely to show the positive cognitive effects associated with becoming bilingual. One could argue that the Spanish-dominant sample is therefore not strictly Spanish-dominant and has gone beyond into more balanced language use and therefore does not reflect the characteristics relevant to testing the theory. Therefore, if the children in this study did perform in a more cognitively advanced mode on the tests used here, one could attribute this performance to a relatively balanced bilingualism. One could, however, argue that because these children were not totally balanced bilinguals in all their language development aspects (word knowledge and discourse elements), they still maintain their Spanish dominance and may still be at the level where Diaz notes that positive cognitive performance is measurable.

In either case, there are children who are Spanish-dominant both in terms of word knowledge as well as discourse measures and these children were not represented in this sample. How these children would compare to the children in the present study is a question left to be explored. A more stratified approach would include groups with low word knowledge and low discourse production; as well as groups with low word knowledge and high discourse production. This design might reveal differences not found here, but the present sample is too small for this analysis to be fruitful.

Chapter IV.

Results: Categorization Tasks

The underlying assumption for the categorization tasks is that the more complex cognitive functioning is associated with taxonomic relationships, whereas the least advanced cognitive functioning is linked to the thematic responses. The slot filler category is seen as the preliminary foundation from which the taxonomic category develops. According to Diaz's hypothesis, the DS-K group would be expected to be more cognitively advanced, thus more taxonomically inclined, than the MS-K group. In addition, the DS-1G group is expected to categorize more taxonomically than the MS-1G group. Positive cognitive advantages for the DE-1G group would not be easy to find according to Diaz. For every categorization task the language and grade status will be examined, comparisons to prior research with monolingual English speaking children will be addressed, and assessments of the Diaz hypothesis will be made.

I. Forced Choice Unlabeled Picture Task

The Forced Choice Unlabeled Picture task required the children to look at a target picture and two choice pictures. The children were to determine which of the two choices went best with the target picture. Table 8 shows the total number of choices made for each of Superordinate, Slot filler, and Thematic categories when speaking in Spanish and when speaking in English. The kindergarten and first grader's preference order was the same in English as in Spanish: Thematic, slot filler, and superordinate. This preference order was the same as in the Lucariello et al, (1992) study with monolingual English-speakers. Speaking two languages did not make a difference in the preference pattern.

However, one-way ANOVAs revealed significant differences in the total number of superordinate and thematic choices made. When speaking in Spanish, the greatest number of superordinate choices were made by the DS-K group ($F=2.79$, $p<.03$). (See Table 8.) Specifically, the DS-K group chose significantly more superordinate responses than the MS-1G and the DE-1G groups. In addition, when speaking in English, more superordinate responses were made by the DS-K group than by the DE-1G group ($F=4.97$, $p<.01$). It was also found that the DE-1G group made significantly more thematic choices than the DS-K group in English ($F=5.14$, $p<.01$).

Table 8
Forced Choice: Unlabeled Picture Task In Spanish And English
Mean Number Of Superordinate, Slot Filler, And Thematic Selections
By Triad Type And Group

	Kindergarten		First Grade		
Triad Types	MS-K	DS-K	MS-1G	DS-1G	DE-1G
Thematic					
Spanish	7.85	7.80	8.95	8.20	8.78
English	----	6.70	----	8.35	8.94
Slot Filler					
Spanish	5.90	5.55	5.90	6.15	6.00
English	----	6.21	----	6.10	6.22
Superordinate					
Spanish	4.25	4.65	3.15	3.65	3.22
English	----	4.42	----	3.55	2.72

The maximum number of responses within each type is twelve.

T-tests comparing the performance of specific groups yielded significant differences. In no instance however, were any significant differences found between the monolingual and dominant kindergarten groups nor the monolingual and dominant first grade groups.

In terms of the superordinate responses, for speaking in Spanish, t-tests revealed that the DS-K group produced significantly more superordinate responses than the MS-1G and the DE-1G groups respectively ($t=3.10$, $p<.004$; $t=2.88$, $p<.007$). In English as well, the DS-K group produced significantly more superordinate responses in comparison to the DE-1G group ($t=3.11$, $p<.004$).

For speaking in English, t-tests revealed that the DS-K group chose significantly fewer thematic responses in comparison to the DS-1G and the DE-1G group respectively ($t=2.13$, $p<.04$; $t=3.05$, $p<.004$). With respect to thematic responses given when speaking in Spanish, the MS-1G group chose significantly more thematic responses than the DS-K group ($t=2.15$, $p<.04$).

Table 9 refers to the Slot filler (SF) over superordinate (SP); Thematic (TM) over Slot Filler (SF), Thematic (TM) over Slot filler (SF) triads selection. When compared to Lucariello et al., (1992), the samples appeared to perform similarly, although the DS-K group selected slot filler and thematic choices when paired with a superordinate choice somewhat less frequently.

When asked to choose the best match given the SP over TM triad choice in Spanish, the preference order for the superordinate choice in descending order is as follows: DS-K, MS-1G, MS-K, DS-1G, and DE-1G. The DS-K group selected significantly more superordinate choices than the MS-1G group when speaking in Spanish by Scheffe's test ($F=2.70$, $p<.04$.) When speaking in English, the preference order for the superordinate choices in descending order is as follows: DS-K, DS-1G, and DE-1G. Again the DS-K group was significantly more superordinate in their choices than the DE-1G group, as found by Scheffe's test ($F=4.96$, $p<.01$).

Significant differences were also found between the choosing of TM over SP responses when speaking in English and in Spanish. ANOVAs revealed that when speaking Spanish, the MS-1 group selected more thematic responses than the DS-K group ($F=2.49$ $p<.05$). When speaking English, the DE-1G group chose more thematic type responses than the DS-K group ($F=6.79$, $p<.002$).

T-tests comparing groups performance on the TM over SP triad when speaking in Spanish yielded significant findings. The DS-K and DS-1G groups made significantly fewer thematic responses than the MS-1G group given the TM over SP triad ($t=2.12$, $p<.04$; $t=3.60$, $p<.001$). These findings were significant for the SP over TM triad ($t=3.60$, $p<.001$.; $t=2.12$, $p<.04$).

Table 9
Forced Choice-Unlabeled Picture Task
Mean Number Of Slot-filler, And Thematic Selections
By Triad Type, Group, and Language
Lucariello, Kyratzis, & Nelson (1992) Comparisons

Group Language	SF OVER SP	TM OVER SF	TM OVER SP
Mono Spanish-K			
English	------	------	------
Spanish	3.45	3.55	4.30
Dom Spanish-K			
English	3.79	3.40	3.30
Spanish	3.45	3.90	3.90
Mean English	3.79	3.40	3.30
Spanish	3.45	3.73	4.10
Lucariello Mono 4-yr-olds	3.90	3.55	4.50
Group Language	SF OVER SP	TM OVER SF	TM OVER SP
Mono Spanish-1 G			
English	------	------	------
Spanish	3.80	3.90	5.05
Dom Spanish-1 G			
English	4.25	4.15	4.20
Spanish	4.00	3.85	4.35
Dom English -1 G			
English	4.42	4.00	4.74
Spanish	4.16	4.05	4.47
Mean English	4.35	4.08	4.62
Spanish	3.99	3.93	4.47
Lucariello Mono 7-yr-olds	4.55	4.30	4.95

SP=Conventional Superordinate category. SF=Slot Filler category. TM=Thematic category.

Forced Choice Nonsense Labeled Picture Task

The Forced Choice Nonsense Labeled Picture task was introduced in response to Markman & Hutchinson's (1984) theory that emphasizes the importance of labeling to highlight taxonomic categorizations. In Nelson's (1986) theory, slot filler categories provide an entry point to understanding taxonomic structure with superordinate labels playing an important role in moving from slot filler to conventional taxonomic structure.

The Nonsense Labeled Forced Choice Task asked children to look at a target picture which was given a nonsense name. They were then asked to choose which of two pictures went best with the target picture whose nonsense name was again repeated. Children's selections of superordinate responses within the SP over SF and SP over TM triad types are shown in Table 10. Overall, the superordinate selections were quite low, ranging from a mean of .06 to 2.74 (out of 6 responses).

Table 10
Forced Choice Picture Task
Nonsense Labeled
Mean Number Of Superordinate Selections By Triad Type, Group, And Language

Superordinate	MS-K	DS-K	MS-1G	DS-1G	DE-1G	Mean
SP over SF						
English	------	1.75	------	1.85	1.83	1.83
Spanish	2.74	1.78	2.42	2.11	2.00	2.19
SP over TM						
English	-----	1.25	------	1.15	1.64	1.31
Spanish	1.32	1.11	.06	1.26	1.25	1.11

The maximum number of responses within each triad type is six.
SF=Conventional Superordinate category. SF=Slot Filler category. TM=Thematic category.

Although Markman & Hutchinson (1984) found more taxonomic responding when given a nonsense label, no significant differences among the groups were found in this study when the superordinate choices made in the Unlabeled condition were compared to the superordinate choices made in the Nonsense Labeled Condition. See Table 11. Six of the eight comparisons are in the opposite direction to that predicted by Markman and Hutchinson's theory and found in their research with English speaking preschoolers. T-tests revealed significant differences for the DS-K group when the Unlabeled and the Nonsense Labeled Total number of Superordinate responses were compared. The DS-K group chose more superordinate responses in the unlabeled condition when they spoke in English and when they spoke in Spanish in comparison to the labeled condition (t=2.64, p<.02, t=2.87, p<.01). No other significant differences were found.

Table 11
Forced Choice Picture Task
Unlabeled And Nonsense Labeled
Mean Number Of Total Superordinate Responses
By Language And Task

LANGUAGE	MS-K	DS-K	MS-1G	DS-1G	DE-1G
ENGLISH					
Unlabeled	------	4.42	------	3.55	2.72
Nonsense Labeled	------	3.00	------	3.00	3.57
SPANISH					
Unlabeled	4.25	4.65	3.15	3.65	3.22
Nonsense Labeled	4.05	2.89	3.05	3.37	3.25

The maximum number of possible superordinate choices is 12 for both the unlabeled and nonsense tasks.

Tables 12 and 13 refer to the superordinate choices made in the SP over SF and SP over TM triads when English and when Spanish was spoken. Within group differences between the labeled and unlabeled conditions revealed that the DS-K group had significantly more superordinate responses in the unlabeled condition for the SP over TM triad type in both English and Spanish than in the labeled condition ($t=3.27$, $p<.004$; $t=3.45$, $p<.003$).

ANOVAs revealed that in the Unlabeled SP over TM condition the DS-K group had significantly more superordinate responses than the DE-1G group in English and in Spanish the DS-K gave more superordinate responses than the MS-1G group ($F=4.96$, $p<.01$; $F=2.7$, $p<.04$). In the forced choice task, the DS-K group tended to perform at a more taxonomic level in the unlabeled condition.

In the unlabeled condition t-tests comparing different groups revealed only one significant finding when speaking in English. Given the SP over TM triad, in English, the DS-K group responded significantly more superordinately than the DE-1G group ($t=3.07$, $p<.004$). When speaking in Spanish, the DS-K group gave significantly more superordinate responses than the MS-1G group in the SP over TM triad ($t=3.60$, $p>.001$). The DS-K group also gave significantly more superordinate responses than the DE-1G group, when speaking in Spanish given the SP over SF triad ($t=2.29$, $p<.03$). In addition, the DS-1G group produced significantly more superordinate responses than the MS-1G group, given the Spanish SP over TM triad ($t=2.19$, $p<.04$).

In the Nonsense Labeled condition, when speaking in Spanish with respect to the SP-TM triad, the DS-1G group produced significantly more superordinate responses than the MS-1G group ($t=2.29$, $p<.03$). When speaking in Spanish, for the SP over SF triad, the MS-

K group produced significantly more superordinate responses than the DS-K group ($t=2.42$, $p<.02$).

When all the groups were collapsed across the triads, an analysis comparing the labeled and unlabeled conditions revealed that in the SP over TM condition, the groups gave more superordinate responses given the unlabeled condition whether they were speaking in English or in Spanish ($t=2.64$, $p<.01$; $t=3.72$, $p<.001$).

When all the groups were collapsed for their overall superordinate responses in the nonsense labeled versus the unlabeled conditions a t-test revealed that when speaking in Spanish, more superordinate responses were made overall in the unlabeled versus the nonsense labeled condition ($t=1.96$, $p<.05$).

Table 12
Forced Choice Picture Task In English
Unlabeled and Nonsense Labeled Comparisons
Mean Number Of Superordinate Selections By Triad Type And Group

Superordinate	DS-K	DS-1G	DE-1G	Mean-1G
SP over SF				
Labeled	1.75	1.85	1.83	1.83
Unlabeled	2.55	1.75	1.58	2.00
SP over TM				
Labeled	1.25	1.15	1.64	1.30
Unlabeled	2.10	1.80	1.26	1.75

The maximum number of responses within each triad type is six.
SP=Conventional Superordinate category. SF=Slot Filler category. TM=Thematic category.

Table 13
Forced Choice Picture Task In Spanish
Unlabeled And Nonsense Labeled Comparisons
Mean Number Of Superordinate Selections By Triad Type And Group

Superordinate	MS-K	DS-K	Mean	MS-1G	DS-1G	DE-1G	Mean
SP over SF							
Labeled	2.74	1.78	2.26	2.42	2.11	2.00	2.18
Unlabeled	2.55	2.55	2.55	2.20	2.00	1.84	2.01
SP over TM							
Labeled	1.32	1.11	1.22	.06	1.26	1.25	.86
Unlabeled	1.70	2.10	1.90	.95	1.65	1.53	1.38

The maximum number of responses within each triad type is six.
SF=Conventional Superordinate category. SF=Slot Filler category. TM=Thematic category.

Justification data were not readily interpretable. Basically, the most common justification was actually "no response". If the item to be justified was not preferred, the justifications were thematic for all the groups, whether they were speaking in English or in Spanish. If the Slot-filler or Superordinate item to be justified was preferred, the justifications were usually Functional. The justification of the preferred Thematic items were usually Thematic. The data for the Justification Tasks can be found in Appendices K-N.

II. Category Production Task

In this task, children were asked to name all the foods, clothes, and animals that they could think of. Table 14 shows the total number of items generated in each of the categories in both languages. When speaking Spanish, the mean number of items produced by the MS-K and DS-K groups combined was 4.75 and 5.67 for the MS-1G and DS-1G groups combined. When speaking English, the DS-K group's total items produced was 3.27, for DS-1G group it was 3.10, and for the DE-1G group it was 8.00.

Nelson & Nelson (1990) reported that a monolingual English kindergarten K-2 group produced a mean of 8.62 items across the food, clothes, and animal categories and Grade 2 group produced a mean of 19.29 items. The children in this study generated far fewer items regardless of the language used. It is not clear what variations in groups or method might have produced these differences. Because of the discrepancy the results will not be further compared to Nelson & Nelson (1990).

Referring to the animal category, the Monolingual Spanish groups generated the most items, while the Dominant Spanish groups generated the most items for the food category. (Refer to Table 14.) The Dominant English group produced the most number of items within the English animal category. One-way ANOVAs compared the groups on each category and significant differences were found which were then analyzed by the Scheffe test to note the specific group differences. When speaking in Spanish, the MS-1G group generated significantly more items when asked about food ($F=5.6$, $p<.001$) and the DS-1G group generated significantly more items when asked about animals than the DE-1G group ($F=16.54$, $p<.001$). Scheffe's test revealed that they named more items than the DE-1G group. In addition DS-1G groups also produced more items than the DE-1G group given the animal category, when speaking in Spanish. In addition, the MS-K, MS-1G, and the DS-1G groups generated significantly more Spanish items given the clothes category than the DE-1G group ($F=8.24$, $p<.001$).

When speaking in English, the DE-1G group produced the most English items in the food, clothes, and animal categories when compared with the DS-K and DS-1G groups ($F=10.56$, $p<.001$; $F=12.08$, $p<.001$, and $F=15.26$, $p<.001$).

In terms of the number of Spanish items generated, significantly more Spanish items were generated by the MS-1G and the DS-1G groups given the food and animal categories than the DE-1G group ($F=9.54$, $p<.001$; $F=22.2$, $p<.001$). Moreover, the DS-1G group named significantly more Spanish items given the clothes category in comparison to the DE-1G groups ($F=10.17$, $p<.001$).

Significant differences were found with t-tests that compared specific groups in terms of the total number of words produced. In Spanish, the MS-K group produced significantly more items given the clothes and animal categories than the DS-K group ($t=2.77$, $p<.01$; $t=4.14$, $p<.001$). Significantly more food, clothes, and animals were named by the MS-1G group than the DE-1G group ($t=3.65$, $p<.001$; $t=3.47$, $p<.002$; $t=6.53$, $p<.001$). The DS-1G group also produced more Spanish items given the food, clothes, and animal categories than the DE-1G group ($t=2.88$, $p<.007$; $t=4.08$, $p<.001$; $t=4.71$, $p<.001$).

In English, however, the DE-1G group produced significantly more words given the food, clothes, and animal categories than the DS-1G group ($t=4.58$, $p<.001$; $t=5.17$, $p<.001$; $t=3.88$, $p<.001$).

Table 14
Category Production
Mean Number Of Items Produced By Group, Language, And Category

Category	MS-K	DS-K	MS-1G	DS-1G	DE-1G	Mean
Food						
English	------	3.30	------	2.55	6.94	4.26
Spanish	5.42	4.50	6.50	5.58	3.31	5.06
Clothes						
English	------	3.20	------	2.45	7.13	4.26
Spanish	5.53	3.94	4.50	4.95	2.19	4.22
Animals						
English	------	3.20	------	4.15	10.13	5.83
Spanish	5.79	3.44	7.00	5.52	1.88	4.72

Table 15 presents the total number of Spanish and English items generated across the food, clothes, and animal categories. When speaking Spanish, it was found that the MS-K, MS-1G, and the DS-1G groups produced significantly more items across the categories than the DE-1G ($F=16.84$, $p<.001$). The MS-K and the MS-1G groups also produced significantly more items than the DS-K group. When speaking English, it was found that the DE-1G group produced significantly more items than the DS-K and the DS-1G groups ($F=15.32$, $p<.001$).

The order in which the children produce the words is indicative of how the classification system is organized. The relationships between the items are thought to reflect both hierarchical taxonomic and event-context /script based organizations (Nelson & Nelson, 1990). In order to calculate the conventional and the script based organizations "each item on each child's list was coded in order of its output twice, once for the presumed event in which it was usually experienced, and once in terms of conventional subcategorization system for foods, clothes, and animals (Nelson & Nelson, 1990, p. 440). See Appendix O for the coding system used in calculating the script/context and the conventional subcategories.

T-tests comparing the performance of specific groups across all the categories yielded significant results. When speaking in Spanish, the MS-K group produced significantly more words than the DS-K group ($t=3.98$, $p<.001$). The MS-1G group also produced significantly more words in Spanish than the DE-1G group ($t=6.11$, $p<.001$). The DS-1G group also produced significantly more Spanish words than the DE-1G group ($t=4.84$, $p<.001$). When speaking in English however, the DE-1G group produced significantly more words than the DS-1G group ($t=4.83$, $p<.001$).

Table 15
Category Production In Spanish And English
Total Mean Number Of Items Produced By Group,
Across The Food, Clothes, And Animal Categories

Category Productions	Kindergarten	First Grade
Monolingual Spanish Spanish	 5.58	 6.00
Dominant Spanish Spanish English	 3.96 3.23	 5.35 3.05
Dominant English Spanish English	 ____ ____	 2.46 8.07

Table 16 displays the Mean Length of Conventional Subcategory Runs in each of the food, clothes, and animal categories. The MS-K and DS-K groups averaged 2.06 runs in Spanish across the food, clothes, and animal categories. For the DS-1G and the MS-1G groups, the mean length of runs in Spanish across the food, clothes, and animal categories averaged 2.18. The DE-1G group's runs in English and in Spanish were (1.78, 1.13) respectively.

The animal category elicited the longest runs in the Conventional Subcategory analysis in English (2.07) and in Spanish (2.48). When speaking in Spanish about animals, the MS-K and MS-1G groups averaged longer runs than the DE-1G group ($F=5.12$, $P<.001$). In addition, when speaking in Spanish about clothes, the MS-K, MS-1G, and DS-1G groups also had significantly longer runs than the DE-1G group ($F=5.84$, $p<.003$).

Table 16
Category Production
Mean Length Of Runs By Group, Language, And Category Conventional Context

Category	MS-K	DS-K	MS-1G	DS-1G	DE-1G	Mean
Food						
English	------	.88	------	1.13	1.43	1.15
Spanish	1.37	1.67	1.25	1.44	.82	1.31
Clothes						
English	------	1.33	------	1.14	2.1	1.52
Spanish	2.17	1.67	2.56	2.22	1.17	1.96
Animals						
English	------	2.52	------	1.90	1.8	2.07
Spanish	3.11	2.32	3.45	2.14	1.4	2.48

Table 17 shows the mean length of runs for the Script/Context Based Subdivision for each of the food, clothes, and animal categories. When speaking Spanish, the mean length of runs for the MS-K and DS-K groups averaged 2.94 runs, and the DS-1G and MS-1G groups averaged 3.25 runs across the food, clothes and animal categories.

When the MS-K group spoke in Spanish about food, they had significantly longer runs than the DS-K group in the script context analysis ($F=3.41$, $P<.01$). When they spoke in Spanish about clothes, the MS-K group also performed significantly better than the DE-1G group ($F=4.31$, $p<.003$).

When speaking in English, the DE-1 group also performed at an average level of 3.59 runs across all the categories. Moreover, analysis revealed that the DE-1G group performed significantly better in English than the DS-K and the DS-1G groups across the food, clothes, and animal categories respectively ($F=11.13$, $p<.001$; $F=3.87$, $p<.01$; $F=6.87$, $p<.002$). In Spanish, the DE-1G group averaged only 2.18 runs across all the categories.

T-tests comparing the performance of specific groups yielded significant findings. When speaking in Spanish about animals, the MS-1G group produced significantly longer runs than the DS-1G group ($t=2.60$, $p<.01$). However, when speaking about food, the DS-1G group significantly longer runs than the MS-1G group ($t=2.91$, $p<.006$).

When comparing the DS-1G and the DE-1G groups in Spanish about clothes and animals, the DS-1G group produced significantly longer runs than the DE-1G group ($t=3.34$, $p<.002$; $t=2.05$, $p<.05$).

When comparisons were made between the MS-1G group and the DE-1G group, significantly longer runs were made in Spanish by the MS-1G group across the food, clothes, and animal categories (t=2.64, $p<.01$; t=3.80, $p<.001$; t=3.42, $p<.002$).

The significant finding in English was that the DE-1G group produced significantly longer runs than the DS-1G group when speaking about clothes (t=2.03, $p<.05$).

Table 17
Category Productions
Mean Length Of Runs By Group, Language, And Category
Script Context

Category	MS-K	DS-K	MS-1G	DS-1G	DE-1G	Mean
Food						
English	------	1.69	------	1.73	4.03	2.48
Spanish	4.20	2.78	5.18	3.30	3.14	3.72
Clothes						
English	------	2.36	------	1.80	3.76	2.64
Spanish	3.97	2.65	3.17	3.44	2.06	3.06
Animals						
English	------	1.36	------	1.75	2.97	2.03
Spanish	2.10	1.95	2.33	2.09	1.33	1.96

The most productive category in the Script based analysis when speaking English was clothes, averaging 2.64 runs and when speaking in Spanish, it was food averaging 3.72 runs. When the older children are spoken to in their dominant language they perform better than the younger children.

Table 18 displays the mean length of runs for both the Context/Script based and the Conventional Subcategories in each of the languages for each of the groups. For every group in each of the languages the Script/Context based subcategories had longer runs than the

Conventional subcategories.

When comparing the MS-1G group to the DS-1G group on Spanish the mean length of runs across the categories, a t-test revealed that the MS-1G group produced significantly longer runs than the DS-1G group given the conventional and contextual analyses ($t=2.28$, $p<.03$; $t=2.08$, $p<.04$). The MS-1G group also produced longer runs in the conventional and contextual analyses when compared to the DE-1G group ($t=4.61$, $p<.001$; $t=2.79$, $p<.009$). Moreover, the MS-K group produced significantly longer runs in the conventional as well as the contextual analyses than the DS-K group ($t=2.77$, $p<.01$; $t=3.38$, $p<.002$).

When speaking in English, t-tests only revealed that the DE-1G group produced significantly longer context runs than the DS-1G group ($t=3.22$, $p<.003$).

Table 18
Category Productions
Across Food, Clothes, And Animals
Mean Length Of Runs By Group, Language, Script Context And Conventional Subcategories

	Spanish			English		
	Conventional	Contextual	Mean	Conventional	Contextual	Mean
MS-K	2.22	3.40	2.81	-----	-----	-----
DS-K	1.89	2.46	2.18	1.58	1.80	1.70
MS-1G.	2.42	3.56	3.00	-----	-----	-----
DS-1G	1.93	2.94	2.44	1.39	1.76	1.58
DE-1G	1.13	2.18	1.65	1.78	3.59	2.69
Means	1.92	2.91	2.42	1.58	2.38	1.98

Overall, the main result of the Category Production Task indicated that the script-based organization was more meaningful to the children than the conventional-based organization.

III. Word Association Task

Children were presented with words from food, clothes, and animal categories and asked to state the first word that came to their mind. The responses were coded as Taxonomic horizontal, which included slot filler and superordinate relations; Taxonomic Vertical, which included superordinate and slot filler labels; and Thematic, which included complementary, functional, spatio-temporal relations, other. No responses and language transfers were also coded.

Table 19 shows the Word Association performance of the groups on the various categories in English. Significant differences in English Taxonomical Vertical responses were noted. The DS-K group produced more superordinate type labels than the DS-1G group ($F=3.19$, $p<.05$). Significantly more subordinate labels were produced by the DS-1G and the DE-1G groups than the DS-K group ($F=8.28$, $p<.001$). Significantly more Thematic responses were produced by the DE-1G in comparison to the DS-K and the DS-1G groups ($F=6.85$, $p<.002$). The DE-1G group produced more responses coded as acts than the DS-K or the DS-1G groups ($F=3.40$, $p<.04$). No Responses were produced significantly more by the DS-K and the DS-1G groups in comparison to the DE-1G group ($F=3.49$, $p<.04$).

T-tests were used to compare the performance of specific groups. The DS-K group produced significantly more superordinate labels than the DS-1G group ($t=2.47$, $p<.02$). The DS-1G group produced more subordinate references than the DS-K group ($t=3.09$, $p<.004$). In terms of complementary references, the DE-1G group produced more such references than the DS-1G group ($t=2.95$, $P<.006$). With respect to language transfers, the DS-1G group produced significantly more words in Spanish than the DE-1G group ($t=2.20$, $p<.03$). In terms of no responses, the DS-1G group had significantly more no responses than the DE-1G group (t=2.99, p<.006).

Table 19
English Word Associations
Mean Number Of Responses By Category And Language Group

Response Type	DS-K	DS-1G	DE-1G
TAX-HORIZONTAL			
Slot Filler	3.65	4.50	7.21
Superordinate	1.25	2.55	2.60
Total Horizontal	4.90	7.05	9.81
TAX-VERTICAL			
Slot Filler Label	.25	.40	.73
Superordinate Label	3.00	.25	1.20
Subordinate	.05	.85	1.30
Total Vertical	3.30	1.5	3.23
THEMATIC			
Function	2.90	1.95	2.13
Complement	1.70	1.80	4.33
Spatio-Temporal	.15	.45	.60
Total Thematic	4.75	4.20	7.06
OTHER			
Feature	0	.35	.27
Idiosyncratic	4.25	2.70	3.40
Acts	.35	.55	1.53
Total Other	4.60	3.60	5.20
No Response	7.10	8.50	1.60
Language Transfers	2.05	1.90	.20

Table 20 refers to the Spanish Word Associations. In the Taxonomic Horizontal category a significant difference was found such that the MS-1G group responded with more slot fillers than the DS-K group (F=5.06, p<.001). Overall, the MS-1G group produced more Taxonomic Horizontal responses than the DE-1G group (F=4.13, p<.004). The MS-K, MS-1G, DS-1G groups produced significantly more taxonomic horizontal responses than the DS-K group.

With respect to the Taxonomic Vertical category, more superordinate labels were used by the MS-1G group than the DE-1G and the MS-K groups (F=3.39, p<.01). Significantly more subordinate labels were made by the MS-K and the MS-1G groups than the other groups (F=5.26, p<.001). Overall, for the Total Taxonomic Vertical category, the MS-1G group produced more such responses than the DE-1G group (F=3.85, p<.006).

With respect to the Thematic category, the MS-K group produced significantly more complementary responses than the DE-1G group (F=5.27, p<.001). The DE-1G group made more No Responses than the MS-K, MS-1G, and DS-1G groups (F=7.27, p<.001).

In addition, a one-way ANOVA revealed a significant difference between the groups on the language transfers (F=5.53, p<.001). When speaking in Spanish, the DE-1G group produced more words in English than the other groups.

In terms of the t-tests comparing the Spanish performance of each of the groups to each other a few significant differences were noted. With respect to Taxonomic Horizontal relations, the MS-1G group produced more slot filler words than the DE-1G, DS-K groups respectively (t=3.28, p<.003; t=3.38, p<.002). The MS-K group also produced significantly more slot filler words than the DS-K and the DE-1G groups respectively (t=2.50, p<.02;

$\underline{t}$=2.89, p<.007). The DS-1G group produced significantly more slot filler words than the DE-1G group. In terms of the overall Taxonomic Horizontal responses, the MS-K and the MS-1G groups respectively produced more such relations than the DS-K group ($\underline{t}$=2.58, p<.01; $\underline{t}$=3.21, p<.003). The DS-1G groups also produced significantly more Taxonomic Horizontal responses in comparison to the DE-1G group ($\underline{t}$=2.09, p<.05).

With respect to Taxonomic Vertical responses, the DS-1G produced significantly more slot filler labels than the DE-1G group ($\underline{t}$=2.40, p<.02). In terms of overall vertical taxonomic responses, the MS-1G group produced more such words than the DS-1G and the DE-1G groups respectively ($\underline{t}$=2.06, p<.05; $\underline{t}$=2.84, p<.008).

In terms of Thematic responses, the DS-1G group produced significantly more complementary related words than the DE-1G group ($\underline{t}$=2.66, p<.01).

Responses which were classified as features were significantly more common for the DS-1G group than the DE-1G group ($\underline{t}$=2.09, p<.04).

Table 20
Spanish Word Associations
Mean Number Of Responses By Category And Language Group

Response Type	MS-K	DS-K	MS-1G	DS-1G	DE-1G
TAX-HORIZONTAL					
Slot Filler	8.53	5.06	9.95	8.79	4.93
Superordinate	3.79	2.44	3.53	3.32	2.50
Total Horizontal	12.32	7.50	13.48	12.11	7.43
TAX-VERTICAL					
Slot Filler Label	.47	.89	1.11	.84	.27
Superordinate Label	.26	.78	1.11	.26	.00
Subordinate	.42	.00	.42	.00	.00
Total Vertical	1.15	1.67	2.64	1.1	.27
THEMATIC					
Function	1.56	4.11	1.11	3.11	2.60
Complement	5.68	3.11	3.05	3.47	.80
Spatio-Temporal	1.00	.67	.89	.68	.20
Total Thematic	8.24	7.89	5.05	7.26	3.60
OTHER					
Feature	.42	.28	.47	.32	0
Idiosyncratic	1.74	3.22	1.63	1.58	1.93
Acts	.47	.33	.53	.21	.33
Total Other	2.63	3.83	2.63	2.11	2.26
No Response	2.63	5.56	3.21	3.53	11.47
Language Transfers	0	.55	0	.84	2.20

Table 21 compares the Spanish and the English Word Associations for the DS-K, DS-1G, and the DE-1G groups. Paired t-tests compared the performance within the same group across languages. Within the DS-K group, significantly more Taxonomic Vertical responses were made in English than in Spanish (t=2.65, p<.02). The Thematic type responses were significantly higher in Spanish than in English (t=2.93, p<.009). More specifically, the complementary type responses were higher in their dominant language, Spanish, than in English (t=2.37, p<.03).

Within the DS-1G group, there were significantly more Taxonomic Horizontal responses in Spanish than in English (t=4.45, p<.003). In particular, more slot filler type responses were made in Spanish as compared to English (t=5.60, p<.001). In addition, significantly more total Taxonomic Vertical responses were made in Spanish than in English (t=2.64, p<.02). More specifically, more slot filler labels were used in Spanish than English (t=2.65, p<.02).

Within the DE-1G group, significantly more Taxonomic Vertical responses were made in English rather than in Spanish (t=2.19, p<.05). In particular, more responses were coded as subordinate in English than in Spanish (t=3.75, p<.003). For the DE-1G group, similar to the DS-K group, more thematic type responses were made in the dominant language, English (t=4.57, p<.001). In particular, the complementary type responses were significantly higher in English (t=5.19, p<.003). The DE-1G group also made more Other responses, in English than in Spanish (t=2.22, p<.05).

Overall, the No Response category was greatest in the weaker language DS-K, t=2.50, p<.02; DS-1G, t=3.88, p<.001; DE-1G, t=2.58, p<.03.

Table 21
English And Spanish Word Associations
Mean Number Of Responses By Category And Group

Response Type	DS-K ENG	DS-K SPAN	DS-1G ENG	DS-1G SPAN	DE-1G ENG	DE-1G SPAN
TAX-HORIZONTAL						
Slot Filler	3.65	5.06	4.50	8.79	7.21	4.93
Superordinate	1.25	2.44	2.55	3.32	2.60	2.50
Total Horizontal	4.90	7.50	7.05	12.11	9. 81	7.43
TAX-VERTICAL						
Slot Filler Label	.25	.89	.40	.84	.73	.27
Superordinate Label	3.00	.78	.25	.26	1.20	0
Subordinate	.05	0	.85	0	1.30	0
Total Vertical	3.30	1.67	1.50	1.10	3.23	.27
THEMATIC						
Function	2.90	4.11	1.95	3.11	2.13	2.60
Complement	1.70	3.11	1.80	3.47	4.33	.80
Spatio-Temporal	.15	.67	.45	.68	.60	.20
Total Thematic	4.75	7.89	4.20	7.26	7.06	3.60
OTHER						
Feature	0	.28	.35	.32	.27	0
Idiosyncratic	4.25	3.22	2.70	1.58	3.40	1.93
Acts	.35	.33	.55	.21	1.53	.33
Total Other	4.60	3.83	3.60	2.11	5.20	2.26
No Response	7.10	3.56	8.50	3.53	1.60	11.47
Language Transfers	2.05	.55	1.90	.84	.20	2.20

Summary of Categorization Tasks

Bilingual and Monolingual English Comparisons

With respect to the Forced Choice Unlabeled Picture Task, the monolingual and bilingual children performed similarly to the monolingual sample of Lucariello et al., (1986) monolingual sample in terms of preference order. When speaking in English or in Spanish, the younger and older children's target preference order was as follows: Thematic, slot filler, and superordinate. Thus, having a second language did not alter the overall pattern of response.

In reference to the Nonsense Labeled picture task, the Spanish-speaking monolingual and bilingual children did not show significant increases with respect to superordinate categorization choices when nonsense words were used. Contrary to the Markman & Hutchinson (1984) findings, a nonsense label did not increase taxonomic responding.

With respect to the Word Association task, in the Lucariello et al., (1992) sample, the younger children primarily relied on Thematic responses, while the older children relied on the Taxonomic Horizontal knowledge. In particular, more slot filler responses were made than superordinate responses. Moreover, the children rarely drew on their Vertical Taxonomic knowledge.

Contrary to Lucariello et al., both the younger and older groups (DS-K, DS-1G, and the DE-1G) produced the greatest number of responses that were classified as Taxonomic Horizontal. However, in English and in Spanish, the Puerto Rican children did rely more on the slot filler response than the superordinate response as was the case in the Lucariello et al.

sample. In addition, the children utilized the Taxonomic Vertical knowledge the least whether speaking in English or in Spanish, as did the Lucariello et al., sample.

In Spanish, as was the case in English, Taxonomic Horizontal knowledge was more dominant in all the groups (with the exception of the DS-K group which had more thematic responses). Moreover, in both English and in Spanish, the means for the Taxonomic Vertical responses were higher in the MS-K, MS-1G, and the DS-K groups than the monolingual groups in the Lucariello et al., (1992) study.

With respect to the Category Production task, the Spanish-speaking children generated far fewer items than the Nelson & Nelson (1990) sample so that comparisons could not be made. However, by comparing the samples based on the qualitative patterns of the data some interesting findings emerged. In terms of the number of items generated by the Nelson & Nelson sample, the younger sample generated the most items in the food, followed by clothes, and lastly the animal category. The young bilingual Spanish-speaking sample from New York followed this same order. However, young monolinguals generated the most items in the animal, then the clothes, then the food category.

The older children in the Nelson & Nelson sample generated the most items in the animal, then the food, and lastly the clothes category. From the older children, the only group which matched this pattern was the monolingual sample.

In terms of the Context versus the Conventional based categories, the younger and older groups in the Nelson & Nelson study relied more on the context based organization. Similarly, whether the children were speaking in English or in Spanish, they also used the context-based category more than the conventional category system.

Summary: Bilingualism and Categorization Strategies

Results are discussed based on the composition of the groups as measured by the PPVT. According to Diaz (1985), the higher levels of categorization (superordinate responses) should be seen in group DS-K because they are the youngest, thus those who were most recently integrating the Spanish and English languages. Because the DE-1G and DS-1G groups are assumed to have been integrating the two languages for longer time, it was hypothesized that the opportunity within which to document the positive effects of two languages may have passed. If the DS-1G is still in the early stages of integrating the two languages, positive differences may be seen over the MS-1G group.

In the Forced Choice task, the SP over TM responses appear to have implications for Diaz's hypothesis. When speaking in Spanish, the DS-K group made significantly more superordinate responses than the MS-1G. In the unlabeled and labeled tasks, the DS-1G group also made more superordinate responses than the MS-1G group.

According to Cummins, the DE group should not perform as well as the DS groups because the DE group scored below the age-appropriate language levels in both English and Spanish. Results were, however, found which support Cummins' theory. When speaking in English, given the SP over TM triad, the DS-K group had significantly more superordinate responses than the DE-1G group. In Spanish, given the SP over SF triad, the DS-K group also chose superordinate responses significantly more than the DE-1G group.

With respect to the Word Association and the Category Production Tasks, none of the findings support the Diaz hypothesis. In the Word Associations, Cummins' theory was, however, supported by the results which showed the DE-1G group performing significantly lower than the other groups, which usually occurred when they were speaking in Spanish, their weaker language. However, this finding was countered by the fact that when they spoke in English, significant results revealed that the DE-1G group outperformed the other groups.

The fact still remains that given the forced-choice task, the Dominant Spanish children did respond more taxonomically given a specific triad type. This finding is directly in contrast to what Cummins' theory would have predicted. These children were not balanced in both languages, and yet they still outperformed the monolingual speakers.

Given the Word Association Task, when speaking in Spanish, the MS-K group had significantly more Taxonomic Horizontal responses than the DS-K group. In terms of the Vertical Horizontal category, the MS-1G group produced significantly more such responses than the DS-1G group. With respect to the Category Production Task, the MS-K group performed significantly better than the DS-K group. In reference to the Mean Length of Runs when speaking in Spanish, the MS-K group produced significantly longer runs than the DS-K group in the Script context.

The composition of the DS groups is an interesting issue because it seems that although the PPVT indicated that there was a dominance for Spanish, measures of discourse indicated that they were more balanced. In an attempt to clarify what impact the fluency measures would have on the categorization tasks, the subjects were re-coded into 5 groups based on their English and Spanish script fluency scores. The groups were as follows: 1=MS-K same as before; 2=MS-1G same as before; 3=DS (Kindergarten and first grade); 4=DE (Kindergarten and first grade); and 5=Balanced (Kindergarten).

The performance of the groups on the Forced-Choice, Category Production, as well as the Words Associations was reanalyzed. With this re-coding, no significant differences were found among the groups whether speaking in English or in Spanish. This would suggest that significant differences in the superordinate classifications was not tied to fluency but was more related to the PPVT.

Chapter V

Discussion

The questions set forth at the end of the introduction are considered here in terms of the data resulting from this study. Before considering their implications, a brief re-statement of the Diaz and Cummins predictions as they apply to the tasks used here is presented. Diaz believed that children at the early stages of bilingual development would exhibit positive cognitive effects. According to Diaz, it would be harder to identify the positive cognitive advantages associated with bilingualism once the languages were more balanced. Thus, he would have predicted that the DS groups would perform with more superordinate type responses than the MS or the DE groups. Overall, there was support for Diaz's hypothesis. See Table 22. The DS-K and the DS-1G groups made more superordinate choices than the MS groups given the Forced-choice Task (specifically comparing the SP-TM triad type). However, neither the Word Association nor the Category Production Tasks provided evidence in support of the Diaz hypothesis.

Table 22
Superordinate Responses By Tasks And Language

Tasks	Spanish MS<DS K	Spanish MS<DS 1	MS>DS K	MS>DS 1	English DE 1	English DS 1	(<,>)
Forced-choice Unlabeled (SP)	X	**X***					<
Forced-choice Labeled (SP)		**X***	**X***				>
Category Production (Conven)			**X***	**X***			>
Word Associations (SP)			X	X			>

The table was based on the mean number of superordinate responses. Significance of at least .05 is noted by the asterisk.

Cummins' theory stated that limited bilinguals, achieving low language levels in both languages, would exhibit negative results. Thus, he would have predicted that the DE group would have performed more negatively because they were not at age-appropriate levels in either English or Spanish. When the DE group spoke in Spanish, with respect to the Forced-Choice and the Category Production Tasks the findings supported Cummins' theory. However, when the DE-1G group spoke in English, their dominant language, the findings were reversed. (See Table 22.) Thus the results seem to support a language specific competence hypothesis.

With respect to the performance of the MS groups, overall means indicated that they performed better than the DS groups in terms of the Word Association and the Category Production Tasks (see Table 22). In these cases, having two languages was not related to more advanced forms of categorization strategies. These findings might reflect the reality that these children were more comfortable with their school language, Spanish, given that they were in a Spanish majority community and school. Although the dominant Spanish-speaking children went to bilingual programs their familiarity and comfort level with the languages may have been lessened because of the language status difference in the general culture and in the school environment.

The dominant Spanish-speaking children performed better when they were speaking in Spanish and the dominant English group performed better when they were speaking in English (with the exception of two conditions). See Table 23. It suggests that performance on the tasks was language specific. Moreover, evaluations based on the children's stronger language are more reflective of what they are capable of than evaluations based on the society's dominant language. The findings suggest that Spanish dominant children should build on concepts and structures already established in Spanish, instead of relying on a language for which a solid social, cultural, and experiential foundation does not exist.

Table 23
Language Competence Based on Mean Number of Superordinate Types of Responses

	Spanish >English			Spanish <English		
Tasks	DS-K	DS-1	DE-1	DS-K	DS-1	DE-1
Forced-choice Unlabeled (SP)	S	S	S			
Forced-choice Labeled (SP)		S		E		E
Category Production (Conven)	S	S				E
Word Associations (SP)	S	S				E

The letters refer to the language in which the mean number of superordinate responses was greatest (based on means).

With respect to categorization, the children performed with more complex superordinate responses when tested in their dominant language. The children's Spanish language performance validates the support of their dominant language, although it is not society's dominant language. For the dominant Spanish-speaking children, their Spanish scripts served as the basis from which more complex types of taxonomic categorizations developed. The Spanish interactions served as the best condition in which to assess the children's more complex categorization strategies.

In terms of how well the Puerto Rican children fit within Nelson's categorization research, the overall patterns were the same. With respect to the Forced-Choice Task, the preference order was the same for the Spanish-speaking children as for (Nelson's) English monolingual children: Thematic, slot-filler, and superordinate. Given the Category Production Task, all the children relied more on script/context based categories than the conventional categories (whether speaking in English or in Spanish). With respect to the Word Association Task, the older Spanish-speaking (MS-DS) and (Lucariello et al.) English monolingual children relied on the Taxonomic Horizontal knowledge. However, the younger Lucariello et al. sample relied more on the Thematic responses, while the younger Spanish-speaking children relied more on the Taxonomic Horizontal responses.

Overall, the categorization patterns were the same, suggesting that having a second language does not alter the system in general. However, in the Forced-Choice Task the DS-1G and the DS-K groups chose more superordinate responses suggesting that the second language may accelerate this type of response (albeit specific to this one picture task).

With respect to Markman and Hutchinson's proposal that labeling elicits more superordinate types of responses, the children in this sample did not respond more superordinately given a nonsense label. It is possible that because the children had become familiar with the picture items (in the unlabeled condition) that they did not except or use the nonsense labels as Markman et al. would have expected. The fact that the task was not set up exactly as Markman et al. prescribed could also have altered the results.

The results obtained in support of Diaz's hypothesis could be further explored through the differences observed in the proficiency measures. Was the DS-K group's performance somehow related to the fact that on other measures of language proficiency they were more balanced? How did the script task which measured bilingual proficiency relate to task performance? Although the PPVT indicated that the DS-K and the DS-1G groups were Spanish-dominant, measures of discourse indicated that they were more balanced in English and Spanish. In an attempt to clarify what impact the fluency measures would have on the categorization tasks, the subjects were re-grouped into 5 groups based on their English and Spanish script fluency scores. This re-coding allowed the balanced children to be isolated. No significant differences were found across the tasks among the groups, whether speaking in English or in Spanish. This would suggest that what is related to finding significant differences in the superordinate classifications is not tied to fluency or discourse. However, it should be noted that while the PPVT is more school based the discourse measures of fluency are not as school based. The PPVT is, however, related to school-based instruction word meaning and categorization.

However, the fact still remains that this sample was more balanced in terms of discourse which describes a different sample from what Diaz would have posited as dominant in one language across different language competencies. A sample of children strictly dominant in one language across different language areas such as fluency and flexibility might have yielded different results. Moreover, other language measures should exist which have been standardized on this population. These tests are probably more accurate at differentiating the children in terms of fluency or grammatical complexity etc. which could possibly lead to different findings. In addition, other measures may tap into a particular language skill that may, in fact, be more related to how the children categorize.

The question of how language and culture relate to the children's perceptions is also important. Do the children have different representations related to categories in each of the languages? Appendices P and Q also support the fact that there were differences in what the children chose to speak about when asked about the birthday and home scripts. Differences could, however, be attributable to lack of formal knowledge or lack of experience with the second language, although this study did not test this. For example, it is not clear whether or not the children spoke about the television more in the English home script than in the Spanish because of a different system of representation or because of lack of familiarity or use of the other language. It is important to note, however, that the children could at any point have spoken in the other language to include any concept which they had in one language and not in the other. However, language transfers were a rare occurrence (with the exception of the DE-1G group), suggesting that specific elements were spoken about depending on the language.

It is also possible that the groups, although all Puerto Rican, represented different language cultures. Families who raise children dominant in Spanish, in a society where English is the main language are different from families with children who speak English, the dominant language of this society. The issues that are talked about and the contexts within which the different languages are spoken are different and should be further explored.

Moreover, the social acceptability and prestige of the languages is also important to consider. Could the monolingual Spanish speakers superior performance on some of the tasks be related to the fact that in Puerto Rico to speak Spanish is not associated with negative consequences or ramifications? Could the bilingual New York and New Jersey samples have performed differently if the society in which they lived equally valued both of their languages?

In addition, how the children learned their languages should have been indexed. Although an open ended question referring to how the children learned both of their languages was included in the language questionnaire, the responses obtained were not comparable and were difficult to code.

In terms of future work with Puerto Rican children a more culturally relevant/specific set of items would be explored. The items used in these categorization tasks were developed through the help of and then tested on White monolingual English-speaking children. To begin to establish a literature which addressed Puerto Rican children and their categorization strategies, these items were not altered. It would be of great interest, however, to explore Spanish-speaking bilingual children's responses to, for example, what they consider typical dinner, breakfast, and lunch foods and what types of word associations are given with respect to these items which they would have generated. In this case, more culturally relevant items would be included while other items such as guinea pig and waffles would have been eliminated. Thus, placing the categorization experience within a more culturally relevant context could lead to different findings.

Currently, an English only amendment is being debated in the Senate and will impact on US as well as Puerto Rican citizens. This society's negative value of languages other than English, will inevitably have a negative impact on children's performance in English as well as Spanish. These negative effects will undoubtedly go beyond mere language performance but will impact on the children's perceptions of their culture as well as their self-esteem.

In light of the fact that the data from this dissertation suggest that children are more than capable when working in their dominant language, children's school performance in Spanish and the relationship between this knowledge and the English language experience should be investigated. More studies analyzing the richness of the children's knowledge in their own dominant language are needed. More importantly, studies which address how the children use Spanish to learn and comprehend English will hopefully show the value of supporting the children's dominant language and enhance bilingual programs overall.

Appendices

Appendix A

Demographic Information

The demographic and language questionnaires were only completed by 55% of the parents. Only 9 parents (45%) from group the MS - K group, and 15 parents (75%) from the MS- 1G group completed the form. Twelve parents (60%) from the DS-K group and 14 parents (70%) from the DS-1G group completed the questionnaire. Lastly, only 4 parents (20%) from the children of the DE-1 G group completed the questionnaire. Moreover, while 55% completed the questionnaires the percent is not reflective of the fact that sometimes parents chose not to answer some questions, such as rooms per person because they felt the question too intrusive.

Appendix B
Parental Age, Education, and Rooms Per Persons.

Group	Mom's Age	Dad's Age	Mom's Education	Dad's Education	Rooms per Persons
MS - K	32	36	2.5	2.8	.76
DS - K	30	33	2.3	1.8	1.2
MS - 1G	32	35	2.9	2.4	.75
DS - 1G	31	37	1.8	1.6	.78
DE - 1G	26	29	3	2.3	1.1

Education was classified as follows: 1=partial high school or less; 2= completed high school; 3=partial college; 4= completed college; 5=graduate school.

Parental demographics such as age, education, and rooms per persons can be seen in Appendix B for the subjects who responded (See Appendix A). Mothers' mean age is 30 years and for the fathers it is 34 years. Most of the mothers and fathers have completed high school. The mothers of the DS-1G group, and fathers of the DS-K and DS-1G groups have the lowest level of education achieving partial high school on average.

Appendix C
Parents Use of English and Spanish at Work

Group	MS - K	DS - K	MS - 1G	DS - 1G	DE - 1G
English					
Mom	0%	33%	21%	10%	100%
Dad	67%	67%	20%	55%	100%
Spanish					
Mom	86%	75%	100%	60%	75%
Dad	100%	78%	93%	64%	100%

Appendix C refers to parental language use at work. It seems the parents of the MS and DS groups are speaking more Spanish at work. However, parents of the DE group are using both English and Spanish at work. For the Monolingual and Dominant Spanish groups, parents are speaking more Spanish at work than English. Parents of the Dominant English group are using both English and Spanish at work.

Appendix D
Years Spent in the United States and Puerto Rico

Group	Child's Time in US	Child's Time in PR
MS - K	.11	5.7
DS - K	4.2	.94
MS - 1G	.33	6
DS - 1G	4.75	1.67
DE - 1G	7	0

The children have spent most of their lives in the countries where they were born. The mean time spent in the US was 4.2 for the kindergarten group and 5.9 years for the first grade groups. With the exception of the DE group they all have lived some time in Puerto Rico.

Appendix E

Children's Language Context (%)

In what language/s do the mom and child speak?

Group	Spanish Only	Mostly Spanish	English & Spanish	Mostly English	English Only
MS - K	89	11	0	0	0
DS - K	42	0	50	8	0
MS - 1G	94	6	0	0	0
DS - 1G	64	7	29	0	0
DE - 1G	25	0	25	50	0

In what language/s do the dad and child speak?

Group	Spanish Only	Mostly Spanish	English & Spanish	Mostly English	English Only
MS - K	88	13	0	0	0
DS - K	46	18	27	0	9
MS - 1G	100	0	0	0	0
DS - 1G	69	8	15	8	0
DE - 1G	0	50	25	0	25

In what language/s do the child and sibling speak?

Group	Spanish Only	Mostly Spanish	English & Spanish	Mostly English	English Only
MS - K	88	13	0	0	0
DS - K	9	27	55	9	0
MS - 1G	100	0	0	0	0
DS - 1G	58	0	33	8	0
DE - 1G	0	33	0	0	67

In what language/s do the mom and dad speak?

Group	Spanish Only	Mostly Spanish	English & Spanish	Mostly English	English Only
MS - K	71	14	14	0	0
DS - K	33	33	25	0	8
MS - 1G	93	0	7	0	0
DS - 1G	62	31	8	0	0
DE - 1G	0	50	50	0	0

The parents completed these questions as part of the language questionnaire. Almost all of the children in the MS groups spoke in Spanish only given every context. It is of interest to note that half of the DS-K group was reported to have spoken both in English and Spanish when speaking to the mother and when speaking to their siblings. Almost two-thirds of the DS-1G group spoke only in Spanish given every context. Half of the DE-1G group spoke in English only when speaking to the mother. When speaking to the father, half of the DE-1G group spoke in Spanish. However, when speaking to their siblings, two-thirds of the children spoke in English only. With respect to the languages spoken by the parents, half of the DE-1 group said their parents spoke mostly in Spanish and half said their parents spoke both in English and Spanish.

Appendix F
Percent of Children's Language Feelings Across All The Groups

Questions	Very Happy	Happy	OK	Sad	Angry
How do you feel about speaking English?*	54	21	11	7	8
How do you feel about speaking Spanish?*	32	25	29	5	9
How do you feel about speaking English at home?	49	15	24	10	2
How do you feel about speaking Spanish at home?	46	26	15	4	9
How do you feel about speaking English with your friends?*	35	28	16	10	11
How do you feel about speaking Spanish with your friends? *	40	23	19	4	14
How do you feel about speaking English in class?	42	20	15	11	12
How do you feel about speaking Spanish in class? *	42	17	23	14	3
How does your mom feel about you speaking English?	54	22	14	4	5
How does your mom feel about you speaking Spanish?	49	21	19	3	9
How does your teacher feel about you speaking English in class?	55	22	11	4	8
How does your teacher feel about you speaking Spanish in class?	46	24	12	8	11
How do your friends feel about you speaking English?	40	22	23	8	8
How do your friends feel about you speaking Spanish? *	36	25	21	5	13
How do you feel about yourself?	70	14	7	8	2
How do you feel about your skin color?	29	34	12	15	10

* indicates a significant difference for the item among the groups p =.05

Chi Squares revealed significant differences in children's language feelings when comparing children's positive (very happy & happy) and negative (sad & angry) responses. When asked about how they felt about speaking English, the MS-1G group was significantly less positive (31%) about speaking English than the DS-1G group (58%). When asked how they felt about speaking Spanish, the DE-1G group was significantly less positive (27%) than the DS-1G group (53%).

When asked they felt about speaking English to their friends, the MS-1G group was significantly less positive (29%) than the MS-K (51%), DS-1G group (55%). When asked how they felt about speaking Spanish to their friends, the DS-K group was significantly less positive (29%) than the DS-1G group (54%).

When asked how they felt about speaking Spanish in their class, the children in the MS-K (31%), DS-K (28%), and DE-1G (34%) groups were significantly less positive than the DS-1G group (60%).

When asked how their friends felt about them speaking Spanish, the DE-1G group was significantly less positive (28%) than the MS-1G (59%) and the DS-1G group (51%).

Apparently, the monolingual Spanish first graders in Puerto Rico were less favorable about speaking English themselves as well as to their friends. In addition, the DE-1G group seems less favorable about speaking Spanish in class as well as to their friends than the DS-1G group. Moreover, the DS-1G groups was significantly more positive about speaking Spanish, about speaking Spanish with their friends, and about speaking Spanish in their class.

Appendix G

Individual Script Tasks

Appendices H and I refer to how the children responded to the Script : "What happens at a birthday party?" and "What happens after school when you get home?" The tables show the mean number of words produced, acts mentioned, fluency ratings, and language transfers made by each of the groups. When asked in English what happens at a birthday party, the DE-1G group as expected produced significantly more words than the other groups ($F=16.35$, $p<.001$). In Spanish, the MS-K and MS-1G groups produced more words than the DS-1G and the DE-1G groups ($F=6.89$, $p<.001$).

Significantly more acts were named by the DE-1G group in English than the DS-K and the DS-1G groups ($F=5.05$, $p<.001$). In Spanish, the MS-K, MS-1G, and DS-1G groups named more acts than DE-1G ($F=10.50$, $p<.001$). The MS-1G group also named more actions than the DS-K and the DS-1G groups.

Fluency in the English birthday script was significantly better for the DE-1G group than the DS-K and the DS-1G groups ($f=12.71$, $P<.001$). In Spanish, the MS-K, MS-1G, and DS-K groups were more fluent than the DE-1G group ($F=11.90$, $p<.001$).

Language transfers were produced more by the DE-1G group when speaking in Spanish than the MS-K, MS-1G, and the DS-1G groups ($F=5.07$, $p<.001$).

Paired t-tests showed, as expected, that when comparing the English and Spanish birthday scripts, the DE-1G group had significantly more words, acts, and higher fluency in English rather than Spanish ($\underline{t}=5.77$, $p<.001$; $\underline{t}=3.22$, $p<.001$; $\underline{t}=7.60$, $p<.001$). The DE-1G group also produced more English words when speaking in Spanish ($\underline{t}=2.30$, $p<.001$).

However, there were no significant differences for the DS-K and the DS-1G groups when comparing words, acts, or fluency across English and Spanish. The birthday script task lends support to the possibility that these two groups are more balanced rather than Spanish-dominant as the PPVT seemed to suggest.

When asked to state what happens at home after school, in English, the DE-1G group produced more words than the DS-K and the DS-1G groups ($F=9.75$, $p<.001$). See Table 7. In Spanish, the MS-1G groups produced more words than the DS-K, DS-1G, and the DE-1G groups. More actions were named when speaking Spanish, by the MS-K, MS-1G, and DS-1G groups than the DE-1G group ($F=9.75$, $p<.001$).

Fluency in English for the home script was significantly higher for the DE-1G group than the DS-1G group ($F=6.71$, $p<.003$). Fluency in Spanish was significantly higher for the MS-K, MS-1G, DS-K, and the DS-1G groups in comparison to the DE-1G group ($F=15.79$, $p<.001$). The MS-K group was also more fluent than the DS-K group.

With respect to language transfers when speaking in English, the DS-1G group produced significantly more words in Spanish than the DS-K and DE-1G groups ($F=5.85$, $p<.005$). When speaking in Spanish the DE-1G group produced significantly more English words than all the other groups ($F=4.78$, $p<.002$).

Paired t-tests revealed that for the home script, the DE-1G group produced more words, acts, and had higher fluency in English rather than Spanish ($\underline{t}=4.17$, $p<.001$; $\underline{t}=3.27$, $p<.001$; $\underline{t}=4.67$, $p<.001$). They also produced more English language transfers when speaking Spanish ($\underline{t}=2.08$, $p<.05$). The DS-1G group also produced more acts and had better fluency in Spanish than English ($\underline{t}=2.24$, $p<.04$; $\underline{t}=2.20$, $p<.04$). Moreover, they also produced more language transfers in Spanish than when speaking in English (t=2.52, $p<.02$). However, the DS-K group did not show significant differences between Spanish and English on any of the home variables thus possibly indicating more balance between the languages.

Appendix H
Birthday Script Constructions
Total # of Words, Acts, Fluency, and Language Transfers by Group and Language

Birthday Script	MS-K	DS-K	MS-1G	DS-1G	DE-1G	Total Mean
# Words						
English	----	13.85	----	7.85	29.94	17.21
Spanish	25.17	16.25	25.95	9.50	8.18	17.02
# Acts						
English	----	2.50	----	2.35	3.82	2.89
Spanish	3.68	2.85	4.52	3.00	1.41	3.09
Fluency						
English	----	2.40	----	1.75	3.97	2.71
Spanish	3.26	2.50	3.37	2.15	.94	2.44
Language Transfers						
English	----	.25	----	.85	0	.37
Spanish	0	.85	0	.60	4.00	1.09

Fluency was rated on a 5 point scale, the most fluent of which is 5.

Appendix I
Home Script Constructions
Total # of Words, Acts, Fluency, and Language Transfers by Group and Language

Home Script	MS-K	DS-K	MS-1G	DS-1G	DE-1G	Total Mean
# Words						
English	----	17.35	----	9.65	27.67	18.22
Spanish	18.79	17.15	26.79	12.55	7.76	16.61
# Acts						
English	----	2.15	----	2.65	3.00	2.60
Spanish	3.63	2.90	4.21	3.50	1.41	3.13
Fluency						
English	----	3.00	----	1.90	3.56	2.82
Spanish	3.95	2.85	3.58	2.70	1.29	2.91
Language Transfers						
English	----	.15	----	1.70	0	.62
Spanish	0	.50	0	.10	6.88	1.50

Fluency was rated on a 5 point scale, the most fluent of which is 5.

Appendix J

Justifications for the Unlabeled Forced-choice Picture Task

After the Forced-choice Task was completed, the children were asked to justify why a target picture and their choice item went together (for half of the items). The children were also asked to justify why a target and a picture that they had not chosen went together (for the other half of the items). Thus, half of the items to be justified referred to their preferred choices and the other half referred to the choices they had not made/not preferred.

Justifications for the Superordinate, Slot-filler, and the Thematic Responses were tabulated in Appendices K-M. No statistical analysis was carried out, but the patterns suggest that groups used "no response" as their main justification. For both the kindergarten and the first grade groups, other justifications were functional, slot filler, and thematic. If the item justified was not preferred, then the most prevalent justification was thematic for all the groups, younger, older, monolingual, or bilingual, whether speaking in English or in Spanish. For the Slot filler responses, the most common justification was again no response. For the thematic responses, when the children were asked to justify a preferred choice, the justifications were primarily thematic. When the choice was not preferred, the most common justification type was first no response then and second was functional.

Overall, when asked to justify a chosen/preferred Superordinate or Slot filler response, the children's justifications were primarily functional (whether older or younger, monolingual or bilingual). Justifications made for the chosen Thematic responses were primarily thematic (whether older or younger, monolingual or bilingual). Justifications of the nonchosen responses were primarily thematic.

Justifications Of Nonsense Labeled Forced-choice Picture Task-

Superordinate Response Justifications

It should be noted that the DS-K group was the only group which had superordinate justifications as the main type of justification. In English, when asked to justify their chosen response and in Spanish when asked to justify their non-preferred response, the justifications were primarily superordinate.

That superordinate justifications were more predominant in the nonsense labeled task than in the unlabeled condition. This would support Waxman & Gelman (1986) and the Markman & Hutchinson (1986) findings which stated that the use of nonsense words would increase taxonomic responses. See Appendix N.

Appendix K
Unlabeled Forced-Choice Justifications
Mean Percentage Of Justifications For Superordinate Responses
By Justification Type, Choice Type, Language, And Group

RESP	NR	SP	FUNC	SF	TM	FEA
DS-K- C						
ENGLISH	59.09	13.64	15.91	6.82	2.27	2.27
SPANISH	27.66	27.66	29.79	8.51	6.38	0.00
DS-K-N C						
ENGLISH	31.11	24.44	6.67	6.67	31.11	0.00
SPANISH	20.45	20.45	15.91	9.07	31.82	2.27
MS-K - C						
ENGLISH	------	------	------	------	------	------
SPANISH	35.14	8.11	24.32	8.11	21.62	2.7
MS-K-NC						
ENGLISH	------	------	------	------	------	------
SPANISH	44.19	11.63	6.98	6.98	27.91	2.33
L,K,N. (4yr) -C	37.5	31.8	16.7	0	3.3	12.0
L,K,N. (4yr) -NC	76.9	15.2	3.0	0	3.8	1.0
MS-1G -C						
ENGLISH	------	------	------	------	------	------
SPANISH	38.71	12.90	9.68	12.90	25.81	0.00
MS-1G -NC						
ENGLISH	------	------	------	------	------	------
SPANISH	28.57	10.71	17.86	3.57	39.29	0.00
DS-1G- C						
ENGLISH	36.00	24.00	28.00	12.00	0.00	0.00
SPANISH	42.11	10.53	21.05	18.42	7.89	0.00
DS-1G-NC						
ENGLISH	60.00	3.33	13.33	3.33	20.00	0.00
SPANISH	28.57	2.86	17.14	11.43	40.00	0.00
DE-1G-C						
ENGLISH	25.81	3.23	16.13	6.45	48.39	0.00
SPANISH	86.67	0.00	6.67	6.67	0.00	0.00
DE-1G-NC						
ENGLISH	4.76	23.81	19.05	14.29	38.10	0.00
SPANISH	55.00	20.00	5.00	0.00	20.00	0.00
L,K,N,(7yr) - C	27.4	25.0	41.6	0	2.5	3.6
L,K,N, (7yr) - NC	68.6	9.8	15.4	1.0	1.7	3.5

Calculations are based on the children who made a superordinate choice. C refers to the chosen responses. NC refers to the responses not chosen. NR=no response. SP=superordinate FUNC=functional. SF=slot-filler category. TM=thematic. FEA=featural. L,K,N refers to the Lucariello et al. study.

Appendix L
Unlabeled Forced-Choice Justifications
Mean Percentage Of Justifications For Slot Filler Responses By Justification Type, Choice Type, Language, And Group

RESP	NR	SP	FUNC	SF	TM	FEA
DS-K- C						
ENGLISH	50.77	13.85	13.85	16.92	4.62	0.00
SPANISH	28.3	16.98	33.96	13.21	5.66	1.89
DS-K-N C						
ENGLISH	44.07	10.17	13.56	5.08	27.12	0.00
SPANISH	29.09	14.55	20.0	5.45	29.09	1.82
MS-K - C						
ENGLISH	------	------	------	------	------	------
SPANISH	49.02	7.84	17.65	7.84	15.69	1.96
MS-K-NC						
ENGLISH	------	------	------	------	------	------
SPANISH	42.31	1.92	5.77	13.46	34.62	1.92
L,K,N. (4yr) -C	46.9	19.0	12.4	2.0	16.3	3.3
L,K,N. (4yr) -NC	70.3	17.1	7.7	0	3.4	1.7
MS-1G -C						
ENGLISH	------	------	------	------	------	------
SPANISH	39.22	9.8	25.49	9.8	13.73	1.96
MS-1G -NC						
ENGLISH	------	------	------	------	------	------
SPANISH	39.34	14.75	13.11	6.56	24.59	1.64
DS-1G - C						
ENGLISH	54.17	6.25	25	6.25	8.33	0.00
SPANISH	31.15	6.56	42.62	11.48	4.92	3.28
DS-1G -NC						
ENGLISH	45.65	6.52	17.39	6.52	23.91	0.00
SPANISH	41.67	6.67	11.67	16.67	23.33	0.00
DE-1G- C						
ENGLISH	20.41	10.2	22.45	18.37	28.57	0.00
SPANISH	61.11	22.22	5.56	11.11	0.00	0.00
DE-1G-NC						
ENGLISH	36.36	6.82	25.00	9.09	22.73	0.00
SPANISH	54.84	9.68	6.45	12.90	12.90	3.23
L,K,N,(7yr) - C	21.2	12.5	30.4	5.8	27.1	1.7
L,K,N, (7yr) - NC	49.3	12.2	16.6	5.0	15.8	1.0

Calculations are based on the children who made a slot filler choice. C refers to the chosen responses. NC refers to the responses not chosen. NR = no response. SP= superordinate. FUNC=functional. SF=slot-filler. TM= thematic. FEA=featural. L,K, N refers to the Lucariello et al. study.

Appendix M
Unlabeled Forced-Choice Justifications
Mean Percentage Of Justifications For Thematic Responses By Justification Type, Choice Type, Language, And Group

RESP	NR	SP	FUNC	SF	TM	FEA
DS-K- C						
ENGLISH	23.88	1.49	2.99	8.96	62.69	0.00
SPANISH	11.11	2.78	2.78	1.39	81.94	0.00
DS-K-N C						
ENGLISH	36.51	30.16	19.05	6.35	7.94	0.00
SPANISH	39.74	24.36	25.64	1.28	8.93	0.00
MS-K - C						
ENGLISH	------	------	------	------	------	------
SPANISH	15.79	1.32	5.26	7.89	69.74	0.00
MS-K-NC						
ENGLISH	------	------	------	------	------	------
SPANISH	42.19	17.19	20.31	6.25	10.94	3.13
L,K,N. (4yr) -C	13.2	0.00	0.00	0.00	86.8	0.00
L,K,N. (4yr) -NC	33.2	0.00	0.00	0.00	66.7	0.00
MS-1G -C						
ENGLISH	------	------	------	------	------	------
SPANISH	12.5	4.55	2.27	6.82	73.86	0.00
MS-1G -NC						
ENGLISH	------	------	------	------	------	------
SPANISH	35.9	14.1	25.64	3.85	16.67	3.85
DS-1G - C						
ENGLISH	38.81	0.00	0.00	5.97	55.22	0.00
SPANISH	15	1.25	2.5	3.75	77.5	0.00
DS-1G -NC						
ENGLISH	56.92	15.38	16.92	7.69	3.08	0.00
SPANISH	41.67	17.86	20.24	13.1	7.14	0.00
DE-1G-C						
ENGLISH	11.76	2.94	0.00	5.88	79.41	0.00
SPANISH	44.44	0.00	1.85	0.00	53.70	0.00
DE-1G-NC						
ENGLISH	20.00	1.54	0.00	3.08	75.38	0.00
SPANISH	58.82	9.80	15.69	9.80	5.88	0.00
L,K,N.(7yr) - C	12.8	0	0	0	87.3	0
L,K,N, (7yr) - NC	17.3	0	0	0	82.6	0

Calculations are based on the children who made a thematic choice. C refers to the chosen responses. NC refers to the responses not chosen. NR=no response. SP=superordinate. FUNC=functional. SF=slot-filler. TM= thematic. FEA=featural. L,K,N refers to the Lucariello et al. study.

Appendix N
Nonsense Labeled Forced-Choice Justifications
For Superordinate Response
Mean Percentages By Justification Type, Choice Type, Language, And Group

GROUP LANGUAGE	NR	SP	FUNC	SF	TM	FEA
MS-K - C						
ENGLISH	------	------	------	------	------	------
SPANISH	35.9	15.38	10.26	20.51	17.95	0
MS-K - NC						
ENGLISH	------	------	------	------	------	------
SPANISH	22.86	11.43	11.43	5.71	48.47	0
DS-K- C						
ENGLISH	45.45	27.27	18.18	4.55	4.55	0.00
SPANISH	29.63	14.81	29.63	3.7	22.22	
DS-K-NC						
ENGLISH	11.54	15.38	30.77	3.85	34.62	3.85
SPANISH	24.00	28.00	24.00	4.00	20.00	0
MS-1G - C						
ENGLISH	------	------	------	------	------	------
SPANISH	28.57	11.43	17.14	5.71	31.43	5.71
MS-1G -NC						
ENGLISH	------	------	------	------	------	------
SPANISH	40.00	12.00	16.00	4.00	24.00	4.00
DS-1G - C						
ENGLISH	23.54	17.65	35.29	11.76	11.76	0
SPANISH	20.51	17.95	33.33	7.69	17.95	2.56
DS-1G-N C						
ENGLISH	42.11	5.26	31.58	5.26	15.79	0.00
SPANISH	17.86	21.43	21.43	10.71	28.57	
DE-1G-C						
ENGLISH	38.10	19.05	28.57	0	14.29	0
SPANISH	80.00	0	6.67	6.67	6.67	0
DE-1G-NC						
ENGLISH	13.64	0	22.73	22.73	40.91	0
SPANISH	47.62	4.76	28.57	9.52	9.52	0

Calculations are based on the children who made a superordinate choice. C refers to the chosen responses. NC refers to the responses not chosen. NR=no response. SP=superordinate. FUNC=functional. SF=slot-filler. TM=thematic. FEA=featural. L,K, N refers to the Lucariello et al. study.

Appendix O
Subdivisions Used in Category Production Analysis
Conventional Subcategories and Context Subdivisions
Nelson & Nelson (1990)

Conventional Subcategories

Animals	Clothing	Food
Mammals	Outerwear	Meat Vegetables
Fish	Underwear	Fruit
Birds	Sports	Cereal
Insects	Footwear	Pasta
Rodents	Outdoor wear	Dairy
Marsupials	Headgear	Beverages
Amphibians	Nightwear	Breads
Reptiles	Accessories	Cakes
Worms		Condiments
Mollusks		Candy
		Nuts
		Soup
		Manufactured Foods

Context Subdivisions

Animals	Clothing	Food
Zoo Animals	Day/Indoor Clothes	Breakfast
Farm Animals	Outdoor Clothes	Dinner
Pet/Home	Sports Clothes	Lunch
Woods/Park Animals	Adults Clothes	Snack
Water Animals	Night Clothes	Dessert

Appendix P
Home Script
Percent of Children Stating Activities

	MS-K Eng	MS-K Span	DS-K Eng	DS-K Span	MS-1G Eng	MS-1G Span	DS-1G Eng	DS-1G Span	DE-1G Eng	DE-1G Span
Family/ Friends	----	42%	45%	50%	----	37%	10%	35%	17%	12%
Clothing	----	32%	20%	40%	----	26%	10%	25%	6%	0%
Sleep	----	42%	10%	40%	----	42%	20%	25%	39%	24%
TV	----	42%	20%	20%	----	42%	30%	45%	39%	6%
Homework	----	21%	30%	20%	----	68%	60%	60%	50%	6%
Play	----	37%	20%	30%	----	53%	45%	55%	39%	18%
Eat	----	32%	20%	30%	----	37%	45%	50%	39%	35%
Bath	----	26%	15%	25%	----	42%	5%	15%	28%	12%
Wake	----	16%	0%	0%	----	16%	0%	0%	0%	6%
Behave	----	16%	0%	0%	----	16%	0%	0%	6%	0%
Choirs	----	16%	0%	20%	----	11%	5%	10%	0%	0%
Park	----	5%	5%	15%	----	5%	5%	30%	11%	6%
Personal Account	----	21%	35%	15%	----	26%	5%	5%	11%	11%

When the children were asked to talk about what happens at home after school, there were differences in terms of how many children selected to talk about certain elements. For example, it seems that in the home script many of the younger children focussed on friends/family and sleep issues. The majority of the older children, on the other hand, focussed on homework.

Moreover, the bilingual groups differed in terms of the elements they mentioned when they spoke in English and in Spanish. For example, almost 50% of the DS-K group mentioned changing clothes and sleeping when they spoke in Spanish, but when they spoke in English less than a quarter of the children noted these activities. Almost 50% of the DS-1G group mentioned watching television when they spoke in Spanish, but only a third mentioned it in English. About 50% of the DE-1G group mentioned homework when they spoke in English but only one child mentioned it when she spoke in Spanish.

Thus it seems that there are different scripts depending on the age of the children as well as the language spoken.

It would have been interesting to ask the children about the different elements and compare how they respond to whether or not the terms were known but not stated. This could emphasis the point that the differences were not due to lack of word knowledge but rather different systems of representation associated with the different languages.

Appendix Q
Birthday Script
Percent of Children Stating Activities

	MS-K		DS-K		MS-1G		DS-1G		DE-1G	
	Eng	Span	Eng	Span	Eng	Span	Eng	Span	Eng	Span
Cake	----	68%	45%	50%	----	63%	40%	65%	72%	29%
Family/friend	----	25%	0%	45%	----	26%	0%	15%	22%	24%
Play/games	----	26%	30%	25%	----	58%	60%	60%	61%	35%
Presents	----	32%	10%	30%	----	58%	10%	5%	28%	6%
Eat/Drink	----	32%	30%	30%	----	32%	30%	50%	33%	18%
Candy	----	32%	5%	10%	----	32%	15%	20%	28%	6%
Sing HB	----	26%	15%	5%	----	16%	5%	5%	17%	6%
Music & dance	----	26%	15%	15%	----	21%	10%	15%	22%	12%
Candles	----	16%	15%	10%	----	0%	5%	5%	11%	0%
Piñata	----	11%	0%	5%	----	32%	0%	10%	0%	0%
Fun/Feel	----	11%	5%	10%	----	32%	0%	15%	6%	0%
Balloons	----	11%	10%	10%	----	0%	15%	20%	33%	0%
Personal Account	----	21%	25%	20%	----	26%	10%	0%	11%	6%

Given the birthday script, the central activity which cut across age and language was the mentioning of a cake. In addition, for the older groups it seemed that playing games was a central component of what was to occur at a birthday party.

Again there were differences in how the children expressed themselves in each of the languages. For the DS-K group almost half of the children mentioned their friends or family while none of the children noted them when they spoke in English. For the DS-1G group half of the children mentioned eating and drinking when they spoke in Spanish but only a third noted this when they spoke in English. Lastly, almost two-thirds of the DE-1G group noted playing games when they spoke in Spanish but only one-third did so when they spoke in Spanish.

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