CHILDHOOD BILINGUALISM, METALINGUISTIC AWARENESS AND CREATIVITY

Lina Angela Ricciardelli

Department of Psychology

University of Adelaide

October 1989

CONTENTS

ABSTRACT

A number of studies have investigated the effects of bilingualism on either metalinguistic awareness or creativity, and the majority of these lend some support to the view that bilingualism has a positive influence on abilities relevant to both concepts. However, the two types of abilities have not been studied simultaneously before. It was hypothesised here that there would be positive relationships between abilities in the metalinguistic awareness and the creativity areas, for both bilingual and monolingual children. This hypothesis was based primarily on the notion of the "objectification of language", which has also been proposed for explaining the more widespread cognitive gains associated with bilingualism.

One of the other themes included in this thesis was the degree of consistency among different metalinguistic awareness tasks. The findings from two experiments with English speaking monolinguals supported the view that there is a general metalinguistic ability. In Experiment 1 children aged between 5 and 9 years were studied, but some tests were found to be rather easy for the older children. Therefore only 5 and 6 year olds were tested in Experiment 2. Furthermore, Experiment 2 was specifically designed to study metalinguistic awareness, and its relationship to general intellectual development. Although, evidence was found for the notion of a general metalinguistic ability, the findings also suggested that metalinguistic abilities were not clearly distinguishable, in factorial terms, from other tests of intellectual abilities.

The hypothesis that there would be positive relationships between measures of metalinguistic awareness and creativity was investigated by Experiments 3 and 4. In both experiments the subjects were 5 and 6 year olds, however in Experiment 3 subjects were Italian-English bilinguals and English monolinguals from South Australia, whilst Experiment 4 subjects were Italian-English bilinguals and Italian monolinguals from Rome. Overall this hypothesis was not supported, however, the results were consistent with the Threshold Theory. In both Experiments 3 and 4 the findings suggested that whilst high levels of performance in two languages may promote some aspects of cognitive development, lower levels do not. The results were also discussed in relation to other theoretical views.

STATEMENTS

This thesis is presented for the degree of Doctor of Philosophy. It contains no material which has been accepted for the award of any other degree or diploma in any University, and to the best of the author's knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made.

The author consents to the thesis being made available for photocopy and loan if accepted for the award of the degree.

Lina Angela Ricciardelli

ACKNOWLEDGEMENTS

I would like to express my gratitude to both my supervisors, Inara Proske and Eric E. Rump, who have given me their valuable time and guidance (always) since I commenced my thesis in March 1985.

During my stay in Rome (this included the greater part of 1988) I was also assisted by Prof. R. Titone and his two associates, Dr. M. A. Pinto and Dr. T. Taeschner at the University of Rome, "La Sapienza". They helped me in contacting suitable schools and drew my attention to the relevant literature on bilingualism and metalinguistic awareness in Italy. In addition, Dr. M. A. Pinto helped me with the translation of the metalinguistic tasks for Italian-speaking children. All their time and help is greatly appreciated.

I am also indebted to the staff and children (and their parents) from the 24 schools (13 in Adelaide and 11 in Rome) where I conducted the empirical work for my thesis. The schools are: Ridgehaven Primary and Junior Primary School, Modbury West Junior Primary School, Redwood Park Primary School, Banksia Park Junior Primary School, Surrey Downs Primary School, Newton Primary School, St. Joseph's Primary School (Hectorville), Trinity Gardens Primary School, St. Joseph's Primary School (Tranmere), Nailsworth Primary School, St. Francis of Assisi Primary School, Thorndon Park Primary School, Mater Cristi Primary School, St. George's English School, American Overseas School, Kendale Primary International School, Core: the Co-operative School, Rome International School, Summerfield School, Socrate Scuola Bilingue, Scuola Materna Giuseppe Verdi, Scuola Elementare Giuseppe Verdi, Scuola Elementare Tomassetti Giuseppe, and Scuola Elementare e Media Giuseppe Silla.

LIST OF TABLES:

CHAPTER 1 BILINGUALISM AND COGNITIVE DEVELOPMENT

This thesis is concerned with the effects of childhood bilingualism on metalinguistic awareness and creativity. Flowing from this topic there is an additional theme of the relationship between metalinguistic awareness and creativity. The first part of the thesis (Chapters 1 and 2) provides an overview of the background literature concerned with bilingualism and cognitive development. The second part (Chapters 3 to 6) focuses more specifically on previous research and preliminary empirical work on metalinguistic awareness, whilst the third part (Chapters 7 and 8) deals with the relevant background literature on creativity. The last part (Chapters 9 to 11) is concerned with the main empirical work, in which measures of metalinguistic awareness and measures of creativity were examined.

Interest in the effects of bilingualism on both metalinguistic awareness and creativity grew following the influential Canadian study by Peal and Lambert (1962). In this frequently cited study, Peal and Lambert found that the performance of a group of 10 year old French-English bilinguals was significantly superior to a group of English monolinguals on nonverbal and verbal intelligence tests. The bilinguals were balanced bilinguals, and hence they were considered equally skilled in French and English. In addition, the bilinguals were matched with the monolinguals on age, sex, and socioeconomic status (SES). Thus, Peal and Lambert (1962, p. 22) concluded, contrary to many earlier investigators, that bilinguals "have a language asset, are more facile at concept formation, and have a greater mental flexibility".

Research before the Peal and Lambert study was primarily concerned with the effects of bilingualism on verbal and nonverbal intelligence (Darcy, 1953; 1963), and as a result of the consequential findings, bilingualism was generally portrayed as a handicap (Saer, 1923; Yoshioka, 1929; Smith, 1939; Thompson, 1952). During this early period bilingualism was also associated with squinting, left-handedness, stuttering and immoral behaviour (Hess, 1922, cited by Vildomec, 1963).

After the Peal and Lambert study, researchers have been concerned with more narrowly defined cognitive abilities, and in general, bilinguals have performed significantly better on measures from various cognitive areas. These include the two areas which will be examined further in this thesis, metalinguistic awareness (Cummins, 1978a) and creativity (Landry, 1974). A bilingual superiority has also been found in these other areas: concept formation (Liedtke & Nelson, 1968); social sensitivity (Genesse, Tucker & Lamber, 1975); problem solving (Bain, 1975); perceptual disembedding (Duncan & De Avila, 1979); understanding complex instructions (Powers & Lopez, 1985); memory (Whitaker, Rueda & Prieto, 1985); classifying objects (Fang, 1985/1987) and science concepts (Eckstein, 1986).

As a result of these positive findings, bilingualism is now frequently portrayed as positive and enriching for academic and intellectual potential (Cummins & Gulustan, 1974; Titone, 1981; Diaz, 1985a; Clyne, 1986; Williams, 1989; Hakuta & Garcia, 1989). It has also been argued by Dodson (1983) that the benefits of bilingualism may not only be associated with the cognitive sphere, but they may extend to the bilingual's lifestyle in general:

"As he [the bilingual] has available two languages he can communicate more readily with a wider range of people, participate more fully in their culture and way of living, increase his own mobility and perhaps even improve his chances of employment. Knowing two languages can give the individual an extra window on the world, increase his understanding, his visions and his insights and, in the process, perhaps help him to develop into a more tolerant person than he would otherwise have been" (Dodson, 1983, p. 401).

The striking contrast between the general negative findings reported before the mid 1960's, and the more frequently found positive results reported since have been analysed by Lambert (1975) and Cummins (1976). It has been noted by both Lambert and Cummins that researchers in earlier studies failed to control for additional factors, such as SES and the degree of bilingualism. On the other hand, researchers in more recent studies have frequently controlled for additional factors and have employed balanced bilinguals. Furthermore, the majority of the recent studies have been done in an "additive bilingual" environment: that is, an environment in which both languages are valued and maintained.

Few studies completed after the work of Peal and Lambert have found negative effects associated with bilingualism. In one such study by Tsushima and Hogan (1975), it was found that bilinguals performed significantly poorer than monolinguals on measures of vocabulary, reading and language usage which were assessed by the Iowa School Achievement Test. However, it has been noted by Cummins (1976) that details concerning the bilinguals' relative competence in both languages were not given in this study. Brown, Fournier and Moyer (1977) have also found that bilinguals performed significantly

poorer than monolinguals on a concept formation and a science test, but again it should be noted that the degree of bilingualism was not assessed.

It also needs to be noted that studies in this area have been criticised on methodological grounds. For example, MacNab (1979) and Wagner (1980) have argued that many of the cognitive gains associated with bilingualism may be explained with reference to experimental bias in the selection of bilingual subjects: Balanced bilinguals are specifically selected on the basis of their relative skill in their languages and therefore they may be more intelligent than their monolingual controls.

Another point argued by MacNab (1979) and several others including McLaughlin (1984a, 1984b), Diaz (1985b), Palij and Homel (1987), is that bilingual and monolingual groups are not "comparable" groups. Children are not randomly assigned to bilingual or monolingual upbringings, for unfortunately this allocation is beyond the experimenter's control. This last point is well summarised by Diaz (1985b):

"Regardless of experimenter's efforts to match the groups on relevant variables, good experimental science tells us that cognitive differences between bilinguals and monolinguals could be ultimately explained by differences other than proficiency for a second language" (p. 7).

If there are other underlying variables which may explain the differences found between bilinguals and monolinguals (say SES) then these variables are worthy of further investigation. It is not sufficient merely to recognise that such variables might be intervening explanatory constructs. Furthermore, intervening or background variables, may be controlled as covariates or by use of multiple regression, so as to examine differences which remain thereafter.

In fact, Hakuta and Diaz (1985) and Diaz (1985a, 1985b) have proposed a "within-bilingual" experimental design for studying the effects of bilingualism, in which both proficient and nonproficient English bilinguals are included. To allow greater control of additional variables, multiple regression techniques are advocated, and "the effect of bilingualism on cognitive ability could be assessed by estimating the variance explained by second-language learning proficiency, once the variance explained by first-language ability and other relevant variables (such as age and SES) are partialled out from the analysis" (Diaz, 1985b, p. 10).

The above type of paradigm has also been used by Alvarez (1984) and Gerald (1985). However, this paradigm has its limitations too, because the performance of bilinguals can not be compared to that of monolinguals. An optimal design would include proficient and nonproficient bilinguals, and monolinguals.

Overall, researchers have become more aware of the methodological limitations in the field, and recent efforts to integrate the general findings and the limitations have led several authors to draw "cautious" conclusions (Ben-Zeev, 1984; McLaughlin, 1984a, 1984b; Garcia, 1986; Hakuta, 1986; Katchan, 1986; Arnberg, 1987; Bowey, 1988; Baker, 1988; Cummins, 1989). For example, Baker (1988) has argued:

"Two extreme conclusions may both be untenable. First, to conclude without a doubt that bilingualism gives cognitive advantages fails to take due cognizance of the weight of the criticisms and limitations given throughout the chapter. Second, to conclude that such criticisms are so damaging as to suggest all the research is invalid, fails to acknowledge that the judgement of

the great majority of researchers tends to be positive. While individual pieces of research are sometimes weak and with limitations, cumulatively the verdict seems to favour a bilingualism-cognitive advantages link. There is insufficient evidence to satisfy the sceptic, but what evidence there is leads in the direction of supporting believers in bilingualism" (pp. 43-44).

An important question for researchers now who are convinced of the positive effects associated with bilingualism is "how or why does bilingualism promote cognitive development?" In contrast, the earliest theoretical work in this field was concerned with explaining the negative effects attributed to bilingualism, and this will be reviewed first in the next chapter.

CHAPTER 2 THEORIES CONCERNING THE EFFECTS OF BILINGUALISM ON COGNITIVE DEVELOPMENT

An early theory for explaining the negative effects first associated with bilingualism was proposed by Jespersen (1922, p. 148). He held that bilingual children did not learn either of their languages as well as monolingual children learnt one, and in addition, he believed that "the effort of the brain required to master two languages instead of one" diminished the childrens' capacity for further learning. Jespersen's theory is known as the Balance Effect Theory (Macnamara, 1966; Jakobovits, 1970; Cummins, 1981a, 1981b) and it assumed that the two sets of linguistic abilities in bilinguals are separate. As Cummins (1981a, p. 27) has noted the Balance Effect Theory assumed:

"that there is only so much linguistic capacity available and therefore sharing it between two languages would lead to lower levels of proficiency in each language compared to unilingual speakers of each".

Now there is a large amount of evidence which is inconsistent with the assumptions of the Balance Effect Theory (Cummins, 1979, 1981a, 1981b, 1989; Cummins, Swain, Nakajima, Handscombe, Green & Tran, 1984; Eckstein, 1986; Harley, Hart & Lapkin, 1986; Ramirez, 1987; Malakoff, 1988). The present evidence suggests that the two sets of linguistic abilities are interdependent, and thus any instruction in one language is capable of promoting skills in both languages.

The Balance Effect Theory was proposed to explain the negative cognitive effects first associated with bilingualism. On the other hand, in 1962 Peal and Lambert proposed three hypotheses for explaining the positive

effects of bilingualism which they found on verbal and nonverbal intelligence tests. These have been subsequently elaborated by Cummins (1976) and Diaz (1985b). Cummins has labelled these (a) "the experiential enrichment hypothesis", (b) "the switching hypothesis" and (c) "the objectification hypothesis".

Each of these hypotheses highlights various aspects of bilingual functioning. The experiential enrichment hypothesis holds that bilinguals are more advanced because they are exposed to a wider range of experiences and culture. The switching hypothesis holds that bilinguals are more advanced because they develop a more flexible language set as a result of switching between languages and making use of two different perspectives. The objectification hypothesis holds that bilinguals are more advanced because they have two symbols for many objects from an early age; and in this way they may conceptualise environmental features in terms of their general properties without reliance on linguistic symbols. Therefore, they may be more flexible, and adept as concept formation and abstract thinking.

Cummins has extended Peal and Lambert's third hypothesis. He has suggested that because bilinguals have two symbols for every word, they may develop a faster separation between sound and meaning; and this directs bilingual children to the essential attributes of objects and to the nature of the two languages. This hypothesis is the one favoured by Cummins (1976), and some of the results from earlier studies have been re-interpreted in the light of this hypothesis. For example, anecdotal evidence from the linguist Leopold (1939-1949) and from Imedaze (1960, cited by Diebold, 1968) is viewed as supporting the objectification hypothesis. Even Vygotsky's (1962) views are relevant:

"the bilingual child will tend to see his languages as one particular system among many, to view its phenomena under more general categories, and this leads to an awareness of his linguistic operations" (p. 110).

Two additional hypotheses have been proposed by Diaz (1985b, p. 16) and these are also described by Hakuta, Ferdman and Diaz (1987). The first is "the verbal mediation hypothesis" which holds that "the unique linguistic experience of bilingualism and the accompanying awareness of language might lead to an increasing reliance on verbal mediation in cognitive tasks". Furthermore, it is maintained by Diaz that the reliance on verbal mediation may account for the bilinguals' improved performance on many tasks. The second hypothesis integrates both the objectification and the verbal mediation hypothesis, and according to Diaz, this is the one which best accounts for the overall findings on bilingual cognitive development:

"The systematic exposure to two languages found in bilingual additive situations will give a unique advantage in the objectification of language. Such objectification of language, in turn, will foster an increased and more efficient use of language for self-regulatory functions" (p. 16).

One other hypothesis for explaining the cognitive effects associated with bilingualism has been proposed by Ben-Zeev (1977c). Ben-Zeev has emphasised another aspect of bilingual functioning, that is, interlingual interference. Interlingual interference has been studied by several researchers (e.g., Weinreich, 1953/1963; Durga, 1978; Foster-Meloni, 1978; Lindholm, 1980; Ahukanna, Lund & Gentile, 1981; Magiste, 1984). However, Ben-Zeev is not interested in interlingual interference per se, but in "the cognitive consequences of the strategies or processes which develop in the bilingual

child as he struggles to overcome interlingual interference operating on the structural level of language" (p. 30).

Ben-Zeev (1977c, p. 31) has proposed four different mechanisms which the bilingual child may use to resolve the interference between his/her languages. Although it is cautioned by Ben-Zeev that "these mechanisms are not intended to be definite and they are subject to revision with further evidence. They are the result of extrapolations from and interpretations of data which now exist". Her basic assumption is "that the primary effect of bilingualism is on language-learning strategies, and that is through this channel that bilingualism may affect general thought processes". All four of the mechanism's focus on the structure of language at the syntactic level: language analysis, sensitivity to feedback cues, maximisation of structural differences between languages and neutralization of language structure.

It has also been noted by Dodson (1983) that the bilingual children have additional language-learning strategies available to them as compared to monolinguals:

"Whilst the monolingual child has been observed to exhibit three main language strategies when involved in this absolutely vital playing with language, i.e. extending, substituting and chaining utterances or parts of utterances, the bilingual is able to play further games with language because he has another language available. He compares and contrasts utterances from both language so that both versions are said one after the other, e.g. 'the blue hat - der blaue Hut - the yellow hat - der gelbe hut - der rote hut -the red hat' etc. He has become a little interpreter who, in the process of interpreting, learns to compare and, more importantly, keep apart the two languages" (p. 410).

Ben-Zeev has argued that interlingual interference may explain the positive effects associated with bilingualism, but it needs to be noted that interlingual interference has also been proposed by some researchers for explaining its negative effects (Carringer, 1974). This at first appears somewhat paradoxical, however the two opposing views may be accomodated by the Threshold Theory (Cummins, 1976, 1979, 1984, 1987; Toukomaa & Skutnabb-Kangas, 1977, cited by Cummins, 1979; Skutnabb-Kangas, 1981/1984). This theory maintains that bilinguals need to achieve high levels of linguistic proficiency in both of their languages before bilingualism can promote cognitive development. It would also be the case that if bilinguals had a good command of both their languages, they would then be in a better position to analyse their language systems and thus deal effectively with interlingual interference by using the types of strategies described by Ben-Zeev.

The Threshold Theory further maintains that if children attain a high level of proficiency in only one language and they attain a lower facility with the other language, then their bilingualism will have no positive effect on their cognitive development. Last, if children attain a poor level in both languages then the theory maintains that bilingualism will have a negative effect on cognitive development. In addition, if bilinguals have not attained a high level of proficiency in either language then they may not be equipped to deal effectively with their interlingual interference.

The Threshold Theory has received some empirical support, in that, proficient bilinguals have been found to perform significantly better than nonproficient bilinguals or monolinguals on various cognitive tests (Cummins &

Mulcahy, 1978; Duncan & De Avila, 1979; Holtzman, 1980; Rueda, 1983). However, the majority of studies in this field may not be interpreted as providing evidence either for or against the Threshold Theory, in that, researchers have frequently only examined bilingual balance. Therefore, bilinguals may have attained a high level of proficiency or a low level of proficiency in both languages. (Studies which have included measures of metalinguistic awareness are reviewed in Chapter 3, and studies which have included measures of creativity are reviewed in Chapter 7.)

There is one study by Diaz (1985a) which has provided evidence which is not consistent with the Threshold Theory, and thus he has suggested an alternative view. Diaz found that the degree of bilingualism predicted significant portions of the variance in most of the assessed cognitive variables for a nonproficient bilingual group, but not for a more proficient bilingual group. This alternative view was proposed:

"the positive effects of bilingualism are probably related to the initial efforts required to understand and produce a second language rather than to increasing higher levels of bilingual proficiency (Diaz, 1985a, p. 138).

It needs to be noted, however, that the results found by Diaz have not been replicated. This results are contrary to the Threshold Theory, but the latter has the greater empirical support. In the next chapter, previous studies which have specifically investigated the effects of bilingualism on metalinguistic awareness are reviewed.

CHAPTER 3 METALINGUISTIC AWARENESS AND BILINGUALISM

The first empirical evidence suggesting that bilingualism may promote metalinguistic awareness was anecdotal in nature, and was provided by Leopold (1939-1949, 1961), who observed the development of metalinguistic awareness, particularly word awareness, in his young bilingual daughter Hilgeard. Hilgeard was exposed to German and English from birth and Leopold (1961) noted:

"The most striking effect of bilingualism was a noticeable looseness of the link between the phonetic word and its meaning. The child never insisted on stereotype writing of stories, as monolingual children often do and even made vocabulary substitutions freely in memorized rhymes and songs. The unity of phonetic word and naming, which is postulated by some scholars, was definitely not a fact for this child, who heard the same thing constantly designated by two different phonetic forms. This separation of word and meaning may be considered beneficial, because it favours content over form, thinking over verbiage" (p. 358).

Leopold's main conclusions from his observations have been independently supported by Imedadze (1960, cited by Diebold, 1968):

"At the very first stage of speech development in the bilingual child, when he first encounters the fact that an object can have two names, a separation of object and name begins. A word, when freed from its referents, can easily become the object of special attention" (p. 236).

Further observations of a similar kind have been made more recently by Slobin (1978) and Oksaar (1977/1983, 1980, 1981). Slobin cited several

examples of his daughter's metalinguistic skills between the ages of 3 and 6 years. The emergence of these early metalinguistic skills was associated with the child's linguistic environment whilst living in Turkey and travelling through a number of other countries where she came into contact with several foreign languages. Similarly, Oksaar has commented that multilingual children demonstrated metalinguistic awareness earlier than monolingual children in a longitudinal study in Hamburg. Some other anecdotal examples which also provide support for the view that metalinguistic awareness develops at an early stage in bilingual children are cited by Bizzarri (1983), Ferguson (1983) and Clyne (1987).

In addition to the anecdotal evidence, there have been a number of experimental studies which have addressed the relationship between metalinguistic awareness and bilingualism. Thirty-three such studies are summarised in Table 3.1. Many of these studies have been criticised on methodological grounds (Pinker, 1979; Bowey, 1986a), and many have examined only the word-referent relationship. Nevertheless, the majority of these studies do lend some support for the view that bilingualism promotes the development of metalinguistic awareness, in that, a bilingual superiority has often been found.

Table 3.1 Summary of bilingual studies which have included measures of metalinguistic awareness

Study	Subjects	Metalinguistic awareness measures	Summary of main results
Feldman & Shen (1971)	Spanish-English bilinguals English monolinguals Aged between 4 and 6 years	Word-referent task	Bilingual superiority
Ianco-Worrall (1972)	Africaans-English bilinguals Africaans monolinguals English monolinguals Aged between 4 and 9 years	Three part word-referent task	Bilingual superiority on one part of task
Sandoval (1976, cited by Lindholm, 1980)	Spanish-English bilinguals English monolinguals Kindergarten and grade 1	Four part word-referent task	No bilingual advantage
Ben-Zeev (1977a)	Hebrew-English bilinguals Hebrew monolinguals English monolingual Aged between 4 and 9 years	Word-referent task	Bilingual superiority
Ben Zeev (1977b)	Spanish-English bilinguals English monolinguals Aged between 4 and 6 years	Word-referent task	Bilingual advantage, but differences not significant
Cummins (1978a)	Irish-English bilinguals English monolinguals Grades 3 and 6	Three word-referent tasks Analytic orientation to language test	Bilingual superiority on one word-referent task and on analytic test
Cummins & Mulcahy (1978)	Ukrainian-English bilinguals English monolinguals Grades 1 and 3	Word-referent task Syntactic awareness task	Bilingual superiority on syntactic awareness task
Benelli (1978)	Italian-German bilinguals Italian monolinguals Grades 1, 2 and 3	Word-referent task	Bilingual superiority but significance not assessed
Gandolfi & Benelli (1979)	Italian-German bilinguals Italian monolinguals Aged between 3 and 5 years	Word-referent task	Bilingual superiority but significance not assessed
Pinker (1979)	French-English bilinguals English monolinguals Aged between 3 and 5 years	Three word awareness task	No bilingual advantage
Aronsson (1981)	Bilinguals were Swedish speaking and spoke one other European language Aged between 5 and 7 years	Syntactic awareness task Word awareness task Phonemic awareness task	Bilingual superiority on syntactic awareness awareness task
Oren (1981)	Hebrew-English bilinguals English bilinguals Aged between 5 and 7 years	Word-referent task	Bilingual superiority
Diaz & Hakuta (1981)	Spanish-English bilinguals Kindergarten and Grade 1	Two syntactic awareness tasks	Proficient bilinguals performed significantly better than nonbalanced bilinguals on one task
Karolije-Walz (1981, cited by Valtin, 1984a)	Languages of children not given Aged 5 years	Word-referent task	Bilingual superiority
Bense (1981, cited by Valtin, 1984a)	Details not given	Word awareness task	Bilingual superiority
Mohanty (1982)	Telgu-Oriya bilinguals Kui-Oriya bilinguals Oriya monolinguals Grades 6, 8 and 10	Four word referent task	Bilingual superiority
Galambos & Goldin-Meadow (1983)	Spanish-English bilinguals Spanish monolinguals English monolinguals Aged between 4 and 8 years	Three part word-referent task	Bilingual superiority on all tasks for children under 7 years and on one task for children over 7 years

Table 3.1 Summary of bilingual studies which have included measures of metalinguistic awareness (continued)

Study	Subjects	Metalinguistic awareness measures	Summary of main results
Mohanty & Babu (1983)	Kui-Oriya bilinguals Oriya monolinguals Grades 6, 8 and 10	Word-referent task	Bilingual superiority
Rueda (1983)	Spanish-English bilinguals English monolinguals Aged between 10 and 12 years	Three part word-referent task on two parts of task	Bilingual superiority
Rosenblum & Pinker (1983)	Hebrew-English bilinguals English monolinguals Aged between 4 and 6 years	Word-referent task	Bilingual superiority on explanations given
Merino (1984)	Spanish-English bilinguals Grades 2, 3 and 4	Syntactic awareness task	Proficient bilinguals performed significantly better than nonproficient bilinguals
Pattnaik & Mohanty (1984)	Oriya-Kui bilinguals Oriya monolinguals	Metalinguistic test consisting of 7 parts assessing phonemic awareness, syntactic awareness and word awareness	Bilingual superiority
Babu (1984)	Oriya-Kui bilinguals Oriya monolinguals Grades 6, 8 and 10	Syntactic awareness task	Bilingual superiority
Ricciardelli (1984)	Italian-English bilinguals English monolinguals Aged between 4 and 5 years	Word-referent task	No bilingual advantage
Diaz (1985a)	Spanish-English bilinguals Aged between 5 and 7 years	Three syntactic awareness tasks	Proficient bilinguals performed significantly better than nonproficient bilinguals on one task
Bialystok (1986a)	Bilinguals who spoke English and one other language French-English bilinguals English monolinguals Aged between 5 and 9 years	Syntactic awareness task	Bilingual superiority on items which required a higher degree of cognitive control
Bialystok (1986b)	French-English bilinguals English monolinguals Aged between 4 and 6 years	Three word awareness tasks	Bilingual superiority on items which required a higher degree of cognitive control
Hakuta (1987)	Spanish-English bilinguals Aged between 5 and 11 years	Two syntactic awareness tasks for children under 7 years One syntactic awareness task for children over 7 years	Performance on tasks was not related to the degree of bilingualism
Damm-Luhr (1987)	German-English bilinguals French-English bilinguals English monolinguals Aged between 5 and 9 years	Two syntactic awareness tasks	No bilingual advantage
Mohanty & Das (1987)	Languages of children not given Aged 7 and 9 years	Details are not given	No bilingual advantage
Bialystok (1988a)	French-English bilinguals Italian-English bilinguals English monolinguals Aged between 6 and 7 years	Word-referent task Word awareness task Two syntactic awareness tasks	Bilingual superiority on items which required a higher degree of cognitive control and performance on items which required a high degree of analysed knowledge was related to the degree of bilingualism
Galambos & Hakuta (1988)	Spanish-English bilinguals Aged between 5 and 13 years	Two syntactic awareness tasks	Proficient bilinguals performed significantly better than nonproficient bilinguals
Edwards & Christophersen (1988)	Bilinguals and monolinguals from 18 different linguistic and national backgrounds Aged between 4 and 6 years	Analytic orientation to language test Two word-referent tasks Word awareness task Syntactic awareness test Word awareness task Syntactic awareness test	Performance on all tasks except for syntactic awareness correlated positively and significnatly with the degree of bilingualism

Seven of the studies summarised in Table 3.1 have not involved comparisons between bilinguals and monolinguals, but rather metalinguistic performance was studied in relation to the degree of bilingualism (Diaz & Hakuta, 1981; Merino, 1984; Diaz, 1985a; Hakuta, 1987; Bialystok, 1988a; Galambos & Hakuta, 1988; Edwards & Christophersen, 1988). All these studies except for one (Hakuta, 1987) are consistent with the Threshold Theory, in that, the bilinguals with high levels of proficiency in both languages performed significantly better than the less proficient bilinguals on at least some of the metalinguistic tasks.

However, many of the other studies in Table 3.1 may not be interpreted as providing evidence either for or against the Threshold Theory because details concerning the bilinguals' linguistic proficiency in their two languages are not given. In the majority of these studies, researchers have selected bilinguals who have attained a comparable level of proficiency in each of their two languages. Therefore, the bilinguals are considered to be balanced, but the bilinguals may have attained high levels or low levels in both languages. Researchers in only five of the experiments from Table 3.1 (which involve bilingual-monolingual comparisons) have ensured that bilingual subjects were both balanced and highly proficient in their two languages (Ianco-Worrall, 1972; Cummins, 1978a; Cummins & Mulcahy, 1978; Galambos & Goldin-Meadow, 1983; Rueda, 1983).

The predominant view in this field is that bilingualism promotes the development of metalinguistic awareness but recently Bowey (1986a, 1988) has further argued that metalinguistic awareness may promote bilingualism. Thus, bilingualism and metalinguistic awareness may be mutually facilitative. Some

of the available evidence has been re-interpreted as supporting this view (e.g. Cummins, 1978a; Aronsson, 1981; Trites, 1984).

Independently of Bowey's work, Webster (1987) and Thomas (1988) have provided evidence which is consistent with the view that metalinguistic awareness may promote second language learning in adults. Webster has found that syntactic awareness measures are related to the speed and ease of second language learning. Furthermore, Thomas found that bilinguals who had received formal training in both languages made more progress in learning a third language as compared with monolinguals. This was attributed to the bilinguals' superior metalinguistic abilities.

A further question which needs to be addressed in this thesis concerns the nature of metalinguistic awareness, and whether it can be best conceived as a unitary construct. Some of the researchers within the bilingual field have implicitly assumed that metalinguistic awareness is indeed a unitary contstruct (De Avila & Duncan, 1979; Pattnaik & Mohanty, 1984, Thomas, 1988). On the other hand, Cummins (1987) has questioned the construct validity of metalinguistic awareness:

"A major difficulty in interpreting these studies (apart from the usual bilingual-unilingual control problems) is that the measures used to asesss metalinguistic skills usually only have face validity. Where correlations between tasks are reported (e.g., Cummins, 1978b) they tend to be low, thus raising not only the empirical validity question but also the theoretical question of what the dimensions are of the construct of metalinguistic awareness or skill and what developmental stages it goes through" (pp. 70-71). This issue, which clearly should have priority in the empirical investigation of

metalinguistic awareness and its correlates, has been studied within the linguistic developmental field, and it is addressed in the following chapter.

CHAPTER 4 THE DEGREE OF CONSISTENCY AMONG MEASURES OF METALINGUISTIC AWARENESS

Research on metalinguistic awareness in the linguistic development literature has increased intensively during the last decade. Several review articles appear in The Child's Concept of Language edited by Sinclair, Jarvella, and Levelt (1978); Metalinguistic Awareness in Children: Theory, Research and Implications edited by Tunmer, Pratt, and Herriman (1984); Language Awareness and Learning to Read edited by Downing and Valtin (1984); and several other reviews of this expanding field have been done by Hakes (1982); Bredart and Rondal (1982); Saywitz and Wilkinson (1982); Van Kleeck (1982); Chaudron (1983); Barton (1985); Bialystok and Ryan (1985a, 1985b); Sinclair (1986); Wagner and Torgesen (1987); Bowey (1988); Birdsong (1989); and Garton and Pratt (1989).

Moreover, the actual phenomena now studied bearing the descriptor of "metalinguistic" are vast. It is noted by Sinclair (1981, cited by Valtin, 1984a) that metalinguistic phenomena include:

"all the capacities and activities concerning language and language judgement which are not themselves a part of (or very closely tied to) production and comprehension processes. Any reflections, ideas, knowledge or explicit formulation of underlying principles, rules, etc., concerning language structure, functions, or rules for its use have been classified under the label "linguistic awareness" or "metalinguistic awareness" (p. 207).

Other terms are also used to refer to the numerous metalinguistic phenomena in this area. For example, Titone (1985) has made a distinction

between "language awareness" and "metalinguistic consciousness". According to Titone the former is concerned with an implicit, unanalysed knowledge of language functions whilst the latter is concerned with a formal, abstract and explicit knowledge of language functions which requires an advanced level of formal schooling. Contrary to Titone, Bowey (1988) has advocated the use of a looser term which can be applied to both young children and adults, that is, "metalinguistic functioning". It is explained by Bowey "that the only requirement for inclusion of an activity in the category of metalinguistic functioning is that attention should be focussed on form rather than on meaning" (p. 42).

The subject matter thus defined is vast, however, researchers have frequently confined their empirical work to specific types of metalinguistic abilities. The well documented abilities include: (a) phonemic awareness (Nesdale, Herriman & Tunmer, 1984; Valtin, 1984a; Wagner & Torgesen, 1987; Bowey, 1988; Lundberg, Frost & Peterson, 1988), (b) word awareness (Bowey & Tunmer, 1984; Valtin, 1984b; Bowey, 1988; Zhiukov, 1965/1988), (c) syntactic awareness (Tunmer & Grieve, 1984; Ryan & Ledger, 1984; ; Bowey, 1988), (d) pragmatic awareness (Pratt & Nesdale, 1984; Garton and Pratt, 1989), and (e) print awareness (Downing, 1984; Watson, 1984; Huba & Kantos, 1985).

Although, much research in this field has focused on specific metalinguistic abilities, several writers have further addressed the issue of whether there is a general metalinguistic ability. This issue has been investigated by intercorrelating children's performance on different tasks. In an early study of this kind, Cummins (1978b) found very few significant correlations among four metalinguistic tasks in grade 3 and grade 6 children

(the actual correlations are not reported). On the basis of these findings, Cummins concluded that there was little evidence that the tasks represented a unitary dimension.

Subsequent studies, however, have frequently found positive and moderate correlations among various tasks. Thirteen studies, including Cummins' (1987b) study, which have investigated at least three different metalinguistic tasks in either children or adolescents, are summarised in Table 4.1. Only Cummins' study and one other (Edwards & Christophersen, 1988) do not support the notion of a general metalinguistic ability. These two studies both include three of the same tasks derived from a study by Osherson and Markman (1978). Therefore, taken together the two studies strongly question the construct validity of the Osherson and Markman measures which unfortunately have been used in some bilingual studies (Cummins, 1978a; Mohanty & Babu, 1983; Rueda, 1983; Pattnaik & Mohanty, 1984). On the other hand, the majority of the studies in Table 4.1 have generally supported the notion that metalinguistic awareness can be conceived as a unitary construct.

Table 4.1 Summary of studies which have investigated at least three metalinguistic measures in either children or adolescents

Study	Subjects	Metalinguistic awareness measures	Summary of main results
Cummins (1978b)	Irish-English bilinguals English monolinguals Grades 3 and 6	Three word-referent tasks Analytic orientation to language test	Majority of correlations among tasks were not significant but correlations are not reported
Hakes (1980)	English monolinguals Aged between 4 and 8 years	Two syntactic awareness tasks Phonemic awareness task	Moderate and positive correlations among all tasks
Lundberg, Wall, & Olofsson (1980)	Swedish monolinguals Aged between 6 and 7 years	Nine phonemic awareness tasks	Moderate and positive correlations among 7 tasks
Smith & Tager-Flusberg (1982)	English monolinguals Aged between 3 and 4 years	Two phonemic awareness tasks Two word awareness tasks Two syntactic awareness tasks	Moderate and positive correlations among 5 tasks
Saywitz & Wilkinson (1982)	English monolinguals Aged betwen 6 and 7 years	Two phonemic awareness tasks Three syntactic awareness tasks Six word awareness tasks	High and positive correlations among all tasks
Stanovich, Cunningham & Cramer (1984)	English monolinguals Kindergarten	Ten phonemic awareness tasks	Moderate and positive correlations among 7 tasks
Warren-Leubecker (1985)	English monolinguals Kindergarten and Grade 1	Phonemic awareness task Word awareness task Syntactic awareness task	Moderate and positive between phonemic and syntactic tasks in both groups
Carlucci (1987)	Italian monolinguals Grades 4 and 5	Four syntactic awareness tasks Word awareness task Phonemic awareness task	Several moderate and positive correlations among tasks but not all significant
Ottavi (1988)	Italian monolinguals First, second and third grade of high school	Some tasks as in Carlucci (1987)	Several moderate and positive correlations tasks in first grade but not all significant Low positive correlations among tasks in higher grades
Lombardo (1988)	Italian-Sicilian bilinguals First grade of high school	Same tasks as in Carlucci (1987)	Moderate and positive among all tasks but not all significant
Yopp (1988)	English monolinguals Aged between 5 and 6 years	Ten phonemic awareness tasks	Moderate and positive correlations among 9 of the tasks
Tunmer, Herriman & Nesdale (1988)	English monolinguals Kindergarten and Grade 1	Phonemic awareness task Syntactic awareness task Pragmatic awareness task Print awareness task	Moderate and positive correlations among all tasks
Edwards & Christophersen (1988)	Bilinguals and monolinguals from 18 different linguistic and national backgrounds Aged between 4 and 6 years	Analytic orientation to language test Two word-referent Word awareness task Syntactic awareness task	Mostly low and positive correlations among tasks

Recently, Birdsong (1989, p. 50) has argued that "metalinguistic ability should not be regarded as a unitary ability". However, the two main studies he cites to support this conclusion focused on metalinguistic abilities in adult subjects. (Scribner & Cole, 1981; Morais, Bertelson, Cary & Alegria, 1986). In addition, Birdsong maintains that the "correlations of results of different metalinguistic tasks are found to be erratic" by Ryan and Ledger (1984). This reference cited by Birdsong is a review article which addresses the development of grammatical awareness in children, but the authors do not report correlations among different metalinguistic tasks, to substantiate Birdsong's conclusion.

On the other hand, studies which have included adult subjects are consistent with Birdsong's views. Scribner and Cole (1981) have studied the performance of Vai literate and nonliterate monolinguals, and Vai-Arabic bilinguals on four tasks assessing word awareness, three tasks assessing syntactic awareness, and a pragmatic awareness task. The average age of the subjects was 50 years. Younger adults with a mean age of 19.55 years were studied by Webster (1987) and this study included two tasks assessing syntactic awareness and three tasks assessing word awareness. One other study with adults (nonliterate subjects, aged between 17 to 60) by Morais et al. (1986) investigated seven tasks assessing phonemic awareness. In contrast to the overall results found with children, these studies with adults have found mostly low positive and negative correlations among the examined metalinguistic tasks. Furthermore, Ottavi (1988) has found low positive and negative correlations among metalinguistic tasks in second and third year high school adults.

A different conceptual framework for studying metalinguistic awareness has been developed by Bialystok and Ryan (1985a, 1985b). This framework makes reference to two components, analysis of linguistic knowledge and control of linguistic processing, and metalinguistic task are viewed as differing in terms of the demands that each places on these components. Some tasks require more analysed linguistic knowledge (e.g., detecting errors in ungrammatical meaningful sentences) and others require a higher control of linguistic processing (e.g., detecting errors in grammatical anomalous sentences).

Recently, Bialystok (1988b) has provided some support for the existence of the two components in 8-year old children. Only two metalinguistic tasks were employed, a syntactic awareness task and a word awareness task, but each continued three types of items. Items which made low analysis and low control demands, items which made high analysis and low control demands, and items which made low analysis and high control demands. On the whole, the correlations between the items from the two tasks which made similar processing demands were positive and significant although somewhat low (.25, .37, .34). Furthermore the correlations among the items which made low demands on both "analysis" and "control", and those that made high demands on both "analysis" and "control", and those that made high demands on either "analysis" or "control" were generally low positive or low negative (e.g., .08). However some, positive and significant correlations were found between items that made high demands on analysis but low demands on control, and those that made low demands on analysis but high demands on control (e.g., .48). Therefore, these results are also consistent with the studies which have found moderate correlations among different metalinguistic tasks.

Studies with children have further suggested that metalinguistic awareness can be viewed as developing concomitantly with other intellectual activities. Metalinguistic awareness tasks have been found to correlate moderately and positively with tasks assessing conservation skills (Hakes, 1980), general language development (Saywitz & Wilkinson, 1982; Smith & Tager-Flusberg, 1982; Bowey, 1986a, 1986b; Bowey & Patel, 1988) and reading achievement (Lundberg, Wall & Olofsson, 1980; Stanovich, Cunningham & Cramer, 1984; Warren-Leubecker, 1985; Willows & Ryan, 1986; Bowey 1986a; 1986b; Warren-Leubecker & Carter, 1988; Tunmer, Herriman & Nesdale, 1988). In addition, Forrest-Pressley and Waller (1984) have found a composite measure of metalinguistic awareness to be related to measures of reading, nonverbal intelligence, attention and memory.

An appropriate method for assessing whether metalinguistic awareness can be best conceived as a unitary or a multidimensional construct, and whether metalinguistic abilities are basically different from other intellectual abilities is factor analysis. In this field factor analysis has been used by Warren-Leubecker (1985), Stanovich, Cunningham and Cramer (1984), Valtin (1984a), and Yopp (1988). However, Warren-Leubecker (1985) failed to obtain an "enlightening" factor solution, and the other studies have addressed only phonemic awareness.

All three studies concerned with phonemic awareness have found evidence suggesting that it can be conceptualised as a unitary construct. First, Stanovich et al. have found using principle factor analysis with ten tasks, that one factor accounted for 47.8 per cent of the total variance, and that eight tasks had moderate to high loadings on this first factor. Second,

Valtin has used factor analysis with data obtained by Lundberg et al. (1980) which included nine phonemic awareness tasks, two cognitive nonlinguistic tests and three reading tests. Four factors were extracted; seven of the phonemic awareness tasks had moderate to high loadings on the first factor, which accounted for 66 per cent of the total variance. Yopp has also employed principle factor analysis with ten phonemic awareness tasks, although he found that a two factor solution fitted the data better than a one factor solution. The first factor, which accounted for 59 per cent of the total variance, was labelled "simple phonemic awareness"; whilst the second factor which accounted for 9.5 per cent of the variance was called "compound phonemic awareness". However, it may be noted that the correlation between the two factors was high ($r = .77$); and that the second factor was trivial in relation to the first.

The relationship among different metalinguistic tasks is one of the empirical themes included in this thesis. A first small-scale experiment investigated 10 metalinguistic tasks with 40 children aged between 5 and 9 years. In a second larger experiment, 71 children aged either 5 or 6 years old were administered 10 metalinguistic tasks and 12 standard tests assessing both verbal and nonverbal abilities. This second experiment was designed to use factor analysis on a variety of metalinguistic tasks, and to examine metalinguistic awareness and its relationship to other intellectual abilities. The first experiment was conducted during the last school term in 1985 (mid September to early December) and the second experiment was conducted during the first five months of the school year in 1986 (February to June). A detailed report of these two experiments follows.

CHAPTER 5 EXPERIMENT 1: THE RELATIONSHIP AMONG 10 METALINGUISTIC TASKS

The aim of the present experiment was to assess the construct validity of 10 metalinguistic tasks. All the tasks focused on the linguistic unit, the word, but assessed various metalinguistic abilties: understanding of the term word, awareness of words as units of spoken and written language, awareness of phonemes, awareness of the word-referent relationship, awareness of the arbitrary nature of language, and awareness of word order.

Method

Subjects

The subjects were 40 English-speaking children drawn from four grades: reception (the first grade of primary school), grade 1, grade 2 and grade 3. They attended a public primary school located in a predominantly middle-class suburb in Adelaide, South Australia. In view of the small number of children and the unequal number of sexes studied in each grade, the children were divided into two groups of 20 for analysis. Group 1 consisted of 8 reception (2 girls, 6 boys) and 12 grade one children (7 girls, 5 boys). Group 2 consisted of 10 grade two (8 girls, 2 boys) and 10 grade three children (5 girls, 5 boys). The mean age of Group 1 was 5 years 11 months (SD=7 months) and the mean age of Group 2 was 7 years, 7 months (SD=9 months).

Parental consent was obtained for the children to take part. The 10 metalinguistic tasks (specified in detail in the following section) were administered to each child by the experimenter during school hours, and in a private room. Tasks were given to the children in three sessions. Each session

lasted approximately 15 minutes, and there was an interval of 1 to 4 days between adjacent sessions. In Session 1 the children were given Word Discrimination, Word Length, Word Print and Phonemic Segmentation; in Session 2 they were given Word Referent, Word Renaming, and Symbol Substitution; and in Session 3 they were given Word Order Judgement, Word Order Correction, and Word Unit. The tasks were presented as "word games" and they were administered after rapport had been established with the children. The children's responses to the test items were recorded on answer sheets by the experimenter.

Metalinguistic tasks

A brief summary of the 10 metalinguistic tasks is given in Table 5.1. Some details of previous research using similar materials and their usage are provided, because these tasks have not been standardised. A copy of each task (instructions and items) is given in Appendix 5.1. The tasks were scored simply as the number of correct responses except where indicated.

Word Discrimination. This task was adapted from one developed by Bowey, Tunmer and Pratt (1984). It was used to assess children's understanding of the term word and their awareness of words as units of spoken language. They were required to say whether each of 12 items consisted of one or two words (e.g., candle, the farm). These were preceded by a short training task which involved similar instructions, in that the children were required to say whether 6 words were animals or not (e.g., horse, tree). Corrective feedback was provided for the training task. The 12 items of the main task included six bisyllabic words (2 nouns, 2 prepositions, 1 adverbial conjunction, and 1 adjective) and six phrases consisting of two

Table 5.1 Summary of metalinguistic tasks employed in Experiment 1

Task	Main Source	Ability	Task requirements	No. of of items
1. Word Discrimination	Bowey, Tunmer & Pratt (1984)	Understanding of the term "word"	Judge between one and two words	12
2. Word Length	Papandropoulou & Sinclair (1974)	Understanding of the term "word"	Judge between long and short words	12
3. Word Print	Watson (1979)	Awareness of words in print	Circle words or letters	10
4. Phonemic Segmentation	Tunmer & Nesdale (1982)	Awareness of phonemes	Tap phonemes in words	16
5. Word Referent	Piaget (1929)	Awareness of word-referent relationship	Explain arbitrary nature of words	15
6. Word Renaming	Rosenblum & Pinker (1983)	Awareness of word-referent relationship	Answer questions	18
7. Symbol Substitution	Ben-Zeev (1977a, 1977b)	Awareness of arbitrary nature of language	Substitute words in sentences	8
8. Word Order Judgement	Gleitman, Gleitman & Shipley (1972)	Awareness of word order	Judge sentences for grammatical correctness	18
9. Word Order Correction	Pratt, Tunmer & Bowey (1984)	Awareness of word order	Correct sentences	12
10. Word Unit	Tunmer, Bowey & Grieve (1983)	Awareness of words	Tap words in phrases	12

Note: Tasks were scored as "number of correct items"; except that for Word Referent and Symbol Substitution, items were scored out of 2, with 1 given for partially correct answers.

monosyllabic words (3 were of the form determiner plus noun, and 3 were of the form adjective plus noun).

Word Length. This task was based on work conducted by Papandropoulou and Sinclair (1974) and Berthoud-Papandropoulou (1978), and it is similar to a task developed by Pinker (1979). The task was used to assess children's ability to distinguish word from referent, but confounded with this ability is the children's understanding of the term word. The task requirements were similar to the Word Discrimination task: The children were required to say whether 12 items were long or short words. It was given directly after the Word Discrimination. Four types of items were included: (a) three short words with relatively "long" referents (e.g., truck), (b) three long words with "short" referents (e.g., butterfly), (c) three short words with no referents (e.g., hot), and (d) three long words with no referents (e.g., beautiful).

Word Print. This task was modified from Watson's (1979) Units of Print Test. It was used to assess children's understanding of words and letters in print. They were required to circle all the words, or the first word, or the first letter in each word, within each of 10 boxes. For example, in the first item the children were required to circle each word in the box containing these elements: on, 6, little, D and 3. Prior to the test items, the children were also given three practice trials taken from Watson (1979), to ensure that they understood the requirements of the task. In these trials the children were required to circle specified figures in designated boxes, and corrective feedback was provided.

Phonemic Segmentation. This task was used to assess children's ability to segment spoken words into their phonemic units, and it was based on work done by Tunmer and Nesdale (1982, 1985). The test items consisted of eight real digraph words (words which contain letter pairs representing single phonemes, e.g., them) and eight psuedo digraph words (e.g., theb). A task consisting of digraph words was chosen, since Tunmer and Nesdale have found that tasks using nondigraph words (e.g., cat) over-estimate children's phonemic awareness; they have argued that children, particularly beginning readers, adopt a "grapheme" strategy with nondigraph words and tap once for each letter in the word.

For the task, children were required to represent successive phonemes in each spoken word with taps. The task instructions were derived from Tunmer and Nesdale (1982), and three practice trials were first given to the children. These were presented in triads (e.g., oo, boo, boot) and corrective feedback was given. In addition, as in the Tunmer and Nesdale (1982) study, four nonscored vowel sounds were included with the test items, to "avoid possible effects due to response bias and to maintain consistency with the training triads" (Tunmer & Nesdale, 1982, p. 303). However, unlike that study, the order of items was not counter-balanced across the subjects. Instead, the items were presented in a set order as with the other tasks.

Word Referent. This task was used to assess children's understanding of the word-referent relationship and the arbitrary nature of language. Similar tasks have been employed by a number of researchers (e.g., Ianco-Worrall, 1972; Osherson & Markman, 1975; Rosenblum & Pinker, 1983), and these can all be traced to Piaget (1929) or Vygotsky (1962).

The present task contained 15 items. The children were asked a number of questions: Why referents had been given their labels, whether referents could be given new names and the reasons for their answers, why people from a far away country could call things differently, and if we also could call things differently and the reasons for their answers. For instance, in the first item the children were asked, while shown a picture of a cat, "Why do we call it a cat?". Six items requiring a yes or no answer were scored 2 or 0, respectively. The other nine items which required an explanatory answer were scored 2, 1 or 0. A score of 2 was given only to "nonrigid" explanations which reflected a "playful" or an "arbitrary" attitude towards language (e.g., "Because they call them different names sometimes. They can be any names"). Explanations which reflected a "rigid" attitude towards language (e.g., "Because that's not their names") or explanations which were concerned with empirical features of the referents or words (e.g., "Because it chases rats" and "Because it rhymes") were scored 1. Children who gave no specific answer (e.g., "I don't know"), or answers which were judged to be inappropriate (e.g., "Because I had to say it") received a score of 0. Further details of the scoring criteria are given in Appendix 5.2. The maximum possible score on this task was 30.

Word Renaming. This task was modified from a name-manipulation test devised by Rosenblum and Pinker (1983). It was used, in addition to Word Length and Word Referent, to assess children's awareness of the word-referent relationship.

The children were required to accept new names for referents, and answer 18 questions about the renamed referents. The main task was preceded

by a counter-factual task also based on Rosenblum and Pinker's work, in which the children were first asked to accept counter-factual information and then asked to deduce implications.

Following the counter-factual task, the children were given the Word Renaming task containing 18 items, which consisted of questions and commands relating to renamed objects. For example in one item a toy boat was renamed cow and the children were requested to "Put the cow next to the truck" and "Hand me the cow"; they were also asked "Does the cow have a funnel or legs?" and "Does the cow walk or does it sail?". Included were animate and inanimate objects, some being visible and others not.

Symbol Substitution. This task was adapted from one developed by Ben-Zeev (1977a, 1977b) and it was used, in addition to Word Referent, to assess children's understanding of the arbitrary nature of language. The children were required to substitute a given word for a target word in a sentence, even though the result violated sematic and syntactic rules. According to Ben-Zeev, the solution depends on grasping the idea that the structure of language is arbitrary and subject to change.

The present task consisted of eight items. In half of the items, the children were required to substitute a major part of speech for another part of speech: e.g. "For this game the way we say I is to say Ice. So how do we say I am cold?". In other items, the children were required to substitute a minor part of speech for a major part: e.g. "For this game the way we say under is to say play. So how do we say, The kittens are under the tree?" All the items were chosen such that the given word was relevant to the meaning of the sentence, in this way the sentence was not rendered completely nonsensical.

The items were scored either 2, 1 or 0. The highest score was given to "flexible" answers: that is, when the target word was correctly substituted, and no attempt was made to resolve the resulting grammatical and semantic violation. Children received a score of 1 for "rigid" answers: that is, when they substituted the target word for the given word, but in addition they resolved the resulting grammatical or semantic violation. Lastly, the children received a score of 0 only if the given word was repeated, if the sentence was merely repeated, if the given word was substituted incorrectly, or if the meaning of the sentence was changed. The maximum possible score on this task was 16.

Word Order Judgement. This task was an "acceptability judgement" task in which children had to judge sentences for grammatical correctness. Similar tasks have been frequently employed by researchers to assess syntactic awareness (e.g., Gleitman, Gleitman & Shipley, 1972; Smith & Flusberg, 1982; Bohannon & Warren-Leubecker, 1984; Bialystok, 1986a).

The children were introduced to a puppet, Mr P and they were given three practice trials, with corrective feedback. They were asked to judge whether Mr P's utterances were the right or the wrong way round. These were followed by 18 test items. In order for the task to be appropriate for young children, only three simple rules of word order violations were included: (a) adjective-noun was changed to noun-adjective (e.g., The car blue is on the road), (b) subject-verb-object was changed to subject-object-verb (e.g., The teacher a book reads) and (c) auxilary-negator-participle was changed to negator-auxilary-participle (e.g., Mice not do like water). Six items were included from each of the three above groups; half of these were grammatically acceptable and half were not.

Word Order Correction. This was a second task employed to assess syntactic awareness. It was based on a task developed by Pratt, Tunmer and Bowey (1984) that was specifically designed to avoid eliciting judgements and justifications. Pratt et al. argued that it is difficult to determine the criteria used by young children to judge sentences. Instead of attempting to do this, in the Word Order Correction task, Pratt et al. directed the children's attention towards grammatical considerations. This was achieved by telling the children from the commencement of the task that a puppet said things "jumbled up", and it was the children's task to correct the puppet's utterances.

The present task was structured closely on Pratt et al.'s task. The children were introduced to a puppet Miss B, and they were told that Miss B had a lot of trouble saying things the right way round and always said things the wrong way round. The children were requested to help Miss B say things the right way round. They were given three practice trials with corrective feedback. These were followed by 12 test items of the same form as those in Word Order Judgement. There were four items from each of three violation-types. The children's answers were scored as correct if the error in the word order was resolved without altering the meaning of the sentence. Only minor grammatical and semantic ommissions or alterations were tolerated in the scoring of answers as correct.

Word Unit. This task was adapted from Tunmer, Bowey and Grieve (1983), and it was used to assess children's awareness of the word as a unit of spoken language. The test items consisted of two types of compound word phrases: (a) with stressed functors (e.g., his toenails); and (b) with unstressed functors (e.g., the new shoelace). These were the types of phrases employed

by Tunmer et al. to assess a fully developed word concept. According to Tunmer et al. (1983, p. 590) "children who have acquired a fully developed word concept regard words as the smallest meaningful, cohesive, and permutable units of language" and "compound word phrases can only be correctly segmented by children using a word strategy".

The task was modelled closely on Tunmer et al.'s task. The children were required to separate two and three-word phrases by tapping once for every word. Tunmer et al.'s instructions were used and a similar set of 12 compound phrases was constructed. As in the Tunmer et al. study, the task was first demonstrated with an example, and then the children were given two practice trials with corrective feedback before the twelve test items.

Results and Discussion

Group differences

Age differentiation is a major criterion used to validate tests which purport to measure aspects of intellectual development (Anastasi, 1982, p. 144). Therefore, the two age groups in the present experiment were compared. Children's scores on each task were first converted to a percentage of the possible total score, in order that the relative difficulty of each task could also be examined. The mean percentage scores for the two groups on each task are presented in Table 5.2 which shows that in each case the older group obtained higher scores on the tasks.

Scores on the ten tasks were subjected to both multivariate and univariate analyses of variance, by group and sex. For the multivariate analysis, Hotelling's $\underline{T}^2$ revealed significant overall group differences [$\underline{T}^2$=

1.03, $F(10,27)= 2.78$, $p<.05$], as the sole significant effect. In particular, univariate F tests revealed significant group differences on seven of the ten tasks which are shown in Table 5.2. Therefore, the metalinguistic tasks have generally demonstrated the expected age differentiation.

Table 5.2 Mean "percentage correct scores" on metalinguistic tasks in Experiment 1 for Group 1 (mean age 5 years, 11 months; N=20) and for Group 2 (mean age 7 years, 7 months; N=20); and group differences

	Group 1		Group 2			
Task	Mean	SD	Mean	SD	F(1,36)	p
1. Word Discrimination	79.17	22.54	94.17	7.70	6.87	<.05
2. Word Length	78.75	21.03	97.08	5.59	12.78	<.01
3. Word Print	68.50	19.27	79.50	21.64	3.87	n.s.
4. Phonemic Segmentation	25.00	23.73	36.56	26.69	2.42	n.s.
5. Word Referent	32.50	8.84	35.83	9.04	2.24	n.s.
6. Word Renaming	70.28	19.77	84.17	12.13	6.34	<.05
7. Symbol Substitution	35.00	28.92	54.69	28.95	4.92	<.05
8. Word Order Judgement	80.00	10.42	88.33	6.72	8.75	<.01
9. Word Order Correction	55.56	24.45	71.11	22.05	5.74	<.05
10. Word Unit	34.17	36.36	83.33	29.86	18.42	<.01

Two of the tasks which failed to show significant age differentiation, Phonemic Segmentation and Word Referent, were difficult for both groups, with only about a quarter to a third of items scored correct. The other task, Word Print, was less difficult and showed a small difference between the two groups; $F(1,36)=3.87$, $p<.10$.

The children's performance on Phonemic Segmentation was extremely poor as compared to the performance of the kindergarten and grade 1 children studied by Tunmer and Nesdale (1982, 1985). For example, the children in Tunmer and Nesdale's study (mean age=6 years, 2 months) obtained a mean percentage score of 60.71 on the digraph words in their phonemic segmentation task. In this experiment, Group 1 and Group 2 obtained mean percentage scores of 25.00 and 36.56, respectively. Only four children in Group 1, and five children in Group 2 obtained higher scores than 60 per cent. The difference between the studies is difficult to explain, since identical instructions and similar practice and test items were employed. The poor performance of even the old group suggests that several children failed to understand fully the task requirements.

The poor performance on Word Referent reflects the children's rigid attitude towards this aspect of language, and is consistent with previous research using similar tests (e.g., Piaget, 1929; Osherson & Markman, 1975). For instance, Piaget (1929), using similar word-referent problems (e.g., "Could the sun have been called moon and the moon sun?") has argued that children are generally unable to solve these problems before the age of 11 or 12 years. Similarly, Osherson and Markman (1975) found that few grade 1, grade 2 and grade 3 children were able to pass these types of problems. However, this

does not mean that young children are wholly unaware of the word-referent relationship. Rather, the results suggest that children under 11 years may be unable to solve the problems specifically used in tasks like those in Word Referent. Word Renaming and Word Length also assessed children's understanding of the word-referent relationship, and their performance on these two tasks was considerably higher, as can be seen in Table 5.2.

In addition, Smith and Tager-Flusberg (1982) have demonstrated that even children aged between 3 and 4 years are able to solve word-referent problems when presented in a more coherent and simplified manner. For example, in Smith and Tager-Flusberg's task:

"the child was shown a picture of a carrot, and asked if its new name could be "gok". When the new name was accepted, we ensured the child could remember the new word. Then the picture was removed and four true/false questions were asked about "goks"" (p. 455).

It may be noted that adults have performed poorly on tasks which are similar to Word Referent. For example, Rosenblum and Pinker (1983) conducted an informal survey of six Stanford students and staff by asking them "Can you call this table a shig?" and all six thought that the correct answer was no. Rosenblum and Pinker have argued "that the question may have been construed as being about the object's true name in English" (p. 778). Scribner and Cole (1981) have also found that many adults were unable to answer correctly, the type of word-referent problem used by Piaget concerning the interchangeability of the names "sun" and "moon".

Symbol Substitution was another difficult task for both groups, and recently it has been evaluated by Bialystok and Ryan (1985a, 1985b; see also Birdsong, 1989) as requiring a large degree of cognitive control. In this task, the children were required to substitute a given word for a target word in a sentence, even though the result violated semantic and syntactic rules.

Word Order Correction and Word Unit were two other difficult tasks for Group 1. These were more demanding than the three easiest tasks which required only dichotomous judgements: Word Discrimination, Word Length, and Word Order Judgement. For example, in Word Order Judgement, the children were only required to judge sentences for grammatical correctness, while in Word Order Correction, the children were required to correct the ungrammatical sentences. The tasks of moderate difficulty for both groups were Word Print and Word Renaming.

Test reliabilities

Task intercorrelations were calculated to examine evidence of construct validity in both Group 1 and Group 2. First, however, "poor" items were culled from the scales, and the reliability of each task was assessed by computing Cronbach's alpha coefficients for the entire sample in this experiment (N=40). These steps were taken since the magnitudes of correlations are limited by the reliability (i.e. internal consistency) of the scores. Items which correlated negatively with the total scale were deleted in order to increase test consistency. The items with zero variance were also deleted since such items do not reflect individual differences and contribute nothing to the reliability or validity of the test (Anastasi, 1982, p. 193). Details of the deleted items are given in Appendix 5.3.

The number of "valid" items remaining in the culled scales, and the alpha coefficients are displayed in Table 5.3. On the whole, test reliability for all the tasks, after having deleted the "poor" items was very satisfactory, and all coefficients range from moderate to high.

Table 5.3 Test reliabilities for metalinguistic tasks in Experiment 1 (N=40)

Task	No. of items	Cronbach's alpha
1. Word Discrimination	10	.74
2. Word Length	11	.81
3. Word Print	10	.68
4. Phonemic Segmentation	16	.86
5. Word Referent	12	.62
6. Word Renaming	16	.80
7. Symbol Substitution	8	.87
8. Word Order Judgement	10	.77
9. Word Order Correction	12	.68
10. Word Unit	12	.94

Task intercorrelations

Task intercorrelations for Groups 1 and 2 are displayed in Tables 5.4 and 5.5, respectively. All significant correlations for both groups were positive and there were more significant correlations in the younger group. The younger children gave 41 positive correlations of which 18 were significant; whilst the older group gave 30 positive correlations of which 7 were significant. The fact that fewer positive and significant correlations were found in the older groups may be due to some tasks being more appropriate for the younger group. The older children were found to be performing near ceiling level on three of the metalinguistic tasks, that is, Word Discrimination, Word Length and Word Order Judgement (see Table 5.2).

Table 5.4 Intercorrelations among metalinguistic tasks for Group 1 in Experiment 1 (N=20)

Task		2	3	4	5	6	7	8	9	10
1.	Word Discrimination	**.66**	.36	.16	.28	-.03	**.48**	**.49**	**.66**	**.54**
2.	Word Length		**.55**	.36	.24	-.15	**.47**	**.55**	**.65**	.31
3.	Word Print			.32	.33	.17	**.72**	.35	.37	**.38**
4.	Phonemic Segmentation				-.17	.13	.29	.29	.08	.16
5.	Word Referent					.18	**.42**	.18	**.48**	-.09
6.	Word Renaming						**.45**	.18	.09	.34
7.	Symbol Substitution							**.48**	**.47**	.31
8.	Word Order Judgement								**.59**	.34
9.	Word Order Correction									**.47**
10.	Word Unit									

Note: $r > .37$, $p < .05$; $r > .53$, $p < .01$ (one tailed tests).

Table 5.5 Intercorrelations among metalinguistic tasks for Group 2 in Experiment 1 (N=20)

Task		2	3	4	5	6	7	8	9	10
1.	Word Discrimination	.21	.09	-.20	-.34	-.13	.18	-.16	.20	.08
2.	Word Length		**.39**	.37	.19	.36	.33	-.29	-.04	-.04
3.	Word Print			.02	.31	.31	.34	-.02	**.54**	**.59**
4.	Phonemic Segmentation				**.47**	.36	.26	.09	-.22	-.07
5.	Word Referent					-.05	-.16	-.08	.08	.16
6.	Word Renaming						.06	.31	-.16	.24
7.	Symbol Substitution							.20	**.51**	.23
8.	Word Order Judgement								.15	**.43**
9.	Word Order Correction									**.43**
10.	Word Unit									

Note: $r > .37$, $p < .05$; $r > .53$, $p < .01$ (one tailed tests).

Overall, the results from this experiment give some degree of support for the notion of a "general metalinguistic ability" in children, since a generally positive manifold and several significant correlations were found among the ten tasks. A further method for assessing this notion would be factor analysis. No attempt was made to use this statistical technique in the present experiment, since some of the tasks were rather too easy for the older group, and the samples studied at each age level were considered to be too small. Thus a second experiment was specifically designed to utilise factor analysis in the study of metalinguistic awareness.

CHAPTER 6 EXPERIMENT 2: METALINGUISTIC AWARENESS AND GENERAL INTELLECTUAL DEVELOPMENT

The first aim of this experiment was to use factor analysis in the further examination of metalinguistic awareness and its relationship to other intellectual abilities. Because it was found that some tasks were rather easy for the older children in Experiment 1, this experiment focused only on 5 and 6 year olds.

An additional aim of the experiment was to examine the relationship between metalinguistic awareness and five relevant background variables, namely, length of time at preschool, length of time at primary school, age, sex and parental education. The highest level of education attained by parents was used as an index of SES. It was included because specific metalinguistic tasks have been found to be related to SES (Bereiter & Englemann, 1966; Wallach, Wallach, Dozier & Kaplan, 1977; Warren-Leubecker, 1985, 1987; Warren-Leubecker & Carter, 1988; Cito, 1987). The length of time at preschool and at school were recorded, since children from the studied population may spend up to 3 years at preschool, and primary schools may take new intakes of children during various times of the year. In South Australia, most children begin school at the age of 5 years, though a few children may begin at the age of 6.

Method

Subjects

The subjects were 71 English-speaking children drawn from reception classes and grade 1 classes in four public primary schools, located in a predominantly middle class area of Adelaide, South Australia. Four children from the initial sample of 75 did not complete all the tasks due to frequent absences from school, leaving 38 girls and 33 boys for analyses. The mean age of the subjects was 5 years and 9 months (SD=4 months).

Arrangements for testing

Parental consent was obtained for the children to take part, and a short questionnaire concerned with background information was completed by consenting parents. The obtained data included children's age, length of time at preschool and school, and the educational level of parents. A five-point scale was used to describe the highest level of education attained by each parent: (1) only primary school; (2) high school but not to year 12; (3) completed schooling to year 12 or obtained technical qualifications (e.g., plumber) but had not attained entry into university; (4) attained entry into university; or (5) obtained tertiary qualifications (degree or diploma).

Ten metalinguistic tasks and 12 standard tests (specified in detail below) were administered to each child by the experimenter during school hours, in a private room. Tasks and tests were given to the children in five sessions. Each session lasted approximately 30 minutes and there was an interval of 1 to 4 days between adjacent sessions. Children's answers to all items were recorded on answer sheets by the experimenter.

Two test orders were employed, Test Order A and Test Order B. This was a rough check on order effects, though these were expected to be small given the short length of the sessions. Half of the children in each school, and half of the boys and half of the girls did each test order. The contents in the two test orders, displayed in Table 6.1 were chosen in order that there would be a variety of different tasks for the children, and so that the sessions would last no more than 30 minutes to facilitate the children's concentration and interest. The test orders were reverse orders with two exceptions. The Animal House test was given first to all the children in Session 1 as a "play-like" beginning. The four tests in Session 1 (Test Order A) or Session 5 (Test Order B) from the Wechsler Preschool and Primary Scale of Intelligence (WPPSI; Wechsler, 1967), and the Receptive and Expressive tests from the Northwestern Syntax Screening Test (NSST; Lee, 1971) were administered in the standard order.

Metalinguistic tasks

A summary of the metalinguistic tasks employed in the present experiment is given in Table 6.2. Five of the tasks remained unmodified from Experiment 1: Word Discrimination, Word Length, Word Print, Word Renaming and Word Order Correction. Word Order Judgement was not used here because in Experiment 1 nearly half of the items had to be deleted. (These items correlated negatively with the total scale.) Modifications were made to four of the tasks which had been difficult for the younger group: Phonemic Segmentation, Word Referent, Symbol Substitution, and Word Unit. Last, a new task, Supply Initial Consonant, was included to also assess phonemic awareness. Details of the modifications made to the four tasks, and a description of the new task are given below. The complete tasks are included

Table 6.1 Contents of sessions, and the two test orders in Experiment 2

Session	Test Order A	Test Order B
1	Animal House Information Geometric Design Block Design	Animal House Word Unit Symbol Substitution Word Reading
2	Word Discrimination Word Length Picture Completion Sentences Word Renaming	Word Order Correction Word Referent Peabody Picture Vocabulary Test Phonemic Segmentation
3	Word Print Supply Initial Consonant Northwestern Syntax Screening Test-Receptive Northwestern Syntax Screening Test-Expressive	Northwestern Syntax Screening Test-Receptive Northwestern Syntax Screening Test-Receptive Supply Initial Consonant Word Print
4	Phonemic Segmentation Peabody Picture Vocabulary Test Word Referent Word Order Correction	Word Renaming Sentences Picture Completion Word Length Word Discrimination
5	Word Reading Symbol Substitution Basic Number Skills Word Unit	Information Vocabulary Geometric Design Block Design

Table 6.2 Metalinguistic tasks employed in Experiment 2

Task	Main Source	Ability	Task requirements	No. of items
1. Word Discrimination	Bowey, Tunmer & Pratt (1984)	Understanding of the term "word"	Judge between one and two words	12
2. Word Length	Papandropoulou & Sinclair (1974)	Understanding of the term "word"	Judge between long and short words	12
3. Word Print	Watson (1979)	Awareness of words in print	Circle words or letters	10
4. Phonemic Segmentation	Tunmer & Nesdale (1982)	Awareness of phonemes	Tap phonemes in words	16
5. Supply Initial Consonant	Stanovich, Cunningham & Cramer (1984)	Awareness of phonemes	Identify missing sound	12
6. Word Referent	Piaget (1929)	Awareness of word-referent relationship	Explain arbitrary nature of words	8
7. Word Renaming	Rosenblum & Pinker (1983)	Awareness of word-referent relationship	Answer questions	18
8. Symbol Substitution	Ben-Zeev (1977a, 1977b)	Awareness of arbitrary nature of language	Substitute words in sentences	10
9. Word Order	Pratt, Tunmer & Bowey (1984)	Awareness of word order	Correct sentences	12
10. Word Unit	Tunmer, Bowey & Grieve (1983)	Awareness of word	Tap words in phrases	18

Note: Tasks were scored as "number of correct items"; except that for Word Referent and Symbol Substitution, items were scored out of 2, with 1 given for partially correct answers.

in Appendix 6.1. As in Experiment 1, all tasks were scored simply as the number of correct responses, except where indicated.

Phonemic Segmentation. Modifications were made to the instructions in this task in order that the instructions would be more comprehensible. Instructions in the first version were based on Tunmer and Nesdale's (1982) task. The children were told that they were to tap words and they were instructed: "I'm going to say some real words and some play words, and tap them after I say them" (Tunmer & Nesdale, 1982, p. 303). The task instructions were then demonstrated. For example, for the word boot the experimenter tapped three times and the children were asked: "Say boot. Now tap it." In the revised instructions here, the children were told that they were to tap out the sounds, and demonstrations were also used but the requirements of the task were explained in more detail. For example, for the item boot, the experimenter tapped three times, and explained "I tapped three times because there were three sounds" and the sounds were spelt out. No changes were made to the item content or the scoring procedure.

Word Referent. The revised task consisted of eight items which were all concerned with nonsense or foreign names. It was noted that the children in Experiment 1 found these types of items generally easier, and thus more frequently gave "nonrigid" answers which reflected a "playful" or an "arbitrary" attitude towards language. The previous scoring procedure was used; the maximum possible score was 16.

Symbol Substitution. First, in order to help the children understand the requirements of the task, three simple practice trials were introduced and corrective feedback was provided on these (e.g., "For this game the way we say mum is to say dad, so how do we say Mum is working?). In the previous version no practice items had been included, since it was based on a task developed by Ben-Zeev (1977a) which also had not included any practice items. Second, to reduce the difficulty of the task, several shorter sentences were included. The modified task consisted of 10 items which were scored as in Experiment 1; the maximum possible score on the test was 20.

Word Unit. The items of Word Unit in Experiment 1 consisted entirely of compound phrases. Tunmer, Bowey and Grieve (1983) have found that children aged between 5 and 7 years have less difficulty in separating noncompound phrases as compared with compound phrases. Thus, in order to reduce the difficulty of this task, six noncompound phrases (half were two-word phrases and the other half were three-word phrases as in the previous task) were added to the 12 items. Half of the new phrases began with stressed functors (e.g., her new table), and half began with unstressed functors (e.g., the police). No other change was made.

Supply Initial Consonant. This task was introduced in the present experiment to assess further phonemic awareness. It was adopted from a task used by Stanovich, Cunningham and Cramer (1984) which was found to be of moderate difficulty, to have high reliability, and to have a high positive loading on a general factor of phonemic awareness.

The children were presented with a pair of words which were identical except that the initial sound had been deleted from the second word, and they were required to say what the missing sound was (e.g., meal/eel). The children were given three practice trials with corrective feedback, followed by 12 test items.

Standard tests

A brief summary of the 12 standard tests is given in Table 6.3. They covered various aspects of intellectual development, including verbal abilities, sensory-motor skills, and reading and numerical achievement. Seven tests were from the WPPSI: Information, Vocabulary, Sentences, Animal House, Picture Completion, Geometric Design, and Block Design. Both the Receptive and Expressive tests from the NSST were used to assess the development of syntax. The Peabody Picture Vocabulary Test (PPVT) Form M was used (Dunn & Dunn, 1981), and finally, two tests were used from the British Ability Scales; Basic Number Skills (Test Form B) and Word Reading (Test Form A). For each test, standard instructions and raw scores were used; the maximum possible raw score for each test is shown in Table 6.3.

Table 6.3 Summary of standard tests employed in Experiment 2

Task	Main Source	Ability	Task requirements	No. of items	Maximum raw score
1. Information	Wechsler (1967)	Knowledge of environment	Answer factual questions	23	23
2. Vocabulary	Wechsler (1967)	Expressive vocabulary	Explain meanings of words	22	44
3. Sentences	Wechsler (1967)	Memory and comprehension	Listen to and repeat sentences	13	30
4. Animal House	Wechsler (1967)	Learning and memory	Associate coloured pegs with animals	20	70
5. Picture Completion	Wechsler (1967)	Visual organization and memory	Detect missing part in pictures	23	23
6. Geometric Design	Wechsler (1967)	Perceptual and visual-motor organization	Copy designs from test booklet	10	28
7. Block Design (1967)	Wechsler (1967)	Perceptual and spatial organization	Reproduce designs from models	10	20
8. NSST-Receptive	Lee (1971)	Receptive syntax	Select pictures for sentences	40	40
9. NSST-Expressive	Lee (1971)	Expressive syntax	Explain pictures using sentences	40	40
10. PPVT	Dunn & Dunn (1981)	Receptive vocabulary	Select pictures for words	175	175
11. Basic Number Skills	Elliot (1983a)	Pre-numerical and numerical skills	Answer questions	34	34
12. Word Reading	Elliot (1983a)	Reading	Read words	90	90

Results and Discussion

Preliminary analyses

Differences between boys and girls, and between subgroups having different test-orders, were first examined. A multivariate analysis of variance (using Hotelling's T^2) was calculated with the scores from the 10 metalinguistic tasks and 12 standard tests as the set of dependent measures, and with sex and the order of test presentation as independent variables. Both main effects and the interaction effects of sex and test-order were not significant overall at the .05 level, as shown in Table 6.4. Therefore all the subsequent analyses were conducted on the total sample.

Table 6.4 Sex and test-order differences in Experiment 2

Effect	T^2	F(22, 46)	p
Sex	.73	1.53	>.05
Test Order	.79	1.65	>.05
Sex by Test Order	.46	0.96	>.05

Descriptive statistics for metalinguistic tasks

Children's scores on each metalinguistic task were converted to a percentage of the possible total score, in order that the relative difficulty of each task could be examined. In the case of the unchanged tasks, comparisons could be made with the results obtained in Experiment 1. The reliability of each task was assessed by computing Cronbach alpha coefficients, as in

Experiment 1. Both the mean "percentage correct" scores and the reliabilities of the tasks are given in Table 6.5.

Table 6.5 Descriptive statistics for metalinguistic tasks in Experiment 2 (N=71)

Task	Mean percentage correct	SD	No. of items	Cronbach's alpha
1. Word Discrimination	67.25	21.14	12	.68
2. Word Length	68.54	21.60	12	.68
3. Word Print	53.80	30.25	10	.83
4. Phonemic Segmentation	28.43	23.50	16	.83
5. Supply Initial Consonant	68.19	37.65	12	.95
6. Word Referent	34.16	18.48	8	.60
7. Word Renaming	65.18	22.56	18	.88
8. Symbol Substitution	23.38	22.10	10	.88
9. Word Order Correction	52.35	24.45	12	.78
10. Word Unit	64.24	27.69	18	.90

The most difficult metalinguistic tasks (that is, with mean "percentage correct" scores of less than 50 per cent), were Phonemic Segmentation, Word Referent, and Symbol Substitution. Two other relatively difficult tasks were Word Print and Word Order Correction, whilst the remaining tasks were all of moderate difficulty.

Reliabilities for all tasks range from moderate to high, and on the whole they were very satisfactory for this group of 5 and 6 year olds. The inter-scorer reliability of Word Referent was also assessed for five items in the task which required explanatory answers since the scoring of these items requires some degree of subjectivity unlike the test items in the other metalinguistic tasks (e.g., after the child was asked "Can a cat be called a gat?", s/he was asked to justify the answer). (The scoring criteria for Word Referent is described fully in Appendix 5.2.) Children's answers were scored by the author and an independent scorer. The correlation obtained between the two sets of scores was fairly high, .83, thus demonstrating that the inter-scorer reliability for Word Referent is satisfactory. The author's scores were used for all subsequent analyses.

Overall, the present group of children performed at a lower level on the metalinguistic tasks in comparison to the Group 1 children from Experiment 1. For example, on Word Discrimination (which was unchanged from Experiment 1) the Group 1 children in Experiment 1 obtained a mean percentage score of 79.17, whilst the children in the present experiment obtained a mean percentage score of 67.25. The children in this experiment were slightly younger, on average two months younger, and they were tested during the first four months of their school year (February to June). The children in Experiment 1 were tested during the last three months of the school year (mid September to December) and on average they had spent at least three months longer at school. Thus, the differences between the children's performance in this experiment and that of the Group 1 children in Experiment 1 may be attributed to age and schooling effects. In fact, both age and length of time at school correlated positively and significantly with several of the metalinguistic tasks as can be seen in Table 6.6 below.

Four tasks used in Experiment 1 were modified here, in order that they might be easier for the children. However, in general, the children's performance on three of these tasks was not improved: Phonemic Segmentation, Word Referent, and Symbol Substitution. Only Word Unit was found to be less difficult for this group of children. In Word Unit, additional items, noncompound-word phrases, were included of the type which Tunmer, Bowey and Grieve (1983) had found to be easier for young children.

Intercorrelations

Correlations were computed among all 27 variables included in this experiment. In addition, since a large number of correlations were calculated, a preliminary check was undertaken of the overall significance of the total correlation matrix using Sakoda, Cohen and Beall's (1954) method. There were 244 out of 351 significant correlations at the .05 level, and on an experiment-wide basis, this proportion has a null-hypothesis of <.01.

Of interest first are the correlations among the 10 metalinguistic tasks. These as shown in Table 6.6 were all positive, and several were moderate and significant, as in Experiment 1. Correlations among the metalinguistic tasks and the 12 standard tests, as shown in Table 6.7 were also generally positive, moderate and significant.

Table 6.6 Correlations among metalinguistic tasks in Experiment 2 (N=71)

Variable	2	3	4	5	6	7	8	9	10
1. Word Discrimination	**.64**	**.48**	.03	**.25**	.18	**.31**	**.51**	**.43**	**.44**
2. Word Length		**.52**	.02	**.42**	**.25**	**.31**	**.51**	**.50**	**.42**
3. Word Print			**.28**	**.25**	**.31**	**.24**	**.52**	**.56**	**.57**
4. Phonemic Segmentation				.18	.05	**.26**	**.23**	**.41**	.10
5. Supply Initial Consonant					.13	.13	**.36**	**.30**	**.24**
6. Word Referent						.15	**.29**	**.25**	**.27**
7. Word Renaming							**.50**	.19	**.31**
8. Symbol Substitution								**.59**	**.55**
9. Word Order Correction									**.39**
10. Word Unit									

Note: $r > .19$, $p < .05$; $r > .26$, $p < .01$ (one-tailed tests).

Table 6.7 Correlation among metalinguistic tasks and standard tests in Experiment 2 (N=71)

Variable	11	12	13	14	15	16	17	18	19	20	21	22
1. Word Discrimination	.39	.37	.32	.21	.44	.27	.33	.43	.56	.47	.52	.65
2. Word Length	.47	.41	.30	.35	.29	.35	.19	.37	.52	.58	.53	.70
3. Word Print	.48	.45	.50	.37	.40	.39	.19	.52	.59	.52	.53	.61
4. Phonemic Segmentation	.16	.28	.20	.28	.09	.14	.10	.26	.24	.32	.32	.10
5. Supply Initial Consonant	.21	.07	.19	.29	.16	.33	.11	.14	.28	.32	.36	.38
6. Word Referent	.27	.29	.19	.18	.25	.30	.10	.19	.24	.22	.26	.27
7. Word Renaming	.14	.32	.26	.20	.12	.18	.30	.31	.47	.40	.49	.29
8. Symbol Substitution	.41	.50	.41	.47	.43	.43	.23	.53	.65	.58	.69	.59
9. Word Order Correction	.49	.60	.43	.37	.38	.39	.19	.58	.53	.61	.56	.48
10. Word Unit	.42	.30	.45	.32	.30	.42	.31	.47	.47	.45	.53	.57
11. Information		.44	.62	.29	.43	.14	.11	.45	.46	.63	.40	.41
12. Vocabulary			.49	.28	.40	.28	.26	.57	.53	.56	.49	.40
13. Sentences				.22	.46	.07	.12	.54	.52	.56	.45	.40
14. Animal House					.37	.34	.40	.33	.33	.41	.53	.43
15. Picture Completion						.16	.37	.47	.44	.47	.42	.40
16. Geometric Design							.42	.47	.42	.36	.60	.47
17. Block Design								.31	.28	.28	.37	.33
18. NSST-Receptive									.73	.55	.55	.50
19. NSST-Expressive										.57	.62	.56
20. PPVT											.67	.53
21. Basic Number Skills												.69
22. Word Reading												

Note: $r>.19$, $p<.05$; $r>.26$, $p<.01$ (one-tailed tests).

In addition, the majority of the metalinguistic tasks and the standard tests correlated positively and significantly with age and length of time at school, as shown in Table 6.8. These results are generally consistent with previous research which has found metalinguistic awareness to be related both to age (e.g., Saywitz & Wilkinson, 1982) and to school grade (e.g., Warren-Leubecker, 1985). At school teachers talk a lot about words, sounds and other linguistic units and this may facilitate children's metalinguistic awareness (Garton & Pratt, 1989). Furthermore, it may be noted that one of the primary academic activities which much time is devoted to at school is reading, and the relationship between metalinguistic awareness and reading is a well documented one (Calfee, Lindamood & Lindamood, 1973; Downing, 1984; Tunmer, Herriman & Nesdale, 1988; Bowey, 1988).

The nature of the relationship between metalinguistic awareness and reading has been frequently addressed, but the differing theoretical views and varied empirical data have given rise to controversy. It has been argued that metalinguistic awareness plays a casual role in the acquisition of reading (Tunmer & Bowey, 1984; Torneus, 1984; Wagner & Torgesen, 1987); that metalinguistic awareness is mainly the result of learning to read (Donaldson, 1978; Valtin, 1984a); and that the relationship is reciprocal (Perfetti, Beck, Bell & Hughes, 1987; Garton & Pratt, 1989). In the last case, it has been proposed that metalinguistic awareness both plays a role in learning to read and is facilitated by learning to read.

Table 6.8 Correlations of metalinguistic tasks and standard tests with the background variables in Experiment 2 (N=71)

Variable	23	24	25	26	27	Mean	SD
1. Word Discrimination	**.44**	.15	**.57**	.00	-.01	8.07	2.54
2. Word Length	**.36**	.17	**.47**	**.21**	.11	8.25	2.59
3. Word Print	**.34**	.08	**.43**	.13	-.07	5.38	3.03
4. Phonemic Segmentation	.16	-.17	.12	.04	.07	4.55	3.76
5. Supply Initial Consonant	**.33**	-.09	**.35**	**.20**	.06	8.18	4.52
6. Word Referent	**.29**	-.02	.11	-.01	.05	5.47	2.96
7. Word Renaming	.09	.15	**.30**	.05	**.24**	11.73	4.06
8. Symbol Substitution	**.28**	.06	**.44**	**.22**	.07	4.68	4.42
9. Word Order Correction	**.37**	.00	**.33**	.05	-.05	6.28	2.93
10. Word Unit	**.30**	.13	**.39**	.07	.09	11.56	4.99
11. Information	.12	.15	.18	**.22**	**.20**	14.32	2.40
12. Vocabulary	**.29**	.01	**.38**	**.27**	.13	15.03	6.88
13. Sentences	.07	.07	**.22**	**.33**	**.20**	14.78	4.76
14. Animal House	**.24**	.11	.18	.13	-.03	50.21	8.37
15. Picture Completion	**.31**	.12	**.22**	**.20**	.16	14.54	3.47
16. Geometric Design	**.53**	.02	**.43**	-.04	-.12	13.96	4.92
17. Block Design	**.25**	.10	**.26**	.11	.11	14.20	3.07
18. NSST-Receptive	**.36**	.03	**.39**	.06	.04	28.59	4.26
19. NSST-Expressive	**.27**	.00	**.45**	.10	.05	28.73	4.85
20. PPVT	**.32**	.09	**.32**	.16	.17	68.78	13.12
21. Basic Number Skills	**.42**	.15	**.43**	.13	.18	21.16	5.38
22. Word Reading	**.54**	.12	**.58**	.18	.13	13.94	16.81
23. Age		-.01	**.63**	-.19	-.16	5.77	.38
24. Length of time at preschool			-.03	.14	.19	13.82	4.30
25. Length of time at school				.07	-.09	6.06	3.94
26. Mother's education					**.48**	2.80	1.17
27. Father's education						3.44	1.22

Note: $r>.19$, $p<.05$; $r>.26$, $p<.01$ (one-tailed tests).

Further correlations were computed to examine the relationship among the metalinguistic tasks and the standard tests independently of both the effects of age and schooling; to this end age and length of time at school were partialled out. The resulting partial correlations are displayed in Tables 6.9 and 6.10. As would be expected, partial correlations among the metalinguistic tasks and the standard tests were lower than the simple correlations, but several coefficients remained moderate and significant. For example, amongst the metalinguistic tasks, 28 of the 45 correlations were significant at the .05 level.

Table 6.9 Correlations among metalinguistic tasks in Experiment 2 with age and length of time at school partialled out (N=71)

Variable	2	3	4	5	6	7	8	9	10
1. Word Discrimination	**.51**	**.31**	-.06	.04	.11	**.20**	**.36**	**.30**	**.28**
2. Word Length		**.39**	-.06	**.30**	**.21**	**.21**	**.38**	**.41**	**.29**
3. Word Print			**.25**	.10	**.28**	.14	**.41**	**.48**	**.48**
4. Phonemic Segmentation				.13	.01	**.26**	.19	**.38**	.05
5. Supply Initial Consonant					.06	.04	**.25**	.19	.11
6. Word Referent						.17	**.28**	.17	**.24**
7. Word Renaming							**.43**	.14	**.23**
8. Symbol Substitution								**.54**	**.47**
9. Word Order Correction									**.30**
10. Word Unit									

Note: r >.19, p <.05; r >.26, p <.01 (one-tailed tests).

Table 6.10 Correlations among metalinguistic tasks and standard tests in Experiment 2 with age and length of time at school partialled out (N=71)

Variable	11	12	13	14	15	16	17	18	19	20	21	22
1. Word Discrimination	.36	.20	.26	.12	.37	-.01	.21	.26	.43	.35	.35	.48
2. Word Length	.45	.27	.24	.29	.20	.17	.06	.21	.40	.50	.42	.59
3. Word Print	.46	.34	.47	.32	.33	.23	.08	.42	.50	.44	.42	.49
4. Phonemic Segmentation	.13	.25	.19	.25	.05	.07	.06	.21	.21	.29	.28	.01
5. Supply Initial Consonant	.16	-.08	.14	.23	.05	.18	.01	-.02	.15	.22	.22	.20
6. Word Referent	.27	.26	.22	.13	.17	.20	.04	.12	.23	.16	.19	.19
7. Word Renaming	.09	.24	.20	.19	.09	.12	.26	.24	.39	.37	.46	.19
8. Symbol Substitution	.38	.41	.36	.44	.39	.32	.14	.44	.56	.52	.63	.48
9. Word Order Correction	.48	.17	.42	.31	.30	.23	.01	.50	.48	.55	.46	.34
10. Word Unit	.39	.55	.42	.26	.23	.31	.23	.37	.37	.36	.43	.45
11. Information		.41	.60	.27	.42	.08	.06	.42	.44	.62	.37	.40
12. Vocabulary			.46	.23	.34	.12	.17	.39	.41	.49	.38	.23
13. Sentences				.21	.47	.01	.07	.53	.48	.55	.43	.38
14. Animal House					.32	.25	.36	.26	.29	.36	.49	.37
15. Picture Completion						.02	.32	.41	.41	.41	.34	.29
16. Geometric Design							.34	.31	.22	.08	.47	.22
17. Block Design								.22	.19	.20	.28	.20
18. NSST-Receptive									.68	.49	.44	.33
19. NSST-Expressive										.52	.55	.43
20. PPVT											.61	.42
21. Basic Number Skills												.58
22. Word Reading												

Note: $r>.19$, $p<.05$; $r>.26$, $p<.01$ (one-tailed tests).

Several of the metalinguistic tasks and the standard tests also correlated positively and significantly with parental education, as shown in Table 6.8. These results are consistent with other studies which have often found a significant effect for SES on cognitive tests, in favour of children from high or middle SES backgrounds (Robinson, 1978; Dines, 1979; Tizard & Hughes, 1984 Wells, 1985; Gottfried, 1985; Cito, 1987). However, there is much controversy about how such findings are to be explained and whether parents from high or middle SES backgrounds provide a more stimulating and enriching linguistic environment for their children than parents from low SES backgrounds. For example, Tizard and Hughes report some commonly held beliefs that "working-class children are barely talked to by their parents" and that "working-class mothers never play with their children, and that they fail to answer their questions" (Tizard & Hughes, 1984, pp. 135-136). Contrary to these views Tizard and Hughes have found no "social class differences in the amount of mother-child talk, the length of conversations, the frequency and nature of the mother's questions and controlling remarks, or the amount that mothers played with their children" (p. 158). However, Tizard and Hughes did find some more subtle differences between "middle-class mothers" and "working class mothers" which may account for the superior performance of children from higher SES backgrounds on various cognitive tests. They found that:

"... middle-class mothers tended to make some frequent uses of language for complex purposes, and used a wider vocabulary in talking to their children. They more often gave their children information, of a wider range, and they more often took a role in their imaginative play. They also took their children's 'Why' questions more seriously than working-class mothers, that is, they less often ignored them and more often gave them adequate answers" (p. 158).

Factor analyses

Following the correlation analyses, two maximum-likelihood factor analyses were performed using the Joreskog and Lawley technique of extraction within the FACTOR program of SPSS-X (SPSS Inc., 1986). The first analysis included only the 10 metalinguistic tasks, while the second included these plus the 12 standard tests. The effects of age and schooling had been partialled out in both cases, prior to entering correlations into the factor analyses.

In each factor analysis the number of extracted factors was determined by two criteria, both of which had to be satisfied. The first was Kaiser's criterion; only initial factors having eigenvalues greater than one were retained. The second criterion used was the Chi-square statistic derived from the residual correlation matrix, as provided by maximum-likelihood factor analysis. If the Chi-square value is nonsignificant following extraction of a given number of factors, then this implies that the fit of the factor model is good, and it would then be inappropriate to extract further factors.

In both analyses, the two-factor solution was accepted, and reported results are for the unrotated solution since rotation did not assist interpretation. For the first factor analysis, loadings are shown in Table 6.11. The Chi-square statistic testing the residuals after the extraction of two factors was nonsignificant, $\underline{X}^2=31.25$, 26 d.f., $p>.20$. Factor I accounted for 39.3% of the total variance, and was interpreted as indicating general metalinguistic ability. It gained high positive loadings on five tasks (Word Discrimination, Word Length, Word Print, Symbol Substitution, Word Order Correction and Word Unit), and low positive loadings on three tasks (Supply Initial Consonant, Word Referent and Word Renaming).

Only Phonemic Segmentation had an approximately zero loading on Factor I, reflecting its generally low correlations with the other tasks. Phonemic Segmentation also correlated poorly with some of the metalinguistic tasks in Experiment 1. This isolation of Phonemic Segmentation may have been due to the predominance of tasks involving whole words in the battery. In addition, Supply Initial Consonant had a low loading on the general Factor I, which again reflected its low correlations with the other tasks generally. Both Supply Initial Consonant and Phonemic Segmentation were used to assess phonemic awareness, but the correlations between the two tasks was poor. Other studies have reported moderate to high correlations among various phonemic awareness measures (e.g., Yopp, 1988).

Table 6.11 Factor loadings for 10 metalinguistic tasks in Experiment 2 (N=71)

Variable	Factor I	Factor II
1. Word Discrimination	.57	-.06
2. Word Length	.67	-.06
3. Word Print	.60	.25
4. Phonemic Segmentation	.00	1.00
5. Supply Initial Consonant	.25	.13
6. Word Referent	.35	.01
7. Word Renaming	.32	.26
8. Symbol Substitution	.70	.20
9. Word Order Correction	.59	.38
10. Word Unit	.57	.05

Note: For Phonemic Segmentation, the loadings to 4 decimal places were -.0011 and .9995 respectively.

Factor II accounted for only 13.4% of the total variance and was not usefully identified. It was a simple binary factor dominated by an extremely high positive loading on Phonemic Segmentation and a moderate positive loading on Word Order Correction. Only Factor I appeared to be relevant to the identification of metalinguistic awareness, and on the basis of this analysis, metalinguistic ability appeared to be a relatively unitary dimension, at least so far as word units are involved. Such a finding is likely to be contingent on the use of reliable measures, suited to discriminate for the age-level involved.

The second factor analysis was conducted to examine the factorial relationship between the metalinguistic tasks and the standard tests. A two factor solution was again found to be appropriate. In the analysis of nonsignificant residuals, $\underline{X}^2$=206.53, 188=d.f., p>.17. Factor loadings are shown in Table 6.12. The first factor accounted for 32.7% of the total variance and was interpreted as a very general dimension of intellectual ability. The factor had moderate to high positive loadings on most variables. The broad range of the factor is demonstrated by high loadings on measures of verbal abilities (e.g., PPVT, .77), number skills (e.g., Basic Number Skills, .78), reading achievement (e.g., Word Reading, .64) and metalinguistic abilities (e.g., Symbol Substitution, .73). As Thorndike, Hagen and Sattler (1986, p. 6) stated, referring to the general ability factor, g: "Like a phoenix, it keeps rising from its ashes and will no doubt continue to be an enduring part of our psychometric theory".

Factor II accounted for only 4.9% of the total variance, and was a bipolar factor which weakly reflected a verbal/nonverbal distinction. The factor had negative, moderate loadings on two verbal tests from the WPPSI

Table 6.12 Factor loadings for 10 metalinguistic tasks and 12 standard tests in Experiment 2 (N=71)

Variable	Factor I	Factor II
1. Word Discrimination	.48	-.06
2. Word Length	.56	.00
3. Word Print	.63	-.12
4. Phonemic Segmentation	.29	.03
5. Supply Initial Consonant	.24	.13
6. Word Referent	.31	-.03
7. Word Renaming	.41	.27
8. Symbol Substitution	.73	.20
9. Word Order Correction	.67	-.13
10. Word Unit	.56	.05
11. Information	.66	-.40
12. Vocabulary	.58	-.20
13. Sentences	.66	-.38
14. Animal House	.50	.25
15. Picture Completion	.52	-.21
16. Geometric Design	.36	.47
17. Block Design	.27	.27
18. NSST-Receptive	.66	-.11
19. NSST-Expressive	.74	.01
20. PPVT	.77	-.10
21. Basic Number Skills	.78	.35
22. Word Reading	.64	.12

(Information and Sentences), and positive, moderate loadings on one nonverbal test (Geometric Design), and Basic Number Skills. Such a distinction has frequently been found (Sattler, 1982).

Overall, the results from this experiment support the notion of a "general metalinguistic ability" in children, and the data are broadly consistent with the results obtained in Experiment 1. From the second factor analysis it was concluded that the metalinguistic tasks reflected general intellectual ability. The tasks were not factorially distinct from other tests of intellectual abilities, and were not clearly related to a verbal/nonverbal distinction. This kind of consistency with other intellectual and scholastic abilities has been suggested by earlier small-scale studies (e.g., Smith & Tager-Flusberg, 1982). In addition the results from this experiment have indicated that metalinguistic abilities are related to age, schooling and parental education, as are other intellectual abilities.

Up to this point the thesis has been concerned with previous research and preliminary empirical work on metalinguistic awareness. The next chapter focuses on past studies which have addressed one of the other main topics included in this thesis, that is, the effects of bilingualism on creativity.

CHAPTER 7 CREATIVITY AND BILINGUALISM

The majority of researchers who have investigated the effects of bilingualism on creativity have employed the Torrance Tests of Creative Thinking (TTCT; Torrance, 1962, 1966, 1974a). In fact these have been by far the most frequently used creativity tests up to date, as noted by Lissitz and Willhoft (1985, p. 1):

"of all the instruments contained in the Eighth Mental Measurements Yearbook (Buros, 1978), the TTCT ranked 24th in total number of references and had the most references of all tests of creativity". A cummulative bibliography of the vast amount of work that has been done with the TTCTs has also been provided by Torrance, Dogan and Horng (1981).

The TTCTs' popularity is most likely due to the fact that they cover a wide age range, primary school through to college. Moreover, Torrance presents a broad conceptualisation of creativity which he has defined as:

"a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies: testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results" (Torrance, 1974a, p. 8).

The TTCT include two Verbal tests forms (Torrance, 1974b, 1974c) and two Figural test forms (Torrance, 1972a, 1974d). All tests are timed and have standard instructions. The Verbal forms require 45 minutes of testing time and they include these five subtests: Ask-and-Guess Activities; Product

Improvement Activity; Unusual Uses Activities; Unusual Questions Activity; and Just Suppose Activity. The Figural forms require 30 minutes of testing time and they include these three subtests: Picture Construction Activity; Incomplete Figures Activity; and Repeated Figures Activity. All subtests may be scored for fluency (the number of relevant responses); flexibility (the number of different categorical responses); originality (based on the statistical infrequency and appropriateness of ideas produced); and elaboration (the number of details given in elaborating the responses). On the whole, intercorrelations among these scores have been high, and extensive evidence has been provided for tests' construct and predictive validity (Torrance, 1966, 1967, 1972b, 1974a, 1981a).

More recently, Torrance (1979) and Torrance and Hall (1980) have experimented with new scoring procedures for the TTCT, which attempt to capture aspects of creativity that fall outside the realm of cognitive style. Some of these new scores have been studied in relation to the well known scores (e.g., fluency) by Heausler and Thompson (1988), but overall the new scores do not appear to provide any additional information.

Twelve bilingual studies which have examined the TTCT are summarised in Table 7.1. Included in this table are also eight studies which have examined other creativity tests, but like the TTCT, they are divergent thinking tests and in each case the subjects were required to produce as many ideas as they could. In addition, it needs to be noted that many of these bilingual studies have been criticised on methodological grounds (Baker, 1988), as have many of the bilingual studies which have examined measures of metalinguistic awareness (Chapter 3). Nevertheless, the majority of studies in Table 7.1 do

lend some support for the view that bilingualism promotes creativity as assessed by divergent thinking tests, in that, a bilingual superiority has often been found. Only two of the studies reviewed have provided no evidence for a bilingual advantage on any of the examined measures (Gowan & Torrance, 1965; Withey, 1974). There is one further study cited in the literature by Baker (1988) which has reported no bilingual advantage on creativity tests. This unpublished study was conducted by Anisfeld in 1964, but it is not included in Table 7.1 because details concerning the subjects or the tests used are not given by Baker.

Although, a bilingual superiority has frequently been found on creativity tests, as on metalinguistic tasks, only five of the studies reviewed here may be interpreted as providing some support for the Threshold Theory. These five studies included bilinguals who were proficient in both of their languages (Lambert, Just & Segatowitz, 1970; Carringer, 1974; Holtzman, 1980; Okoh, 1980; Alvarez, 1984). In ten of the other studies, the subjects' degree of bilingualism was not assessed (Gowan & Torrance, 1965; Jacobs & Pierce, 1966; Torrance, Wu, Gowan & Aliotti, 1970; Landry, 1973a, 1973b, 1974; Price-Williams & Ramirez III, 1977; Chorney, 1978; Kessler & Quinn, 1980, 1987). Whilst, the remaining five studies included balanced bilinguals who had attained a comparable level of proficiency in both of their languages, but not necessarily a high level (Withey, 1974; Cummins & Gulustan, 1974; Srivastava & Khatoon, 1980; Wang, 1982; Koulos, 1986). This same pattern of results was observed in the bilingual studies which included measures of metalinguistic awareness.

Table 7.1 Summary of bilingual studies which have included creativity measures

Study	Subjects	Creativity measures	Summary of main results
Gowan & Torrance (1965)	Chinese-English bilinguals Malay-English bilinguals Tamil-English bilinguals Chinese monolinguals Malay monolinguals Tamil monolinguals English monolinguals Grades 3, 4, 5 and 6	Figural TTCT (Form version not given)	Monolingual superiority
Jacobs & Pierce (1966)	Bilinguals spoke Czechoslovakian, Polish, German, Greek or Spanish and English English monolinguals Grades 5 and 6	Words Meanings test Uses test Scored for fluency	Bilingual superiority on Uses test but statistical significance was not assessed
Torrance, Wu, Gowan & Aliotti (1970)	Malay-English bilinguals Chinese-English bilinguals Chinese monolinguals Malay monolinguals Grades 3, 4 and 5	Figural TTCT, Form A Scored for fluency, flexibility originality, and elaboration	Monolingual superiority on fluency in each grade, on flexibility in grades 3 and 4, and on originality in grade 3 Bilingual superiority on flexibility in grade 3 and on elaboration in grade 4
St. Lambert Project (Lambert, Just & Segatowitz, 1970; Lambert & Tucker, 1972; Lambert, Tucker & d'Anglejan, 1973; Bruck, Lambert & Tucker, 1974, 1977)	French-English bilinguals English monolinguals French monolinguals Cohort 1 were studied from grade 3 through to 6 Cohort 2 were studied from grade 3 through to 6	Cohort 1 were given Unusual Uses and Consequences tests in grades 3, 4 and 5; and Lines and Patterns tests in grade 6 Cohort 2 were given Unusual Uses and Consequences tests in grades 2, 3 and 4; Lines and Patterns tests in grades 5 and 6; and Unusual Uses and Similarities tests in grade 6 Scored for fluency	Cohort 1 showed a bilingual superiority on the Unusual Uses test in grade 3 and 5 and on the Lines and Patterns tests in grade 6 Cohort 2 showed a bilingual superiority on the Consequences test in grade 4
Landry (1973a)	Second language learners (details not given) English monolinguals Grades 2, 4, 5 and 6	Product Improvement and Unusual Uses from Verbal TTCT (Form version not given) Scored for fluency and flexibility	Bilingual superiority for girls only in grades 4, 5 and 6
Landry (1973b)	Second language learners (details not given) English monolinguals Grades 2, 4, 5 and 6	Incomplete Figures and Circles from Figural TTCT (Form version not given) Scored for fluency and flexibility	Bilingual superiority in grades 4, 5 and 6
Landry (1974)	Second language learners (details not given) English monolinguals Grades 1, 4 and 6	Verbal and Figural TTCTs (Form version not given) Scored for fluency, flexibility and originality	Bilingual superiority in grades 4 and 6
Carringer (1974)	Spanish-English bilinguals Spanish monolinguals Mean age of subjects was 15.2 years	Incomplete Figures and Repeated Figures from Figural TTCT, Form A Product Improvement and Unusual Uses from Verbal TTCT, Form B Scored for fluency, flexibility and originality	Bilingual superiority on verbal flexibility, verbal originality, figural fluency and figural originality
Withey (1974)	German-English bilinguals English monolinguals Aged between 12 and 14 years	Verbal TTCT, Form B Scored for fluency, flexibility and originality	No bilingual advantage
Cummins & Gulustan (1974)	French-English bilinguals English monolinguals Grade 6	Uses test scored for fluency, flexiblity and originality Patterns test scored for flexibility and originality	Bilingual superiority on the Uses orignality score

Table 7.1 Summary of bilingual studies which have included creativity measures (continued)

Study	Subjects	Creativity measures	Summary of main results
Price-Williams & Ramirez III (1977)	Spanish-English bilinguals French-English bilinguals English monolinguals Grade 4	Unusual Uses test Scored for fluency and flexibility	Bilingual superiority for boys only
Chorney (1978)	Ukranian-English bilinguals English monolinguals Aged between 6 and 9 years	Figural TTCT, Form A Scored for fluency, flexibility, originality and elaboration	Bilingual superiority on fluency, flexiblity and originality
Holtzman (1980)	Spanish-English bilinguals Spanish monolinguals English monolinguals Aged between 9 and 12 years	Figural TTCT, Form A Just Suppose and Unusual Uses from Verbal TTCT, Form A Unusual Uses from Verbal TTCT, Form B Scored for fluency and flexibility	Proficient bilinguals performed significantly better than nonproficient bilinguals on verbal fluency on verbal fluency Spanish monolinguals performed significantly better than all other groups on figural fluency and flexibility
Okoh (1980)	Yorubo-English bilinguals Welsh-English bilinguals English monolinguals Aged between 9 and 11 years	Word Meanings test Uses of objects test Instances test Picture Construction and Picture Completion from Figural TTCT, Form B Scored for fluency, flexibility, originality and elaboration	Bilingual superiority on total verbal creativity and on verbal originality
Kessler & Quinn (1980)	Italian-English bilinguals Spanish-English bilinguals English monolinguals Grade 6	Science test which involved generating hypotheses Scored for quality and syntactic complexity	Bilingual superiority
Srivastava & Khatoon (1980)	Kannada-English bilinguals Kannada monolinguals Grade 8	Verbal creativity test scored for fluency, flexibility and originality Nonverbal creatvity test scored for originality and elaboration (Details of tests not given)	Bilingual superiority for both boys and girls on verbal flexibility Bilingual superiority for boys only on verbal fluency Bilingual superiority for girls only on nonverbal elaboration
Wang (1982)	Chinese-English bilinguals English monolinguals Aged between 12 and 15 years	Controlled Association test Opposites test Making Sentences test Arranging Words test Rewriting test Topics test Themes test Different Uses test Ornamentation test Elaboration test Hidden Patterns test Copying test Scored for fluency	Bilingual superiority on a general factor of creativity
Alvarez (1984)	Spanish-English bilinguals Aged between 5 and 10 years	Figural TTCT, Form A Scored for fluency, flexibility, originality and elaboration	Proficient bilinguals scored higher than nonproficient bilinguals but differences were not significantly different
Koulos (1986)	Greek-English bilinguals English monolinguals Aged between 12 and 13 years	Verbal TTCT, Form B Scored for fluency, flexibility, originality and elaboration	Bilingual superiority for boys only
Kessler & Quinn (1987)	Spanish-English bilinguals English monolinguals Grade 6	Science test which involved generating hypotheses Scored for quality, syntactic complexity and number of metaphors	Bilingual superiority but statistical significance not assessed

Moreover, it has been argued, as with metalinguistic awareness, that creativity may also promote second language learning. Scott (1973) has re-analysed some of the data from the longitudinal St. Lambert Project (Lambert & Tucker, 1972). The results indicated that there was a significant difference between the bilinguals and monolinguals on the creativity tests, favouring the bilinguals. In addition, it was found that the creativity measures obtained in grade 2 predicted significantly the bilinguals' speaking skills in grade 3. Thus, it was concluded by Scott that "the results of this study seem to indicate that bilingualism can both influence and be influenced by divergent thinking which operates both as a cause and effect" (p. 10).

Four of the studies summarised in Table 7.1 have further found an interaction effect between bilingualism and sex on measures of creativity, but the results are conflicting. Two studies have indicated a bilingual superiority for boys only (Price-Williams & Ramirez III, 1977; Koulos, 1986); one study has reported a bilingual superiority for girls only (Landry, 1973a); whilst the other study has reported mixed results (Srivastava & Khatoon, 1980).

Studies which have examined sex differences on creativity tests with nonbilingual subjects have also provided confusing and contradictory data. Several studies have reported a significant advantage favouring girls after the age of 7 years (Piers, Daniels & Quakenbush, 1960; Mearig, 1967; Olive, 1972; Maccoby & Jacklin, 1974; Kershner & Ledger, 1985; Richardson, 1985; Dhillon & Mehra, 1987/1989), but some studies have found a significant advantage favouring boys (Torrance & Aliotti, 1969; Raina, 1969), and others have found no sex differences (Dewing, 1970; Akhurst, 1978; Raina, 1980; Schmitz, 1981; Pandey & Pandey, 1984/1987). Furthermore, it may be noted that sex

differences on creativity tests have not been found in the preschool and the earliest school years (Maccoby & Jacklin, 1974; Bayard-de-Volo & Fiebert, 1977; Aliedin, 1979; Torrance, 1981b; Moran III, Milgram, Sawyers & Fu, 1983; Bachtold & Worley, 1986).

It may also be noted that the bilingual studies which have included measures of creativity have not usually focused on children in the earliest school years. Only three studies have included some bilingual children aged 5 or 6 years (Landry, 1974; Chorney, 1978; Alvarez, 1984), but even in these studies, the majority of children were from middle and upper primary school grades. The other bilingual studies summarised in Table 7.1 have focused exclusively on children from middle and upper primary school grades or the early high school grades. On the other hand, researchers in the creativity area have frequently studied younger children, even those as young as 3 years (Levine, 1984). In the following chapter some of the creativity measures which have been developed for use with young children will be reviewed.

CHAPTER 8 ASSESSING CREATIVITY IN YOUNG CHILDREN

One issue needs to be addressed first: There are researchers who hold that the word "creativity" should only be used when referring to adult performance, and it should not be employed in the name of any instrument designed for young children (Ward, 1974; Dudek, 1974). However, even in the adult literature, there are researchers (e.g., Cropley, 1967) who would like to avoid the term "creativity", because too little is known about this very broad concept, and in many instances researchers have been investigating only "divergent thinking".

Ward (1974) has proposed that the word "creativity" should not be used to describe children's abilities or behaviour because childhood "creativity" may have little bearing on adult creative endeavours. The latter is contingent on much learning and effort before any notable creative product is evident. Instead, he suggests calling the tests by more specific names such as "a measure of playfulness, of openness to experience, of ideational fluency, or whatever else it looks like" (Ward, 1974, p. 105).

Despite the please made by researchers like Ward (1974), the term "creative" is a popular word used to describe some young children, and it is likely to remain popular. The popularity is reinforced by commonly held beliefs and intuitions about childhood creativity. Several of these are described by Dudek (1974), such as the following: creativity in young children is universal and spontaneous, it is innate, and it begins to "dry out" very early at around the age of five years due to social pressures for conformity. Similarly, it has been noted by Gilchrist (1972, p. 47):

"that a number of theorists have claimed that the young child is more creative than the average adult, the young child appears to be aware of the nuances of his immediate sensory experience, he is puzzled, quick to question, aware of problems and incongruities, eager to learn, explore and understand". In addition, there are poets and artists assuring us that young children are indeed creative (Torrance, 1981b).

Rimm and associates (Rimm & Davis, 1976, 1980; Rimm, 1980, 1983, 1984) have further developed a series of inventories for identifying highly creative children. One of these, PReschool and Kindergarten Interest DEscriptor (PRIDE; Rimm, 1983) was specifically designed for children aged between 3 and 6 years. It contains 50 items concerned with attitudes and interests usually associated with creativity in young children such as independence and curiosity. This inventory's reliability is very high (.92), and in addition, Rimm (1983) has provided some criterion-related validity. In three different samples, the criterion was a "composite score consisting of teacher ratings of creativeness and experimenter ratings of a picture and a brief dictated story" (p. 3). The correlations between the criterion and PRIDE were .38, .50 and .32 for the three samples.

Much of the other research in this area has been concerned with the development of creativity tests for young children. These include three of the Wallach and Kogan (1965) divergent thinking tests which have been modified by Ward (1968) for use with children aged between 4 and 8 years:

1) Instances. Children are asked to name objects falling into common categories (e.g., things that are round).

2) Alternative Uses. Children are asked to specify possible uses for specified objects.

3) Pattern Meanings. Children are required to specify possible meanings or interpretations for abstract visual designs.

Ward found that the correlations between the Instances and the Alternate Uses tests for the 4 to 6 years olds were similar to those for the 7 and 8 year old children, and to those found by Wallach and Kogan (1965) with 10 and 11 year olds. The correlations between these two tests scored for both fluency and originality were moderately high and positive, and they correlated poorly with IQ. In contrast, Pattern Meanings correlated poorly with the other two divergent thinking tests for the 4 to 6 year olds, but it correlated moderately and positively for the children aged 7 or 8 years. Therefore, Ward has suggested that Pattern Meanings may not be suitable for children under 7 years.

Further evidence, suggesting that the Pattern Meanings may not be suitable for young children was found by Busse, Blum and Gutride (1972) in a study which focused on children identified as "disadvantaged", and who were attending the Head Start Program. The children were aged between 3 and 5 years. In addition, to Pattern Meanings, the children were given three other creativity tests, the Unusual Uses test (children are required to give uses for specified objects as in Alternate Uses; adapted from Torrance, 1962 and Ward, 1968); the Construction test (children are required to build structures with blocks; Savoca, 1965); and the Starkweather test (children are asked to give ideas on what styrofoam forms represent; Starkweather, 1964). These four tests were scored for fluency, flexibility and originality, and all subjects were given two equivalent forms of each test devised by the authors.

Overall, the results found by Busse et al. were discouraging, in that, the Unusual Uses test had to be dropped because few children gave meaningful responses, whilst the correlations among the other three tests, and between the alternate forms were generally low. On the basis of these results, Busse et al. concluded: "It is doubtful that any unitary "creative ability" exists at this age (p. 297).

In contrast, to Busse et al.'s study, more recent studies have provided support for a unitary creativity ability in young children. One such study was conducted by D'Alessio and Mannetti (1976). Their subjects were Italian-speaking preschoolers aged between 5 and 6 years from both low and middle SES backgrounds. All subjects received four of the Wallach and Kogan divergent thinking tests scored for fluency and originality (Instances, Alternate Uses, Pattern Meanings and Line Meanings) and three subtests from the Wechsler Scale of Intelligence (WSIC; Vocabulary, Picture Arrangement, and Block Design), which had been adapted for Italian-speaking children. Two factor analyses using the principle component method followed by a varimax rotation were conducted. Both included the three subtests from the WSIC, but they differed in that the first included the fluency scores from each of the four creativity tests, whilst the second included the originality scores. For both analyses two-factor solutions were accepted, and in each case Factor I was clearly identified as a creativity factor since it had moderate to high positive loadings on each of the creativity measures, but low loadings on the three subtests from the WSIC. On the other hand, Factor II had moderate to high positive loadings on the three subtests from the WSIC, but low loadings on the creativity measures.

Further support for the notion of a unitary creativity ability has been found by Levine (1984) and by Tegano, Moran III and Godwin (1986). Levine assessed creativity in three year olds using the Instances and Alternate Uses tests, and by observing children's play with a doll and stylised blocks. These four measures were scored for fluency, originality and imagination. In contrast to the Busse et al. study, the results indicated that creativity is "a relatively homogenous construct", in that, the average intercorrelation among the four measures was .67. Similarly, Tegano et al. have found moderate and positive correlations among the Instances, Alternate Uses and the Pattern Meanings tests which were scored for originality.

In addition, Harrington, Block and Block (1983) have provided some encouraging evidence for the predictive validity of divergent thinking tests in young children. In this study, subjects were given the Instances and the Alternate Uses tests at the age of 4 and 5 years, respectively. Both of these creativity tests scored for fluency correlated significantly and positively with teacher-evaluated creativity when the children were in grade 6.

Torrance has also developed a test specifically designed for children aged between 3 and 8 years. This is Thinking Creatively in Action and Movement (TCAM; Torrance, 1981b). The test was developed as a result of the author's dissatisfaction with TTCT for young children. Torrance wrote (1981b, p. 4):

"The present author initiated efforts in 1958 to develop tests of creative thinking that would extend downward to five-year olds. These efforts were finally integrated into the Torrance Tests of Creative Thinking (Torrance, 1966, 1974). These tests proved to be only marginally successful even with

five year-olds and were unsuitable with three- and four-year olds. It was not until 1966 at the University of Georgia that the author made serious efforts to test the creativity of preschool children ... Most of these procedures relied heavily upon verbal responses and were generally disappointing in their results. However, it was out of these disappointments that the idea for Thinking Creatively in Action and Movement emerged. In day-care centers and in other programs for preschool children, the author set out to observe the ways in which preschool children expressed their creative thinking. It was on the basis of these experiences that the procedures described herein were developed."

The TCAM contains three subtests which may be scored for fluency or originality:

1) How Many Ways? In this subtest children are asked to invent ways of moving across the room.

2) What Other Ways? In this subtest children are required to think up ways of putting a paper cup in a rubbish bin.

3) What Might It Be? In this subtest children are asked how many things they could do with a paper cup.

In addition, TCAM contains another subtest, "What Might It Be?" for which the children are asked to assume six different roles. Each of the roles (e.g., a tree) which the child is asked to assume is scored on a five-point scale for imagination, where one point indicates very little imagination and five points indicate high imagination. A complete guide for the scoring of this subtest is given by Torrance (1981b) in the test's manual.

Satisfactory reliability data for the TCAM has been provided by Torrance (1981b), and evidence for the test's construct validity is reported by Reisman, Floyd and Torrance (1981), and Tegano, Moran III and Godwin (1986). Reisman et al. have found that the overall score, and the fluency and originality scores from the TCAM correlated moderately, positively and significantly with two measures which involved divergent problem solving skills. On the other hand, the scores from the TCAM correlated poorly with a traditional Piagetian test which assessed convergent thinking. Furthermore, Tegano et al. have found that the majority of scores obtained from the TCAM correlated moderately, positively and significantly with originality scores from the Instances, Alternate Uses and Pattern Meanings tests.

A divergent thinking test has also been included among the assortment in the British Ability Scales (Elliot, 1983a). This is the Verbal Fluency Scale which contains six items. In two items the child is asked to give as many names of things to eat and of animals, as possible; in the next two items the child is presented with ambiguous drawings, and is asked to say what they may represent; and in the last two items the child is asked to say what would be the consequences of certain unusual events, such as having two heads. All items are scored for fluency.

Satisfactory reliability data have been provided for Verbal Fluency for subjects aged between 4 and 18 years (Elliot, 1983b). In addition, intercorrelations between Verbal Fluency and the other ability scales are low positive. With the four scales used to calculate the short-form IQ, the correlations with Verbal Fluency for the 5 year olds were: Matrices, r=.29; Naming Vocabulary, r=.27; Similarities, r=.27; and Recall of Digits, r=.17.

Again, this evidence shows that creativity as assessed by divergent thinking tests may be measured reliabily in young children; and it is distinguishable from convergent thinking.

Other research on creativity with young children has focused on the study of background variables which are believed to affect it. These include SES and birth order. A number of experimental studies have demonstrated that children from high or middle SES backgrounds perform significantly better on creativity tests than children from low SES backgrounds (Savoca, 1965; Lichtenwalner & Mawell, 1969; Ogletree & Ujlaki, 1983; Bruen, Schawarcz & Barihbaum, 1984; Ali, 1987/1989; Mishra, 1987/1989). In fact, it has been argued by Lichtenwalner and Maxwell (1969) that creativity may be impeded in children from low SES families because parents in such families are less likely to provide a stimulating physical environment and "are more likely to exert control by harsh punishments rather than appeals to reason, thereby repressing creative behavior" (p. 1247).

However, not all the evidence is consistent with Lichtenwalner and Maxwell's view. Some studies have found no differences between groups which differ on SES (Cicirelli, 1966; Mannetti, 1976a; Torrance, 1971). Whilst, other studies have shown that children from low SES backgrounds perform significantly better than children from high SES backgrounds, particularly on measures of nonverbal creativity (Rogers, 1968; Singh, 1970; Torrance, 1971; Kaltsounis, 1974; Levene, 1984; Haley, 1984).

The relationship between birth order and creativity has also been addressed frequently in the creativity literature, but the evidence is again

inconsistent, as with the relationships between SES and creativity. First born children have been found to score significantly better than later-born children on creativity tests (Lichtenwalner & Maxwell, 1969; Eisenman & Schussel, 1970; Mannetti, 1976b; Jarial, 1985; Runco & Bahleda, 1987). However, in one study, later-born children were found to be more creative (Staffieri, 1970), and in some studies no differences have been observed (Sellwood, 1974; Albaum, 1977; Bayard-de-volo & Fiebert, 1977; Wilks & Thompson, 1979).

Since the two background variables, SES and birth order have been frequently studied in the creativity literature, and several studies have demonstrated that they are significant correlates of creativity, both variables were included in Experiments 3 and 4 of this thesis. Experiment 3 was conducted during the months July to December of 1986 and March to December of 1987, whilst Experiment 4 was conducted during the months March to May and September to November of 1988. A detailed report of these two experiments follows.

CHAPTER 9 EXPERIMENT 3: METALINGUISTIC AWARENESS AND CREATIVITY IN ITALIAN-ENGLISH BILINGUAL CHILDREN AND ENGLISH SPEAKING MONOLINGUAL CHILDREN, FROM SOUTH AUSTRALIA

The first aim of the present experiment was to investigate the relationship between metalinguistic awareness and creativity in bilingual and monolingual children. Although many researchers have compared bilinguals and monolinguals on measures relating either to metalinguistic awareness or creativity, the two types of measures have not been studied simultaneously before.

In the bilingual literature, no type of relationship between metalinguistic awareness and creativity has been postulated or investigated. It is hypothesised here that there exists a positive relationship between measures of metalinguistic awareness and measures of creativity in young bilingual children. This hypothesis is based on the notion that the degree of the "objectification of language" (described in Chapter 2) associated with bilingualism, will also be associated with consequential gains in both cognitive areas.

With respect to metalinguistic awareness, it has been frequently argued that because bilingual children have two words for every referent from an early age, or more generally two language systems, they consequently have a superior metalinguistic knowledge (Cummins, 1978a; De Avila & Duncan, 1979; Mohanty and Babu, 1983; Tunmer & Myhill, 1984; Diaz, 1985b). Furthermore, it has been argued that having access to two language systems frees children

from the "tyranny" of words and language, and in this way children learn to think in more abstract and conceptual terms (Carringer, 1974; Cummins, 1976). To the extent that such thinking develops, it may assist both creativity and metalinguistic test performance.

Other similar processes are also believed to influence both creativity and metalinguistic awareness in bilinguals. For example, positive gains in these two areas are believed to result from interlingual interference. This general view was described in Chapter 2 but it has been discussed with specific reference to creativity by Torrance, Wu, Gowan and Aliotti (1970). Torrance et al. write of the competition of old and new associations in bilingual and bicultural children, the diverse associations being derived from languages and cultures; and they have suggested that this competition between the new and old associations facilitates creativity. Similarly, with reference to creativity, Landry (1974) has drawn attention to the fact that second language learners experience negative transfer between their two language systems but they become more adept at overcoming instances of negative transfer and this is then beneficial to creativity. Furthermore, it has been argued that bilingual children become more adept at overcoming instances of negative transfer or interlingual interference by attending more closely to language structure and this is then beneficial to metalinguistic awareness (Ben-Zeev, 1977c; Aronsson, 1981).

Nothing has yet been said about any possible relationship between metalinguistic awareness and creativity in monolingual children. However, in the developmental linguistic literature, Van Kleeck (1982), has argued that metalinguistic tasks may be related to creativity tasks, in that both types of

tasks involve cross-category comparisons and evaluations. Therefore, positive correlations between measures relevant to the two conceptual areas were hypothesised also for the monolingual children.

A further aim of the present experiment was to test three hypotheses derived from the Threshold Theory (described in Chapter 2), by the comparison of bilingual and monolingual performance on several cognitive measures. On the basis of the Threshold Theory it was predicted that bilinguals who have attained a high level of proficiency in both languages would perform significantly better than bilinguals who have attained a high proficiency in only one language, or monolinguals who have attained a high level of proficiency in their single language. On the other hand, no significant differences were expected between bilinguals who have attained a high degree of linguistic proficiency in only one language and monolinguals who have attained an equivalent level of proficiency. Last, it was predicted that bilinguals who have attained a low level of proficiency in both languages would perform significantly worse than bilinguals or monolinguals who have attained a high proficiency in at least one language.

The Threshold Theory has very little to say about the performance on cognitive tests of those bilinguals who have attained a low level of proficiency in both languages as compared with monolinguals who have attained an equally low level of proficiency in their one language. The theory might be taken to imply that there would be no difference, but this is not a clear inference. To assess the matter at an empirical level, a relevant group of monolinguals was included in the study.

The children of Experiment 3 were Italian-English bilinguals and English monolinguals from South Australia, aged 5 or 6 years (who had not been included in either of the two previous studies). English verbal tests were used to assess the level of English proficiency in both bilinguals and monolinguals, and Italian verbal tests were used to assess the bilinguals' proficiency in Italian.

In addition, several of the ability and background variables examined in Experiment 2 were included, in order that the relationship between metalinguistic awareness and other relevant variables could be further examined in bilingual children. These variables included: reading achievement, English verbal abilities, nonverbal abilities, age, sex, and parental education which was used as an index of SES. Two additional variables, namely, birth order and children's literary interests (e.g., reading) were also included. Several studies have found that birth order, and SES are related to measures of creativity (these studies were reviewed in Chapter 8). Literary interests in the home were assessed since it has been suggested that metalinguistic development may be promoted in families where literature is valued, but no empirical support for this view has been provided (Lentin, 1973; Van Kleeck, 1982; Hakes, 1982; Hoffmann, 1985; Garton & Pratt, 1989). Furthermore, differences between bilingual and monolingual children on these background variables were examined.

METHOD

Subjects

The subjects were 57 Italian-English bilingual children (34 boys and 23 girls) and 55 English monolingual children (28 boys and 27 girls). Three

children from the initial sample did not complete all the tasks due to frequent absences from school, and thus were not included in the analyses. The children were drawn from reception and grade 1 classes in eight primary schools (four were public schools and four were private Catholic schools). All children were 5 or 6 years old, the mean age for both groups being 5 years and 8 months (SD=4 months).

Arrangements for testing

Parental consent was obtained for the children to take part, and two short questionnaires, Background Information and Literary Interests, were completed by all the consenting parents. A third questionnaire, Language Background, was completed only by the parents of the bilingual children. Details of these questionnaires (and the tests used) are described in later sections. In this section, the test sessions and the orders of presentation are described.

Eighteen measures were obtained from all the children by the author during school hours, in a private room. A summary of these measures is given in Table 9.1 and further details are provided below. The test items were administered in four sessions. Each session lasted approximately 30 minutes and there was an interval of 1 to 6 days between adjacent sessions. As in the previous experiments, children's responses to all items were recorded on answer sheets.

Animal House, a nonverbal test was given first to all the children in Session 1, as a "play-like" beginning. In Session 1 all subjects also received three verbal tests. About half (28) of the bilinguals were first given three

English verbal tests in the order Vocabulary, PPVT, and Sentences; they are labelled in Table 9.1 "Vocabulary1 (English)" and so on. These children received parallel from verbal tests in Italian in Session 2; they are labelled in Table 9.1 "Vocabulary2 (Italian)" and so on. The other half of the bilingual group received the three Italian verbal tests in Session 1, and the English verbal tests in Session 2.

In the case of the monolinguals, about half (28) first received the same set of English verbal tests as the bilingual groups: Vocabulary1 (English), PPVT1 (English), Sentences1 (English). In Session 2 they received the other set of verbal tests, also in English: Vocabulary2 (English), PPVT2 (English), Sentences2 (English). The other monolingual children received the second set of English verbal tests in Session 1, and the first set in Session 2.

In Session 2, after the three verbal tests, all children were given two nonverbal tests: Geometric Design and Block Design. In Session 3, all subjects received Thinking Creatively in Action and Movement (from which were obtained Torrance Fluency and Imagination), Word Discrimination, Word Length and Word Order Correction. In the last session, Session 4, all the children were given Word Print, Symbol Substitution, Word Reading and Verbal Fluency.

Table 9.1 Summary of the tests employed in Experiment 3

Measure	Main source	Ability	Task requirements	No. of items	Maximum raw score
1. Torrance Fluency	Torrance (1981b)	Divergent thinking	Generate ideas	3	none
2. Imagination	Torrance (1981b)	Imagination	Pretending exercises	6	30
3. Verbal Fluency	Elliot (1983a)	Divergent thinking	Generate ideas	6	none
4. Word Discrimination	Bowey, Tunmer & Pratt (1984)	Understanding of the term "word"	Judge between long and short words	16	16
5. Word Length	Papandropoulou & Sinclair (1974)	Understanding of the term "word"	Judge between long and short words	16	16
6. Word Print	Watson (1979)	Awareness of words in print	Circle words or letters	10	10
7. Symbol Substitution	Ben-Zeev (1977a, 1977b)	Awareness of arbitrary nature of language	Substitute words in sentences	10	20
8. Word Order Correction	Pratt, Tunmer & Bowey (1984)	Awareness of word order	Correct sentences	12	12
9. Animal House	Wechsler (1967)	Learning and memory	Associate coloured pegs with animals	20	70
10. Geometric Design	Wechsler (1967)	Perceptual and visual-motor organization	Copy designs from test booklet	10	28
11. Block Design	Wechsler (1967)	Perceptual and spatial organization	Reproduce designs from models	10	20
12. Word Reading	Elliot (1983a)	Reading	Read words	90	90
13. PPVT1 (English)	Dunn & Dunn (1981)	Receptive vocabulary	Select pictures for words	175	175
14. Vocabulary1 (English)	Wechsler (1967)	Expressive vocabulary	Explain meanings of words	22	44
15. Sentences1 (English)	Wechsler (1967)	Memory and comprehension	Listen to and repeat sentences	13	30
16. PPVT2 (English or Italian)	Dunn & Dunn (1981)	Receptive vocabulary	Select pictures for words	175	175
17 Vocabulary2 (English or Italian)	Wechsler (1967)	Expressive vocabulary	Explain meanings of words	22	44
18. Sentences2 (English or Italian)	Wechsler (1967)	Memory and comprehension	Listen to and repeat sentences	13	30

Details of questionnaires

A copy of the three questionnaires used in the present experiment is included in Appendix 9.1.

Background Information. This questionnaire was also used in Experiment 2 and the obtained data included children's age, length of time at preschool and at school (in months), educational level of parents, and details of any siblings (e.g., age). Educational level of parents was rated on a five-point scale (1 to 5) as in Experiment 2.

Literary Interests. This questionnaire contained eight items which were concerned with the children's activities in the home related to reading and language. Parents were required to rate each item on a five-point scale indicating whether the child engaged in the activity: (1) never; (2) sometimes; (3) often; (4) most of the time; or (5) always. The maximum possible score was 40.

Language Background. This questionnaire, which was given only to the parents of the bilingual children was based on Hoffman's (1934) Bilingual Schedule. It was mainly concerned with assessing the amount of Italian used in the home by the child. Parents were first asked to indicate whether Italian or an Italian dialect was spoken in the home, and to indicate whether the child's preferred language was: (1) only English, (2) mostly English, (3) both English and Italian, (4) mostly Italian, or (5) only Italian.

The main part of the questionnaire consisted of 19 questions. Seven questions were concerned with the amount of Italian heard by the child from

the family members and the extended family, and seven further items were concerned with the amount of Italian spoken by the child to the family members and the extended family. Each of these questions was rated using a five-point scale which indicated the extent to which English and Italian/Italian dialect were used: (1) always English; (2) mostly English; (3) both English and Italian; (4) mostly Italian; or (5) always Italian. The last five questions were concerned with additional forms of exposure to the Italian language in the home (e.g., books). These were also scored on a five-point scale indicating whether the exposure was: (1) never; (2) sometimes; (3) often; (4) most of the time; or (5) always. All 19 items were summed to give an overall index of the amount of Italian used in the home; the maximum possible score was 95.

Creativity tests

Two creativity tests were selected from those designed for 5 and 6 year olds: Thinking Creatively in Action and Movement and Verbal Fluency. Both of these were reviewed in Chapter 8. The creativity tests were administered according to the standard test instructions, and raw scores were assessed.

Torrance Fluency. This measure was obtained from three subtests in Thinking Creatively in Action and Movement (Torrance, 1981b): "How Many Ways?", "What Other Ways?", and "What Might It Be?". In each subtest the child is asked to give as many responses as s/he can, and the score is based on the total number of appropriate responses given on the three subtests.

Imagination. Imagination was assessed by a fourth subtest in Thinking Creatively in Action and Movement: "Can You Move Like?". It contains six items and each response is given a rating between 1 to 5. The overall

Imagination score is determined by adding the six ratings; the maximum possible score is 30.

Verbal Fluency. Verbal Fluency is one of the 23 scales in the British Ability Scales (Elliot, 1983a). This scale contains six items and the score is based on the total number of appropriate responses given on each, as for Torrance Fluency.

Metalinguistic tasks

The five metalinguistic tasks used in this present experiment were selected from the 10 tasks studied in Experiment 2. These were Word Discrimination, Word Length, Word Print, Symbol Substitution and Word Order Correction. Each had a moderately high loading on the factor identified as general metalinguistic awareness. In two of the tasks, Word Discrimination and Word Length, which had reliabilities less than .70, four new items were added in the hope of improving the test reliability. A copy of the two modified tasks is included in Appendix 9.2.

Additional cognitive tests

Three of the tests from the WPPSI were employed to assess nonverbal abilities: Animal House, Geometric Design, and Block Design. Word Reading (Test Form A) from the British Abilities Scales was used to assess reading achievement, and three tests were used to assess verbal abilities in English: PPVT (Form M), and Vocabulary and Sentences from the WPPSI. These tests are labelled in Table 9.1 PPVT1 (English); Vocabulary1 (English) and Sentences1 (English). For each test standard instructions were employed and raw scores were calculated.

In order to assess verbal abilities in Italian, first the alternate version of PPVT (Form L) was translated into Italian, and administered according to the standard test instructions (Dunn & Dunn, 1981). Alternate versions of Vocabulary and Sentences are not available, and so two new tests were constructed by the author. These three Italian tests are referred to in Table 9.1 as PPVT2 (Italian); Vocabulary2 (Italian) and Sentences2 (Italian). In constructing the alternate Vocabulary test, English words of equal frequency and of the same category as the words in the Vocabulary test from the WPPSI were chosen from Kucera and Francis' (1967) extensive word corpus, and these were then translated into Italian. For Sentences2 (Italian) the main vocabulary was chosen from a first grade Italian reader (Scotti, 1973) and sentences of the same length as in the WPPSI Sentences test were constructed. Scoring of the new Vocabulary and Sentences tests was based on the same criteria used in the WPPSI. The English versions of these two new tests and the alternate PPVT (Form L) were given to the monolinguals, and these are referred to in Table 9.1 as PPVT2 (English); Vocabulary2 (English) and Sentences2 (English). Copies of the three Italian tests and the English versions of the two new tests are given in Appendix 9.3.

Results and Discussion

The principal aims of the present experiment were to investigate the relationship between measures of metalinguistic awareness and measures of creativity in both bilingual and monolingual children, and to test the hypotheses generated from the Threshold Theory. However, test reliabilities were first calculated for the metalinguistic tasks and for the new measures developed for this experiment.

Test reliabilities

All reliabilities were assessed using Cronbach alpha coefficients, as in the previous experiments. These were calculated for the bilingual and the monolingual group separately, and are given in Table 9.2.

Table 9.2 Test reliabilities examined in Experiment 3

	Bilinguals (N=57)		Monolinguals (N=55)	
Measure	No. of items	Cronbach's alpha	No. of items	Cronbach's alpha
Word Discrimination	16	.71	16	.72
Word Length	16	.66	16	.74
Word Print	10	.78	10	.83
Symbol Substitution	10	.92	10	.90
Word Order Correction	12	.81	12	.79
PPVT2 (Italian or English	62	.89	87	.95
Vocabulary2 (Italian or English)	18	.94	22	.81
Sentences2 (Italian or English)	10	.80	10	.78
Literary Interests	8	.76	8	.65
Language Background	19	.88	Not appropriate	

Note: PPVT2, Vocabulary2 and Sentences2 were given in Italian to the bilinguals and in English to the monolinguals.

For both groups the metalinguistic tasks demonstrated satisfactory reliabilities, in that all coefficients were moderate to high. Four additional items were included in Word Discrimination and Word Length, in the hope of improving the test reliability. Overall, these test reliabilities were improved, in that only Word Length for the bilinguals had a coefficient less than .70.

For the new Italian and English verbal tests, the items with zero variance were not included in the total scale. These items were passed or failed by all the children, and are listed in Appendix 9.4. The reliabilities for these new verbal tests were generally very high. Test reliabilities were also calculated for the other two new scales, Literary Interests and Language Background, and these were satisfactory.

Sex differences

Differences between mean scores for boys and girls were examined in each group separately, by multivariate analysis of variance (using Hotelling's T^2) with the creativity measures, metalinguistic tasks and the other cognitive tests as the set of dependent variables. The overall effect of sex was not significant at the .05 level for either group, and only one univariate F test was significant: this was for the monolingual group, on Word Discrimination, with girls having a higher mean score (12.26 compared with 10.36); $F(1, 53)=5.64$, $p<.05$. Since the overall sex effect was not significant, and most differences were negligible, the variable was not investigated in further analyses.

Intercorrelations among the cognitive measures

Correlations were calculated among all variables included in this experiment for the monolinguals (25) and for the bilinguals (26). Since a large number of correlations was computed for each group, a preliminary check was undertaken of the overall significance of the total correlation matrix using Sakoda, Cohen and Beall's (1954) method, as in Experiment 2. In the monolingual group 187 of the 300 correlations were significant at the .05 level, whilst in the bilingual group there were 147 out of 325. For both groups, on an experiment-wide basis, this proportion has a null-hypothesis of <.01.

Of interest first is the relationship between the measures of metalinguistic awareness and the measures of creativity. Correlations among these measures are shown in Tables 9.3 and 9.4 for the monolinguals and the bilinguals, respectively. These correlations are mostly positive in both groups and some are significant at the .05 level. However the relationship is weak, as reflected by the low correlations overall.

A further method for assessing the overall relationship between the five metalinguistic awareness measures and the three creativity measures is canonical correlation analysis (Thompson, 1984). This was performed for the monolingual and bilingual groups separately, and in each case the overall relationship between the two sets of measures was not significant at the .05 level. Therefore, on the whole, the results from this experiment do not provide support for the hypothesis that there is a positive relationship between measures of metalinguistic awareness and measures of creativity.

Table 9.3 Correlations among creativity and metalinguistic measures for monolinguals in Experiment 3 (N=55)

Variable	2	3	4	5	6	7	8
1. Torrance Fluency	.20	**.39**	.04	.04	-.03	.10	-.02
2. Imagination		**.22**	.13	**.30**	.02	.08	.15
3. Verbal Fluency			-.04	.16	.11	.13	**.25**
4. Word Discrimination				**.46**	**.46**	**.33**	**.26**
5. Word Length					**.50**	**.40**	**.58**
6. Word Print						**.42**	**.31**
7. Symbol Substitution							**.31**
8. Word Order Correction							

Note: r >.21; p <.05; r >.30, p <.01 (one-tailed tests).

Table 9.4 Correlations among creativity and metalinguistic measures for bilinguals in Experiment 3 (N=57)

Variable	2	3	4	5	6	7	8
1. Torrance Fluency	**.37**	**.51**	-.01	.07	-.16	.13	.01
2. Imagination		**.40**	.08	**.29**	.13	**.29**	**.25**
3. Verbal Fluency			-.02	**.24**	.13	.16	**.22**
4. Word Discrimination				**.41**	**.44**	**.35**	**.52**
5. Word Length					**.56**	**.53**	**.54**
6. Word Print						**.42**	**.54**
7. Symbol Substitution							**.58**
8. Word Order Correction							

Note: r >.21, p <.05; r >.30, p <.01 (one-tailed tests).

For both the monolinguals and bilinguals the correlations among the five metalinguistic measures and amongst the English verbal measures, the nonverbal measures and Word Reading were generally moderate, positive and significant. Thus, the main findings of Experiment 2 were replicated here, as displayed in Tables 9.3 and 9.5 for the monolinguals; and these were extended to the bilinguals as shown in Tables 9.4 and 9.6.

A canonical correlation analysis was also conducted to examine the overall relationship between the five metalinguistic awareness measures and seven of the standard cognitive measures which were given to both groups: PPVT1 (English), Vocabulary1 (English), Sentences1 (English), Word Reading, Animal House, Geometric Design, and Block Design. An overall significant relationship was found in both the monolingual group, [T^2=5.72, F(35, 217)=6.76, p<.01], and the bilingual group, [T^2=3.81, F(35, 217)=4.71, p<.01]. In addition, for each group the canonical coefficient on the first function was high. This was .92 for the monolingual children and .88 for the bilingual children, thus indicating that there is a large degree of overlap between metalinguistic measures and the other more standard cognitive measures. This was also suggested by the results of the second factor analysis in Experiment 2.

Correlations among the three creativity measures for the monolinguals and bilinguals are given in Tables 9.3 and 9.4. They ranged from .20 to .51 and all but one was significant. The correlations among the creativity measures and the other standard cognitive measures, shown in Tables 9.5 and 9.6, were mostly low and positive, although several of these were significant, and a few correlations were high. For example, the correlation between Imagination and

Table 9.5 Correlations of the creativity and metalinguistic measures with the other cognitive measures for monolinguals in Experiment 3 (N=55)

Variable	9	10	11	12	13	14	15	16	17	18
1. Torrance Fluency	-.08	-.02	.14	.18	-.03	.17	.03	.04	-.03	.03
2. Imagination	16	.21	**.36**	-.04	**.22**	**.27**	-.08	.11	**.22**	.07
3. Verbal Fluency	.05	.18	**.27**	**.30**	.12	**.42**	.10	**.24**	.05	.05
4. Word Discrimination	**.37**	**.29**	**.24**	**.33**	**.32**	**.22**	**.37**	.16	**.33**	**.28**
5. Word Length	**.57**	**.64**	**.51**	**.49**	**.53**	**.40**	**.44**	**.40**	**.60**	**.52**
6. Word Print	**.51**	**.56**	**.42**	**.45**	**.66**	**.44**	**.47**	**.49**	**.53**	**.38**
7. Symbol Substitution	**.54**	**.39**	**.25**	**.62**	**.40**	**.47**	**.57**	**.31**	**.35**	**.35**
8. Word Order Correction	**.63**	**.55**	**.55**	**.50**	**.34**	**.52**	**.48**	**.36**	**.44**	**.28**
9. Word Reading		**.46**	**.50**	**.45**	**.51**	**.50**	**.48**	**.36**	**.42**	**.36**
10. PPVT1 (English)			**.65**	**.52**	**.71**	**.57**	**.48**	**.47**	**.55**	**.52**
11. Vocabulary1 (English)				**.48**	**.60**	**.72**	**.40**	**.31**	**.51**	**.37**
12. Sentences1 (English)					**.41**	**.57**	**.82**	**.25**	**.32**	**.27**
13. PPVT2 (English)						**.53**	**.28**	**.41**	**.37**	**.41**
14. Vocabulary2 (English)							**.57**	**.48**	**.31**	**.33**
15. Sentences2 (English)								**.23**	**.30**	**.25**
16. Animal House									**.51**	**.47**
17. Geometric Design										**.62**
18. Block Design										

Note: r >.21, p <.05; r >.30, p <.01 (one-tailed tests).

Table 9.6 Correlations of the creativity and metalinguistic measures with the other cognitive measures for the bilinguals in Experiment 3 (N=57)

Variable	9	10	11	12	13	14	15	16	17	18
1. Torrance Fluency	.08	.09	**.24**	.09	.21	.09	.16	-.03	.10	.07
2. Imagination	**.28**	**.30**	**.67**	**.43**	.07	.08	.10	**.29**	**.27**	**.23**
3. Verbal Fluency	.06	**.32**	**.37**	**.25**	.01	.05	.09	**.36**	**.24**	.17
4. Word Discrimination	**.60**	**.51**	.19	**.32**	**.23**	.10	**.28**	**.38**	**.31**	**.37**
5. Word Length	**.62**	**.42**	**.38**	**.33**	.08	.17	.13	**.27**	**.35**	**.43**
6. Word Print	**.46**	**.48**	**.31**	**.35**	-.18	-.10	-.06	**.52**	**.40**	**.50**
7. Symbol Substitution	**.72**	**.47**	**.53**	**.43**	.21	**.38**	**.29**	**.31**	**.35**	**.35**
8. Word Order Correction	**.60**	**.51**	**.38**	**.40**	**.30**	**.29**	**.41**	**.44**	**.47**	**.52**
9. Word Reading		**.48**	**.43**	**.39**	**.38**	**.45**	**.45**	**.34**	**.40**	**.47**
10. PPVT1 (English)			**.47**	**.42**	.12	.05	.13	**.54**	**.41**	**.41**
11. Vocabulary1 (English)				**.58**	-.04	.05	.08	**.35**	.21	**.31**
12. Sentences1 (English)					.01	.00	.18	**.47**	**.46**	**.31**
13. PPVT2 (Italian)						**.55**	**.67**	.04	.09	.07
14. Vocabulary2 (Italian)							**.73**	-.01	.17	**.23**
15. Sentences2 (Italian)								.15	.21	**.22**
16. Animal House									**.44**	**.53**
17. Geometric Design										**.52**
18. Block Design										

Note: $r > .21$, $p < .05$; $r > .30$, $p < .01$ (one-tailed tests).

Vocabulary1 (English) in the bilingual group was .67. Canonical correlation analysis was again employed, in this case to examine the overall relationship between the three creativity measures and the seven standard cognitive measures which were examined above with respect to the metalinguistic awareness measures. An overall significant relationship was found only in the bilingual group [T^2=1.29, F(21, 137)=2.80, p<.01], and the canonical coefficient on the first function was moderately high, .72.

In the bilingual group (see Table 9.6) 13 of the 21 possible correlations among the three creativity measures and the seven cognitive measures were significant at the .05 level, whilst in the monolingual group there were only five significant correlations (see Table 9.5). Previous studies which have investigated the relationship between creativity (as assessed by divergent thinking tests) and intelligence (as assessed by general tests of intelligence such as the WPPSI) have also reported varying degrees of overlap between these two constructs. Correlations range from .60 to -.40, with a median of .20 (Torrance, 1967, 1974a). Low positive, or near zero and negative correlations have usually been found in more homogeneous samples, particularly those of high intellectual ability whilst moderate and positive correlations have been found in more heterogeneous samples (Yamamoto, 1965; Cropley, 1966; Lovell & Shields, 1967; Aliotti, Britt, & Haskins, 1975; Richards, 1976; Rump, 1979; Schmitz, 1981; Zarnegar, Hocevar & Michael, 1988; Esquivel & Lopez, 1988).

On the whole, the monolingual group in this experiment was a more homogeneous group as compared to the bilingual group, in that, the between-subject variation as indicated by the standard deviations (see Tables 9.7 and

9.8) for the majority of measures in the monolingual group were lower. For example, on PPVT1 (English) the standard deviation for the monolingual group was 14.61 as compared with 17.67 in the bilingual group. This may explain the overall significant relationship between the measures of creativity and the other cognitive measures which was found in the bilingual group but not in the monolingual group.

Of further interest in the bilingual group are the correlations among the three Italian verbal measures and all the cognitive measures. As shown in Table 9.6, the Italian verbal measures correlated positively and significantly with some of the other measures, in particular, Word Discrimination, Symbol Substitution, Word Order Correction, Word Reading, and Block Design. Three further canonical correlation analyses were conducted to examine the overall relationship between the Italian verbal measures, and the other sets of measures, that is, the metalinguistic awareness measures, the creativity measures and the other standard cognitive measures. The first assessed the relationship between the three Italian verbal measures and the five metalinguistic awareness measures. Overall this relationship was significant, [T^2=.80, F(15, 143)=2.55, p<.01]; and the canonical coefficient for the first function was moderate, .61, thus indicating that there is a substantial degree of overlap between these two sets of measures. On the other hand, canonical correlation analysis revealed that there is no overall significant relationship between the Italian verbal measures and the creativity measures, nor is there an overall significant relationship between the Italian verbal measures and the other standard cognitive measures.

Overall, the relationship between the metalinguistic awareness and the creativity measures was nonsignificant. On the other hand, there was a large degree of overlap between the metalinguistic awareness and the other standard cognitive measures, as found in Experiment 2. Furthermore, there was a significant relationship between the creativity measures and the other standard cognitive measures in the bilingual group, who on the whole were a less homogeneous group than the monolinguals. These findings are broadly consistent with previous studies which have found varying degrees of correlation between measures of creativity and other intellectual abilities.

Intercorrelations among the cognitive and background measures

The correlations among the cognitive and the background measures examined in this experiment are given in Tables 9.7 and 9.8 for each of the two groups. First it may be noted that in both groups, the metalinguistic measures and the majority of the other cognitive measures correlated moderately, positively and significantly with age and length of time at school, as was found in Experiment 2. Several of these measures also correlated positively and significantly with length of time at preschool which was not found in Experiment 2. On average, the children in the present experiment had spent about the same amount of time at preschool as the children in the previous experiment, but the between-subject variation was greater for this experiment (the standard deviation for length of time at preschool in Experiment 2 was 4.33 months whilst in this experiment it was 7.27 and 7.22 months for the monolingual and the bilingual groups, respectively). Summary statistics on all variables examined in the present experiment are also given in Tables 9.7 and 9.8.

Table 9.7 Correlations among the cognitive and background measures for monolinguals in Experiment 3 (N=55)

Variable	19	20	21	22	23	24	25	Mean	SD
1. Torrance Fluency	-.14	.19	-.12	.17	.04	-.07	**.30**	20.18	10.43
2. Imagination	-.05	.09	.07	.07	.06	.04	.11	15.93	3.12
3. Verbal Fluency	.12	.11	.18	.02	.03	-.08	.08	19.01	5.15
4. Word Discrimination	.07	-.08	**.26**	.11	**.34**	.01	**.32**	11.29	3.10
5. Word Length	.17	**.39**	**.30**	**.44**	**.45**	.17	**.32**	11.09	3.29
6 Word Print	**.32**	**.38**	**.32**	.14	**.28**	-.12	**.22**	5.36	3.08
7. Symbol Substitution	.14	.17	.19	**.39**	**.38**	-.27	.08	3.93	4.62
8. Word Order Correction	**.32**	**.26**	**.35**	**.25**	**.30**	.03	.09	5.27	2.90
9. Word Reading	**.29**	**.25**	**.38**	.21	**.40**	-.21	.09	9.44	13.02
10. PPVT1 (English)	**.22**	**.28**	**.24**	**.49**	**.53**	-.02	**.29**	69.06	14.61
11 Vocabulary1 (English)	.21	**.38**	**.32**	**.33**	**.52**	-.18	**.35**	13.66	5.20
12. Sentences1 (English)	.20	**.29**	**.23**	**.43**	**.40**	-.15	**.31**	16.38	6.03
13. PPVT2 (English)	.20	.17	**.31**	**.34**	**.47**	-.14	**.39**	66.09	13.61
14. Vocabulary2 (English)	.14	**.30**	.13	**.41**	**.57**	**-.30**	**.22**	17.69	6.50
15. Sentences2 (English)	.20	**.26**	.17	**.38**	**.46**	-.05	.09	16.75	6.07
16. Animal House	.20	**.26**	.19	.11	.18	-.08	**.20**	47.33	10.94
17. Geometric Design	**.27**	**.50**	**.23**	.19	**.35**	.11	**.26**	10.27	3.71
18. Block Design	.11	**.26**	.14	**.35**	**.39**	-.16	**.37**	13.53	3.57
19. Age		**.24**	**.75**	.02	-.06	-.09	-.09	5.55	.33
20. Length of time at preschool			.05	**.26**	**.29**	.10	.11	12.69	7.27
21. Length of time at school				.00	-.12	**-.22**	-.01	5.56	2.71
22. Mother's education					**.61**	-.03	**.24**	3.13	1.35
23. Father's education						-.12	.18	3.28	1.26
24. Birth order							-.07	1.53	.50
25. Literary Interests								24.13	4.30

Note: $r > .21$, $p < .05$; $r > .30$, $p < .01$ (one-tailed tests).

Table 9.8 Correlations among the cognitive and background measures for bilinguals in Experiment 3 (N=57)

Variable	19	20	21	22	23	24	25	26	Mean	SD
1. Torrance Fluency	-.07	.09	-.10	.07	-.02	.01	.04	.00	21.12	12.17
2. Imagination	.14	.21	.09	-.03	.12	.00	.05	-.18	15.54	3.38
3. Verbal Fluency	.03	**.23**	.05	.04	.17	-.02	.03	**-.35**	20.35	6.83
4. Word Discrimination	**.49**	-.04	**.56**	-.07	-.13	-.08	-.05	-.09	10.91	3.19
5. Word Length	**.40**	.03	**.46**	.10	.12	-.12	-.15	**-.35**	10.29	3.07
6. Word Print	**.37**	-.15	**.41**	-.06	-.02	-.06	-.06	**-.43**	4.44	2.71
7. Symbol Substitution	.17	.13	**.24**	.20	.15	**-.22**	-.20	-.21	3.25	4.56
8. Word Order Correction	**.31**	-.02	**.42**	.09	.07	-.14	-.10	**-.22**	5.49	3.10
9. Word Reading	**.26**	.02	**.37**	**.26**	.03	-.12	-.09	-.08	10.46	13.32
10. PPVT1 (English)	**.41**	.05	**.37**	.10	.14	**-.24**	-.19	**-.40**	59.51	17.67
11. Vocabulary1 (English)	.16	.11	.09	.04	.11	.02	.03	**-.30**	13.14	5.86
12. Sentences1 (English)	**.49**	.08	**.30**	-.03	-.07	.02	.01	-.10	13.07	4.97
13. PPVT2 (Italian)	.02	.08	.01	.19	-.14	-.09	-.06	**.35**	11.51	8.70
14. Vocabulary2 (Italian)	-.06	**.36**	.04	**.27**	-.04	-.13	-.11	**.31**	.97	3.43
15. Sentences2 (Italian)	.21	**.22**	.01	.18	-.12	-.07	-.06	**.24**	4.28	3.04
16. Animal House	**.41**	.07	**.32**	.08	.14	-.11	-.08	**-.27**	47.40	12.89
17. Geometric Design	**.42**	-.03	**.39**	.16	.14	-.06	.00	**-.24**	10.81	4.15
18. Block Design	.20	.09	**.24**	.04	.03	-.01	.03	-.09	12.97	3.74
19. Age		.01	**.81**	**-.25**	-.21	-.10	-.05	-.14	5.68	.30
20. Length of time at preschool			-.11	-.07	-.16	-.08	-.03	-.19	13.25	7.22
21. Length of time at school				-.13	-.04	-.12	-.03	**-.25**	6.46	3.00
22. Mother's education					**.49**	-.20	**-.23**	-.10	2.58	.98
23. Father's education						**-.23**	**-.24**	**-.33**	2.68	1.31
24. Birth order							-.02	.18	1.54	.50
25. Literary Interests								**.28**	23.83	4.89
26. Language Background									42.98	13.26

Note: $r > .21$, $p < .05$, $r > .30$, $p < .01$ (one-tailed tests).

Several of the cognitive measures were found to correlate positively and significantly with parents' level of education in the case of the monolinguals, as was found in Experiment 2. In addition for the monolingual group several of the cognitive measures, including three of the metalinguistic tasks also correlated positively and significantly with Literary Interests, which assessed children's activities in the home that are related to reading and language. These data offer some support for the contention of Hakes (1982) and Van Kleeck (1982) that literary activities are viewed as positive and enriching for the development of metalinguistic awareness. In addition, the results from this experiment suggest that literary activities may be viewed as positive and enriching for cognitive development generally.

Parental education and Literary Interests correlated positively and significantly with several of the cognitive measures in the monolingual group, but this pattern of results was not found in the bilingual group. In the bilingual group very few of the cognitive measures correlated significantly with mother's level of education, father's level of education and Literary Interests as shown in Table 9.8. A similar finding has also been found by Cahill (1987) with a group of Italian-English bilinguals aged 10 years; Cahill found that parental education was not related to children's listening, speaking, reading or writing skills which were assessed in both Italian and English.

One further background variable, which was examined in both groups was birth order. A number of studies reviewed in Chapter 8 have found that first born children perform significantly better than later-borns on divergent thinking tests. In this experiment children were classified as either first born

or later-born and family size was employed as a covariate. The correlations between this index of birth order and the other measures are given in Tables 9.7 and 9.8, and on the whole these correlations were low and nonsignificant. Thus no support was found for the view that birth order is related to creativity as assessed by divergent thinking tests.

A number of previous studies reviewed in Chapter 8 have further found an effect for SES on divergent thinking tests, in favour of children from high or middle SES backgrounds. However, in both groups studied here, no evidence was found for a significant relationship between creativity and parental education, which was used as an index of SES. Overall these correlations were very low.

The last background variable included in this study was appropriate only for the bilingual group, that is, Language Background, which assessed the amount of Italian used in the home. As shown in Table 9.8, Language Background correlated positively and significantly with each of the Italian verbal measures. However, Language Background correlated negatively and significantly with several of the other cognitive measures: Verbal Fluency, Word Length, Word Print, PPVT1 (English), Vocabulary1 (English), Animal House and Geometric Design. Trends for most of the other correlations were similar. Therefore, these results indicate that the more Italian used in the home then the poorer the children's performance was overall.

The bilinguals who used Italian to a greater extent in the home may have performed better on all tests if these had been given to them in Italian, which may be considered their more dominant language. It may also be case, that

these bilinguals had not attained a high proficiency in either of their languages for which the Threshold Theory does predict an overall poor performance on cognitive tests. Further analyses were specifically conducted to examine differences between bilinguals and monolinguals with varying degrees of proficiency in each of the respective languages. These are reported in the next section.

Overall, the significant background correlates of several of the cognitive measures in both groups were age, length of time at preschool and length of time at school. In addition, parental education and Literary Interests emerged as significant background correlates in the monolingual group, whilst in the bilingual group Language Background correlated significantly but negatively with the majority of the cognitive measures.

Group differences

In order to test the hypotheses generated from the Threshold Theory, both the monolinguals and bilinguals were divided into subgroups. First they were divided into subgroups of those high and low English proficiency on the basis of a median split. The three English verbal tests, PPVT1 (English), Vocabulary1 (English) and Sentences1 (English) were used to assess English proficiency and raw scores on each of these tests were converted to z-scores. These three z-scores were then summed and the totals were converted to T-scores. Both bilinguals and monolinguals with T-scores greater than the median (51.28) were classified as high on English proficiency, whilst the others were classified as low on English proficiency. This type of group division based on the median score for bilingual and monolingual children has also been used by Aronsson (1981), Diaz (1985a) and Bialystok (1988a).

The bilinguals were further divided into subgroups of those high and low on Italian proficiency using the same procedure as for English proficiency, but with the three Italian verbal tests: PPVT2 (Italian), Vocabulary2 (Italian) and Sentences2 (Italian). Bilinguals with an Italian T-score greater than the median (47.90) were classified as high on Italian proficiency, whilst the others were classified as low on Italian proficiency. Therefore, six linguistic subgroups were defined, and for simplicity these are henceforth called "groups". Group 1 consisted of 33 monolinguals high on English proficiency; Group 2 consisted of 22 monolinguals low on English proficiency; Group 3 consisted of 12 bilinguals high on both English and Italian proficiency; Group 4 consisted of 11 bilinguals high on English proficiency and low on Italian proficiency; Group 5 consisted of 15 bilinguals low on English proficiency and high on Italian proficiency; and Group 6 consisted of 19 bilinguals low on both English and Italian proficiency.

The mean English T-score for each of the six groups, and the mean Italian T-score for each of the four bilingual groups are given in Table 9.9. Included in this table are also the group means on the background variables which correlated significantly with several of the cognitive measures, that is, age, length of time at preschool, length of time at school, mother's education, father's education, and Literary Interests. These six background variables were employed as covariates in the subsequent analyses, so that any group differences found on the cognitive measures could not be attributed to any differences on the background variables.

Table 9.9 Summary statistics for the six groups in Experiment 3

Variable	Group 1 (N=33)		Group 2 (N=22)		Group 3 (N=12)		Group 4 (N=11)		Group 5 (N=15)		Group 6 (N=19)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
English T-score	59.06	5.38	42.81	5.63	58.22	6.23	56.37	4.28	41.13	5.89	40.71	5.74
Italian T-score	Not appropriate				59.18	16.99	45.27	2.59	52.51	6.24	44.96	2.13
Age	5.70	.33	5.61	.33	5.81	.23	5.73	.23	5.65	.37	5.60	.32
Length of time at preschool	15.06	6.53	9.14	6.99	14.00	8.99	13.36	3.11	15.47	7.76	10.95	7.10
Length of time at school	5.91	2.75	5.05	2.63	7.08	2.23	7.09	2.63	6.07	3.85	6.00	2.98
Mother's education	3.72	1.31	2.23	.69	2.83	1.12	2.55	.93	2.67	1.11	2.37	.83
Father's education	3.79	1.14	2.50	.96	3.00	1.48	2.91	1.45	2.27	1.22	2.68	1.20
Literary Interests	25.21	4.09	22.50	4.18	23.92	2.61	26.00	5.92	22.93	3.73	23.21	5.99
Torrance Fluency	21.94	10.88	17.55	9.35	29.00	15.66	15.91	6.07	21.40	11.58	18.95	11.09
Imagination	16.36	3.19	15.27	2.96	18.67	2.90	16.73	2.57	13.27	2.40	14.68	3.11
Verbal Fluency	20.15	5.22	17.32	4.65	23.25	5.97	22.73	4.84	19.93	7.82	17.47	6.68
Word Discrimination	11.97	3.11	10.27	2.85	12.08	3.12	11.64	1.96	11.13	3.93	9.58	2.91
Word Length	12.73	2.32	8.64	3.02	11.92	3.09	11.91	2.81	9.20	3.03	9.21	2.51
Word Print	6.52	2.90	3.64	2.52	4.83	2.41	6.36	2.46	3.20	2.24	4.05	2.86
Symbol Substitution	5.49	4.91	1.59	2.92	7.08	6.01	6.09	4.55	.93	1.79	1.00	2.00
Word Order Correction	6.52	2.57	3.41	2.32	8.25	2.09	6.45	2.42	4.67	2.53	3.84	3.15
Word Reading	13.64	14.66	3.14	6.24	20.92	21.10	14.36	7.49	5.53	9.40	5.47	7.18
Animal House	50.52	6.11	42.55	14.51	52.58	4.36	55.09	3.62	45.27	14.51	41.53	15.49
Geometric Design	11.88	3.32	7.86	2.90	14.75	3.25	10.36	2.91	10.40	4.22	8.89	3.74
Block Design	15.24	2.50	10.95	3.43	14.75	4.31	13.27	3.47	12.87	3.07	11.74	3.80

Planned comparisons were conducted to examine differences among the groups on the dependent cognitive measures. These were chosen such that they were both relevant to the theoretical questions of this experiment and independent of each other. In this way, each comparison gave some nonredundant and unrelated information to that provided by the others. On the other hand, if nonindependent comparisons were to be employed then the interpretation of results would be more difficult, as explained by Hay (1963, p. 472):

"One really has no simple way to tell how many of the significant results are due to chance alone, to the circumstance that several tests were carried out on the same data, or, most important, to the circumstances that some results dictate others".

The difficulties described by Hay are minimised if independent comparisons are employed. However, if independent comparisons are employed, only a finite number are possible, and this is always one less than the number of sample groups (Hay, 1963). Thus, in the present case no more than five comparisons can be framed which are completely independent of each other, although different sets of five mutually independent comparisons can be found. One such set of planned comparisons which met this criterion of "independence" and which addressed the main research questions of interest was examined here. In addition, for each of the five planned comparisons, a multivariate analysis of variance using Hotelling's T^2 was conducted first, as a check of the overall significance with 12 dependent measures. The dependent measures were: Torrance Fluency, Imagination, Verbal Fluency, Word Discrimination, Word Length, Word Print, Symbol Substitution, Word Order Correction, Word Reading, Animal House, Geometric Design and Block Design.

Group means on these measures are also given in Table 9.9.

The first planned comparison examined the performance of Group 3 in relation to Groups 1 and 4. On the basis of the Threshold Theory, it was predicted that Group 3 would perform significantly better than the other groups. The bilinguals in Group 3 had attained high levels of proficiency in both languages, whilst Groups 1 and 4 had attained high levels in only English. In addition, Group 5 was not included in this analysis because it consisted of bilinguals who had attained a high level of proficiency in Italian, but they were tested in English.

An overall significant difference was found on the first planned comparison ($\underline{T}^2$=.35 $\underline{F}$(12, 89)=2.61, $\underline{p}$<.01), and further tests revealed significant differences in favour of Group 3 on five of the dependent measures, Torrance Fluency, Imagination, Word Order Correction, Word Reading and Geometric Design, as shown in Table 9.10. Group 3 (see Table 9.9) also scored higher than both Groups 1 and 4 on Verbal Fluency, Word Discrimination, and Symbol Substitution, but these differences did not reach statistical significance. Group 3 only performed significantly less well than Groups 1 and 4, on one measure, Word Print.

Table 9.10 Planned Comparison I in Experiment 3: Group 3 vs Groups 1 and 4

Measure	t(100)	p
Torrance Fluency	2.82	<.01
Imagination	2.12	<.05
Verbal Fluency	.89	n.s.
Word Discrimination	.25	n.s.
Word Length	-.40	n.s.
Word Print	-2.12	<.05
Symbol Substitution	1.12	n.s.
Word Order Correction	1.97	<.05
Word Reading	1.89	<.05
Animal House	-.19	n.s.
Geometric Design	3.19	<.01
Block Design	.56	n.s.

Note: All tests for this comparison are one-tailed, since it was predicted that Group 3 would perform significantly better than both Groups 1 and 4.

The second planned comparison examined the performance of Group 1 in relation to Group 4. The children in both of these groups had attained a high level of proficiency in only English, and on the basis of the Threshold Theory it was predicted that these two groups would not differ significantly from each other. As expected, no overall significant difference was found for this analysis [T^2=.17, $F(12, 89)$= 1.23, p>.05], and nor were any of the univariate analyses significant at the .05 level, as shown in Table 9.11.

Table 9.11 Planned Comparison II in Experiment 3: Group 3 vs Group 4

Measure	t(100)	p
Torrance Fluency	-1.38	n.s.
Imagination	.33	n.s.
Verbal Fluency	.98	n.s.
Word Discrimination	-1.24	n.s.
Word Length	-.80	n.s.
Word Print	-.61	n.s.
Sybmol Substitution	.87	n.s.
Word Order Correction	-.46	n.s.
Word Reading	.13	n.s.
Animal House	1.11	n.s.
Geometric Design	-1.33	n.s.
Block Design	-1.81	n.s.

Note: All tests for this comparison are two-tailed, since no differences were predicted.

The third planned comparison examined the performance of Groups 1, 3 and 4 in relation to Groups 2, 5 and 6. It was predicted that Groups 1, 3 and 4 would perform significantly better than the other three groups because the children in these groups had all attained a high level of proficiency in English, whilst the other three groups had not. This prediction is also consistent with the Theshold Theory, and as expected, an overall significant difference was found [T^2=.67, $F(12, 89)$= 4.96, $p<.01$]. Further univariate tests, indicated that the performance of Groups 1, 3 and 4 was significantly superior to Groups 2, 5 and 6 on all but one of the eleven dependent measures, Torrance Fluency, as shown in Table 9.12.

Table 9.12 Planned Comparison III in Experiment 3: Groups 1, 3 and 4 vs Groups 2, 5 and 6

Measure	t(100)	p
Torrance Fluency	1.48	n.s.
Imagination	4.19	<.01
Verbal Fluency	2.72	<.01
Word Discrimination	1.66	<.05
Word Length	3.95	<.01
Word Print	3.23	<.01
Symbol Substitution	4.64	<.01
Word Order Correction	4.79	<.01
Word Reading	3.10	<.01
Animal House	2.93	<.01
Geometric Design	3.15	<.01
Block Design	2.61	<.01

Note: All tests for this comparison are one-tailed since it was predicted that Groups 1, 3 and 4 would perform significantly better than Groups 2, 5 and 6.

The fourth planned comparison was concerned with the performance of Group 2 in relation to Group 6. No prediction was made about the performance of these two groups for the Threshold Theory has little to say about the performance of those bilinguals who have attained a low level of proficiency in both languages as compared with monolinguals who have attained an equally low level of proficiency in their one language. The results here indicated that there were no significant differences between the two groups either overall [T^2=.07, $F(12, 89)$=.49, p>.05], or on any of the individual univariate tests as shown in Table 9.13.

Table 9.13 Planned Comparison IV in Experiment 3: Group 2 vs Group 6

Measure	t(100)	p
Torrance Fluency	-.34	n.s.
Imagination	.95	n.s.
Verbal Fluency	.20	n.s.
Word Discrimination	1.28	n.s.
Word Length	.09	n.s.
Word Print	-.26	n.s.
Symbol Substitution	-.05	n.s.
Word Order Correction	.97	n.s.
Word Reading	.08	n.s.
Animal House	.41	n.s.
Geometric Design	-.64	n.s.
Block Design	-.40	n.s.

Note: All tests for this comparison are two-tailed since no prediction was made.

The fifth and final planned comparison examined the performance of Group 5 in relation to Groups 2 and 6. All three groups had attained a low level of proficiency in English, but Group 5 had attained a high level of proficiency in at least one of their languages, that is, Italian. Therefore, it was of interest to examine if Group 5 differed significantly from Groups 2 and 6 on any of the other measures. An overall significant difference was found [T^2=.26, $F(12, 89)$=1.90, p<.05], but only one of the univariate tests was significant; this revealed that Group 5 performed significantly less well than Groups 2 and 6 on Imagination, as shown in Table 9.14.

Table 9.14 Planned Comparison V in Experiment 3: Group 5 vs Groups 2 and 6

Measure	t(100)	p
Torrance Fluency	.54	n.s.
Imagination	-2.18	<.01
Verbal Fluency	1.17	n.s.
Word Discrimination	1.66	n.s.
Word Length	-.32	n.s.
Word Print	-.91	n.s.
Symbol Substitution	-.80	n.s.
Word Order Correction	1.15	n.s.
Word Reading	-.21	n.s.
Animal House	.41	n.s.
Geometric Design	1.76	n.s.
Block Design	1.30	n.s.

Note: All tests for this comparison are two-tailed since no prediction was made.

On the whole, the results from this experiment are consistent with the Threshold Theory, for an overall bilingual superiority on the cognitive measures was found only for those children who had attained a high degree of proficiency in both Italian and English. A bilingual superiority was not found for those bilinguals who were high on English but low on Italian, or for those bilinguals who were low on both English and Italian. These results are discussed further in Chapter 11, after a report of Experiment 4 is given.

CHAPTER 10 EXPERIMENT 4: METALINGUISTIC AWARENESS AND CREATIVITY IN ITALIAN-ENGLISH BILINGUAL CHILDREN AND ITALIAN SPEAKING MONOLINGUAL CHILDREN, FROM ROME

The present experiment was designed to investigate further the hypotheses examined in Experiment 3, with a sample of bilingual and monolingual children from Rome. It was essentially a replication of Experiment 3, in that, the same cognitive and background measures were employed, and children were 5 or 6 years old. In addition, the two languages of the bilinguals were kept constant, and it was possible to investigate if the results obtained in the previous experiment with South Australian bilinguals and monolinguals would be replicated in a different country where Italian and not English is the national language. Therefore, for this experiment Italian-English bilinguals were compared to Italian monolinguals.

Method

Subjects

The subjects were 35 Italian-English bilingual children (15 boys and 20 girls) and 35 Italian monolingual children (19 boys and 16 girls). Five children from the initial sample did not complete all the tasks due to frequent absences from school, and thus were not included in the analyses. The bilingual children were drawn from kindergarten (first year of primary school) and grade 1 classes from six "English" schools and one Italian-English bilingual school in Rome or the surrounding regions. The monolingual children were drawn from two Italian public preschools and grade 1 classes in two Italian public primary schools, also from the Rome area.

The Italian monolinguals from the preschools were 5 years old, as were the bilinguals from the kindergarten classes. Furthermore, the monolingual preschoolers were completing their final year at preschool, and during this final year literacy training begins (A.M. Marinelli, personal communication, October 12, 1988). Therefore, this final year of preschool for the monolinguals was considered comparable to kindergarten, and it was taken to be their first year of schooling.

Monolinguals and bilinguals from the grade 1 classes were mostly 6 years old but there were a few 5 year olds in both groups. The mean age for the bilinguals was 5 years 10 months (SD=6 months), and the mean age for the monolinguals was 5 years 11 months (SD=6 months).

Arrangements for testing

As in Experiment 3, parental consent was obtained for the children to take part, and the same questionnaires were completed by consenting parents. These questionnaires were translated into Italian by the author, as were most of the other test items. The details are given below.

Eighteen measures were also obtained from the bilinguals in this experiment, and all test items were administered in four sessions using the same format as in Experiment 3. For the majority (27) of the bilnguals the main language of testing was Italian, and all test items (except for the three English verbal tests) were given to them in Italian. For the other bilinguals (8), whose dominant language was English (as indicated by their parents in the Language Background questionnaire), all test items except for the Italian verbal tests were administered to them in English.

In this experiment 15 measures were obtained from the monolingual children and all tests were given in Italian. The monolinguals were given the same tests as the bilinguals, except for the English set of verbal tests: PPVT1 (English), Vocabulary1 (English), and Sentences1 (English). Since fewer tests were given to the monolinguals in this experiment, it was possible to administer all items in three sessions. Session 1 was the same as for the bilinguals, in which the children were given Animal House, Vocabulary2 (Italian), PPVT2 (Italian), and Sentences2 (Italian). In Session 2 they were given Geometric Design, Block Design, Thinking Creatively in Action and Movement, Word Discrimination and Word Length. In the last session, they received Word Order Correction, Word Print, Symbol Substitution, Word Reading and Verbal Fluency.

Each session for both bilinguals and monolinguals lasted approximately 30 minutes and there was an interval of 1 to 6 days between adjacent sessions. All children were tested by the author during school hours, in a private room, and children's responses to all test items were recorded on answer sheets.

Details of questionnaires

The three quetionnaires employed in Experiment 3 were translated into Italian by the author. Modifications were made to one item in Background Information concerning parents' level of education, since the educational system in Italy differs slightly from the one in South Australia. In Italy there are generally five years of primary school, three years of junior high school and five years of senior high school. In South Australia there are generally eight years of primary school and five years of secondary school. In the modified questionnaire, parents were asked simply to state the highest level of

education attained and this information was then coded on a five-point scale which parallelled the scale used in the previous experiments: (1) only primary school; (2) senior high school not completed; (3) senior high school completed or obtained technical qualifications, but had not attained entry into university; (4) obtained entry into university; or (5) obtained tertiary qualifications.

No modifications were made to Literary Interests. However, Language Background in this experiment addressed the amount of English used in the home by the child, and questions from the previous questionnaire were modified to meet this purpose.

A copy of the modified questionnaires, Background Information and Language Background in English and Italian, and a copy of Literary Interests in Italian are given in Appendix 10.1.

Creativity tests

Thinking Creatively in Action and Movement, and Verbal Fluency (Test Form B) from the British Ability Scales were translated into Italian by the author. No modifications were made. A copy of these translations is given in Appendix 10.2.

Metalinguistic tasks

The Italian metalinguistic tasks were based as closely as possible on the English versions. However, the nature of some items had to be changed in three tasks due to differences between the two languages. The author was helped by Dr. M. A Pinto (University of Rome, "La Sapienza") who is currently developing a test battery for assessing a wide range of metalinguistic abilities

in the upper primary and the secondary school grades (Cito, 1987; Carlucci, 1988; Ottavi, 1988).

First, in the Italian version of Word Discrimination, all items contained three syllables and these were either single words or two-word phrases. In the English version all items were also single words or two-word phrases but each item contained only two syllables. It was necessary to change the syllable criterion in the Italian version since there are few single syllable words in Italian which could be used for two-word phrases. Nine of the original English items when translated into Italian gave three-syllable items (Items 1, 3, 4, 7, 10, 12, 13, 15, and 16) and these were retained. The other seven items of the task in Italian contained more than three syllables and these were replaced by new three-syllables items.

For Word Length, 12 of the original items in Italian met the requirements of the task (Items 2, 4, 6, 7, 8, 9, 10, 11, 13, 14, 15, and 16). Each item had to be of the same type as in the English version, which included: (a) short words with long referents, (b) long words with short referents, (c) short words with no referents, and (d) long words with no referents. The four items which did not meet these requirements were replaced by new items.

Last, modifications were made to Word Order Correction since six of the English ungrammatical sentences when translated into Italian were grammatically acceptable (Items 1, 2, 4, 8, 10, and 12). The items included in the Italian version of Word Order Correction were modelled as closely as possible on the items from the English version, and they were of the same length. Furthermore, this task contained three types of ungrammatical

sentences and there were four of each type, as in the original (described in Chapter 5).

The first type of ungrammatical sentence concerned the position of adjectives. Certain adjectives in Italian precede nouns and only these types were included in the task. As in the English version, the order of adjective-noun was changed to noun-adjective.

The second type of ungrammatical sentence concerned negation. These sentences also paralleled those in the English version. However, in Italian, the negator, "not" (non) precedes the verb, and the order of negator-verb was changed to verb-negator.

The third type of ungrammatical sentences in the English version concerned the order of the verb in relation to the subject and the object: the order of subject-verb-object was changed to subject-object-verb. This modification of word order could not be used for the Italian version because similar changes to Italian word order would not render sentences ungrammatical. On the whole, the position of the verb, subject and object is more flexible in Italian than it is in English (Bates, 1976, 1979). Thus a different type of ungrammatical sentence was included which concerned the position of articles. In these sentences the verb and not the article preceded the noun (e.g., Dad the washes car).

Word Print and Symbol Substitution were also translated into Italian, and no modification was necessary. A copy of each of the metalinguistic tasks in Italian is given in Appendix 10.3.

Additional cognitive tests

The verbal tests were those which had been used in Experiment 3: PPVT1 (English), Vocabulary1 (English), Sentences1 (English), PPVT2 (Italian), Vocabulary2 (Italian), and Sentences2 (Italian). The same nonverbal tests were also used in this experiment: Animal House, Geometric Design and Block Design. These have been translated into Italian and published by Organizzazioni Speciali (Wechsler, 1973). The last test, Word Reading (Test Form A), from the British Ability Scales was translated into Italian by the author and a copy is given in Appendix 10.4.

Results and Discussion

Test reliabilities

In this experiment test reliabilities were calculated for the majority of tests which had been either translated into Italian from the English originals or modified as appropriate. These were calculated for the bilingual and the monolingual group separately, as in Experiment 3, using Cronbach alpha coefficients. The reliabilities of only two of the translated tests were not assessed: Animal House and Torrance Fluency.

The reliability of the Animal House was not computed because it is a speed test, and therefore Cronbach's method is not appropriate. Wechsler (1967, p. 21) has used the test-retest method "in order to obtain proper reliability data" for Animal House, and it was found to be satisfactory (.68). On the other hand, the reliability of Torrance Fluency was not assessed because it contained too few items (3). The reliability coefficient reported by Torrance (1981b) for Torrance Fluency is also based on the test-retest method, and it is very satisfactory (.96).

Some items with zero variance were found in PPVT2 (Italian), Sentences2 (Italian), Block Design and Word Reading. These items are listed in Appendix 10.5, and they were not culled from the total scales in either group unless they were passed or failed by all the children. In this way the scales had an equal number of items for both groups.

In addition, some items were found to correlate negatively with the total scale for Word Length in the bilingual group and for Word Print and Literary Interests in the monolingual group. These items are also listed in Appendix 10.5. In order to improve the test reliabilities and to have equal-item scales, the "poor" items were deleted from the relevant scales in each group. All subsequent analyses were conducted with the modified scales.

The number of "valid" items remaining in the scales and the test reliabilities for both groups are given in Table 10.1. On the whole, they were satisfactory and generally high. Only the reliability for Literary Interests in the monolingual group was unsatisfactory.

Table 10.1 Test reliabilities examined in Experiment 4

Measure	No. of items	Cronbach's alpha	
		Bilinguals (N=35)	Monolinguals (N=35)
Imagination	6	.82	.73
Verbal Fluency	6	.71	.65
Word Discrimination	16	.69	.80
Word Length	13	.62	.60
Word Print	9	.82	.81
Symbol Substitution	10	.92	.96
Word Order Correction	12	.87	.86
Word Reading	90	.99	.99
PPVT2 (Italian)	125	.98	.96
Vocabulary2 (Italian)	22	.85	.72
Sentences2 (Italian)	12	.87	.79
Geometric Design	10	.82	.82
Block Design	9	.88	.77
Literary Interests	6	.63	.44
Language Background	19	.96	not appropriate

Sex differences

Differences between mean scores for boys and girls were examined in each group separately as in Experiment 3, by multivariate analysis of variance (using Hotelling's T^2) with all the cognitive measures as the set of dependent variables. The overall effect of sex was not significant at the .05 level for either group, and only one univariate F test was "significant" in each group. In the monolingual group the girls performed significantly better on Geometric Design (13.00 compared with 9.79); $F(1, 33)=5.52$, $p<.05$. Whilst in the bilingual group the boys performed significantly better on Sentences1 (English) (11.53 compared with 7.40); $F(1, 33)=5.18$, $p<.05$. Since the overall sex effect was not significant, and most differences were negligible, the variable was not investigated in further analyses.

Correlations among the cognitive measures

Correlations were calculated among all variables for each group, and a preliminary check was undertaken of the overall significance of the total correlation matrix as in Experiments 2 and 3. In the monolingual group 140 of the 241 correlations were significant at the .05 level, whilst in the bilingual group there were 133 out of 325. For both groups, on an experiment-wide basis, this portion has a null-hypothesis of <.01.

The correlations among the measures of metalinguistic awareness and the measures of creativity are presented for the monolinguals and the bilinguals in Tables 10.2 and 10.3, respectively. In the monolingual group, the majority of correlations between the metalinguistic awareness measures and the creativity measures are moderate and significant at the .01 level (11 out of 15), and all are positive. In the bilingual group, all but one of the correlations are positive, however fewer are significant (6 out of 15).

Furthermore, a canonical correlation analysis revealed an overall significant relationship between the measures of metalinguistic awareness and creativity only in the monolingual group, [T^2=2.10, F(15, 87)=3.59, p<.01]; and a high canonical coefficient of .79 was obtained on the first function. On the other hand, a canonical correlation analysis for the bilingual group was not significant at the .05 level, and this mirrors the findings for both groups in Experiment 3. It may be noted further that in the monolingual group here, two of the main creativity scores were rather low and significantly lower than in the bilingual group. The monolinguals performed significantly lower on Torrance Fluency [12.26 as compared with 21.94; F(1, 68)= 21.96, p<.01], and on Imagination [14.03 as compared with 16.31; F(1, 68)=12.78, p<.01].

Summary statistics for all the measures are given in Tables 10.6 and 10.7 for the monolinguals and the bilinguals, respectively.

Correlations among the creativity measures, and among the metalinguistic measures for both groups in the present experiment were mostly positive, moderate and significant as in Experiment 3. These are given in Tables 10.2 and 10.3 for the monolinguals and the bilinguals, respectively. In addition, as in Experiment 3, the metalinguistic measures correlated positively and significantly with the majority of other standard cognitive measures in both groups, as shown in Tables 10.4 and 10.5.

Table 10.2 Correlations among creativity and metalinguistic measures for monolinguals in Experiment 4 (N=35)

Variable	2	3	4	5	6	7	8
1. Torrance Fluency	**.43**	.25	**.38**	.23	**.34**	.20	.20
2. Imagination		**.38**	**.55**	**.59**	**.53**	**.60**	**.61**
3. Verbal Fluency			**.35**	**.57**	.08	**.42**	**.38**
4. Word Discrimination				**.62**	**.49**	**.31**	**.62**
5. Word Length					**.48**	**.51**	**.67**
6. Word Print						**.47**	**.53**
7. Symbol Substitution							**.56**
8. Word Order Correction							

Note: r >.27, p <.05; r >.37, p <.01 (one-tailed tests).

Table 10.3 Correlations among creativity and metalinguistic measures for bilinguals in Experiment 4 (N=35)

Variable	2	3	4	5	6	7	8
1. Torrance Fluency	**.34**	**.66**	.25	**.40**	.11	.02	**.38**
2. Imagination		.21	-.05	**.35**	.20	.08	**.41**
3. Verbal Fluency			.20	**.42**	.20	.24	**.39**
4. Word Discrimination					.20	**.30**	**.44**
5. Word Length					.26	**.43**	**.62**
6. Word Print						.15	**.31**
7. Symbol Substitution							**.64**
8. Word Order Correction							

Note: r >.27, p <.05; r >.37, p <.01 (one-tailed tests).

For the monolingual group a canonical correlation analysis was conducted to examine the relationship between the five metalinguistic measures and seven of the other cognitive measures: PPVT2 (Italian), Vocabulary2 (Italian), Sentences2 (Italian), Word Reading, Animal House, Geometric Design and Block Design. This analysis was significant, [T^2=8.15, F(35, 107)=4.98, p<.01]; and a very high canonical coefficient of .94 was obtained on the first function. A similar analysis was conducted in the case of the bilinguals. However, in this analysis the scores of PPVT1 (English), Vocabularly1 (English) and Sentences1 (English) were used instead of the scores of PPVT2 (Italian), Vocabulary2 (Italian) and Sentences2 (Italian) for eight of the bilinguals whose dominant language was English, and who received all tests in English (except for the Italian verbal tests). The results for this analysis paralleled those found in the monolingual group, in that an overall significant relationship was found, [T^2=6.16, F(35, 107)=3.77, p<.01]; and the canonical coefficient on the first function was very high, .91.

For the bilingual group, a further canonical correlation analysis was conducted to examine the overall relationship between the five metalinguistic awareness measures and the three standard verbal measures which were given to the children in their other language (Variables 13 to 15 in Table 10.5). This was English for the majority of bilinguals (27) and Italian for the others. An overall significant relationship was found, [T^2=2.01, F(15, 87)=3.44, p<.01]. In addition, the canonical coefficient on the first function was high, .80. An overall significant relationship between the metalinguistic tasks which were all given in English and the standard verbal tests which were given to the bilinguals in Italian was also found in Experiment 3.

Additional canonical correlation analyses were conducted to examine the overall relationship between the creativity measures and the other standard cognitive measures. These correlations for the monolingual group and the bilingual group, as shown in Tables 10.4 and 10.5, are all positive and several are significant at the .01 level. Furthermore, some are high. For example, the correlation bewtween Imagination and Vocabulary2 (Italian) in the monolingual group is .78.

An overall significant relationship was found between the creativity measures and the other standard cognitive measures in the monolingual group, [T^2=2.86, F(21, 71)=3.22, p<.01]; and the canonical coefficient for this analysis was high, .85. On the other hand, this particular analysis for the bilingual group (which included the seven standard cognitive measures that were given in the main language of testing as were the creativity measures) was not significant at the .05 level. The contrary pattern of results was found in Experiment 3, in that an overall significant relationship was found between the creativity and the standard cognitive measures for the bilingual group and not for the monolingual group.

For the bilingual group it was of further interest to examine the overall relationship between the creativity measures and the standard measures which were administered in their other language. As shown in Table 10.5, all nine of the individual correlations between the creativity measures and these standard measures (Variables 13 to 15 in Table 10.5) were significant at the .01 level.

Table 10.4 Correlations of the creativity and metalinguistic measures with the other cognitive measures for monolinguals in Experiment 4 (N=35)

Variable	9	10	11	12	16	17	18
1. Torrance Fluency	.22	.04	**.33**	.23	.10	.05	-.02
2. Imagination	**.56**	**.60**	**.78**	**.48**	**.57**	**.32**	**.44**
3. Verbal Fluency	.20	**.32**	**.48**	**.32**	.27	.20	.27
4. Word Discrimination	**.42**	**.70**	**.58**	**.49**	**.66**	**.34**	**.36**
5. Word Length	**.60**	**.61**	**.69**	**.50**	**.58**	**.30**	**.56**
6. Word Print	**.57**	**.50**	**.59**	**.46**	**.45**	**.45**	**.28**
7. Symbol Substitution	**.67**	**.42**	**.47**	**.32**	**.34**	.17	**.29**
8. Word Order Correction	**.63**	**.68**	**.59**	**.42**	**.54**	**.37**	**.46**
9. Word Reading		**.38**	**.39**	**.33**	**.28**	.13	**.36**
10. PPVT2 (Italian)			**.68**	**.54**	**.68**	**.54**	**.61**
11. Vocabulary2 (Italian)				**.56**	**.63**	**.43**	**.43**
12. Sentences2 (Italian)					**.51**	**.52**	**.37**
16. Animal House						**.49**	**.59**
17. Geometric Design							**.59**
18. Block Design							

Note: $r > .27$, $p < .05$; $r > .37$, $p < .01$ (one-tailed tests).
Variables 16 to 18 are numbered as for the bilingual group.

Table 10.5 Correlations of the creativity and metalinguistic measures with the other cognitive measures for bilinguals in Experiment 4 (N=35)

Variable	9	10	11	12	13	14	15	16	17	18
1. Torrance Fluency	**.41**	.25	**.43**	.19	**.38**	**.36**	**.28**	.07	**.46**	.19
2. Imagination	**.48**	-.01	.23	.10	**.44**	**.49**	**.51**	.15	**.35**	**.32**
3. Verbal Fluency	**.39**	**.34**	**.47**	**.42**	**.39**	**.29**	**.33**	.17	**.42**	.24
4. Word Discrimination	.06	**.40**	**.31**	.11	.26	.14	.14	.22	.08	**.31**
5. Word Length	**.64**	**.41**	.13	.24	**.40**	**.32**	**.40**	.24	**.44**	**.48**
6. Word Print	.11	.16	.14	-.01	.24	**.28**	.11	.26	.01	.18
7. Symbol Substitution	**.62**	.24	**.33**	**.29**	**.45**	**.28**	**.55**	.23	**.37**	**.46**
8. Word Order Correction	**.68**	**.34**	**.44**	**.46**	**.72**	**.52**	**.73**	**.33**	**.57**	**.65**
9. Word Reading		.20	**.31**	**.35**	**.53**	.27	**.59**	.07	**.37**	**.32**
10. PPVT (main language of testing)			**.28**	**.48**	.27	.21	.27	**.28**	**.38**	.25
11. Vocabulary (main language of testing)				**.31**	**.45**	**.33**	**.34**	-.02	**.44**	.19
12. Sentences (main language of testing)					**.28**	.16	**.48**	**.38**	**.36**	**.31**
13. PPVT (other language)						**.81**	**.80**	.20	**.53**	**.44**
14. Vocabulary (other language)							**.67**	**.29**	**.61**	**.46**
15. Sentences (other language)								**.33**	**.57**	**.52**
16. Animal House									**.31**	**.57**
17. Geometric Design										**.62**
18. Block Design										

Note: $r > .27$, $p < .05$; $r > .37$, $p < .01$ (one-tailed tests).
Main language of testing was Italian for 27 bilinguals and English for 8 bilinguals.

In addition, canonical correlation analysis revealed an overall significant relationship between the two sets of measures, [T^2=.65, F(9, 83)=2.01, p<.05], and a moderate canonical coefficient was obtained, .60. Therefore, although there was no overall significant relationship between the creativity measures and the other standard cognitive measures which had been given to the children in the main language of testing, there was an overall significant relationship between the creativity measures and the standard cognitive measures which the children received in their other language.

Furthermore, as shown in Table 10.5, the majority of the standard cognitive measures which the bilinguals received in their main language of testing also correlated positively and significantly with the measures which the bilinguals received in their other language. This relationship was examined further by canonical correlation analysis. An overall significant relationship was found, [T^2=2.05, F(21, 71)=2.31, p<.01]; and the canonical coefficient obtained on the first function for the analysis was moderately high, .75, thus suggesting that there is a large degree of overlap between the standard cognitive measures which were given in the two different languages. This was not suggested by the findings in Experiment 2. However, the findings of this experiment are consistent with the views of Cummins and recent studies (see Chapter 2). These suggest that bilinguals' linguistic abilities are interdependent and are not separate, and therefore any instruction which bilingual children receive in either language is capable of promoting academic skills in both languages.

Overall, correlations among the cognitive measures in both the monolingual and bilingual group were generally positive, moderate and significant. In addition, the overall relationship between the metalinguistic awareness measures and the standard cognitive measures in both groups was significant, as found in Experiment 3. However, in the bilingual group the overall relationship between the creativity measures and the metalinguistic awareness measures, and the overall relationship between the creativity tests and the other standard cognitive tests which were given to the bilinguals in their dominant language were not significant. In contrast, the overall relationship between the metalinguistic awareness and the creativity measures, and the creativity and the standard cognitive measures in the monolingual group were significant. These findings may be due to the fact that on the whole, the monolingual group obtained lower creativity scores than the bilinguals. Moreover, in the bilingual group, there were significant overall relationships between the creativity tests and the standard cognitive tests which were administered to the children in their nondominant language, and between the standard cognitive tests which were administered in the two different languages. This latter finding is consistent with the view that linguistic abilities of bilinguals are interdependent.

Intercorrelations between the cognitive and the background measures

Correlations between the cognitive and background measures for the monolinguals and the bilinguals are given in Tables 10.6 and 10.7, respectively. Summary statistics on all measures are also given in these tables.

As in the previous experiments, the majority of the cognitive measures correlated positively, moderately and significantly with age and length of time at school in each group. In contrast, length of time at school correlated poorly with all the cognitive measures as in Experiment 2. Furthermore, in the monolingual group several of the cognitive measures correlated positively and significantly with parental education. On the other hand, correlations between the cognitive measures and parental education in the bilingual group were again nonsignificant, as was found in Experiment 3. It may be, as suggested by Holobow, Genesee, Lambert, Gastright and Met (1987, p. 137), that bilingualism "may help to diminish the effects of the social class background". Holobow et al. found that the progess made on French language tests by kindergarten children who were attending partial French immersion bilingual programmes was not related to SES. However, their performance on English language tests, which was assessed before the commencement of the bilingual programme, was significantly related to SES.

Correlations between the cognitive measures and the other background measures, that is, Literary Interests, birth order and Language Background, were generally low and nonsignificant. In the previous experiment, Literary Interests correlated positively and significantly with several of the cognitive measures for the monolinguals. This was not the case here. However, it needs to be noted that Literary Interests was not a satisfactory scale in the

Table 10.6 Correlations among the cognitive and background measures for monolinguals in Experiment 4 (N=35)

Variable	19	20	21	22	23	24	25	Mean	SD
1. Torrance Fluency	.19	.08	.16	-.04	-.03	.03	-.10	12.26	5.03
2. Imagination	**.37**	-.01	.17	**.36**	**.39**	-.21	.21	14.03	2.24
3. Verbal Fluency	**.36**	.20	.20	.24	.25	**-.34**	-.04	21.06	5.02
4. Word Discrimination	**.39**	-.03	**.28**	**.34**	**.35**	.17	.07	8.60	3.84
5. Word Length	**.34**	.10	.26	**.42**	**.42**	-.19	.06	6.06	2.68
6. Word Print	**.43**	.05	**.54**	**.29**	**.36**	-.17	.08	2.46	2.32
7. Symbol Substitution	**.30**	.00	.17	**.40**	**.39**	-.14	.06	1.20	3.45
8. Word Order Correction	**.36**	.18	.20	**.46**	**.50**	-.05	.10	4.23	3.38
9. Word Reading	.26	.18	.23	**.45**	**.48**	-.07	.13	6.11	20.19
10. PPVT2 (Italian)	**.38**	-.08	.24	**.32**	**.36**	.00	.09	55.80	18.11
11. Vocabulary2 (Italian)	**.43**	.09	**.28**	**.38**	**.35**	-.07	.16	15.71	5.09
12. Sentences2 (Italian)	**.47**	.27	**.42**	**.32**	**.29**	**-.28**	-.13	16.00	6.45
16. Animal House	**.37**	-.01	**.32**	**.33**	.24	-.02	.16	47.94	10.36
17. Geometric Design	**.69**	.02	**.59**	**.31**	**.35**	.01	-.08	11.26	4.29
18. Block Design	**.33**	.08	.17	**.29**	.26	-.10	.19	11.97	4.02
19. Age		-.06	**.71**	**.44**	**.36**	-.08	-.23	5.91	.51
20. Length of time at preschool			-.07	**.30**	.24	**-.37**	.01	22.78	9.61
21. Length of time at school				.26	.27	-.15	**-.37**	6.17	3.81
22. Mother's education					**.81**	-.04	.03	2.94	1.29
23. Father's education						-.06	.16	2.97	1.11
24. Birth order							-.11	1.55	.55
25. Literary Interests								16.70	3.35

Note: $r > .27$, $p < .05$; $r > .37$, $p < .01$ (one-tailed tests).
Variables 16 to 25 are numbered as for the bilingual group.

Table 10.7 Correlations among the cognitive and background measures for bilinguals in Experiment 4 (N=35)

Variable	19	20	21	22	23	24	25	26	Mean	SD
1. Torrance Fluency	**.58**	.15	**.42**	-.06	.17	.02	-.09	-.11	21.94	11.15
2. Imagination	.21	.13	**.37**	.09	-.03	-.18	.18	.16	16.31	3.05
3. Verbal Fluency	**.52**	.21	**.40**	.07	.15	-.16	-.09	-.02	21.89	6.69
4. Word Discrimination	.18	-.05	.19	.04	-.05	.13	**-.32**	**-.31**	9.49	3.22
5. Word Length	**.56**	.16	**.51**	.20	.03	-.21	-.07	-.14	7.29	2.75
6. Word Print	.21	-.03	.18	.19	.11	-.04	.09	.21	3.00	2.57
7. Symbol Substitution	**.35**	-.06	**.48**	.17	.24	-.21	.00	-.11	2.91	4.10
8. Word Order Correction	**.56**	-.11	**.57**	.17	.13	-.09	-.15	-.02	6.06	3.77
9. Word Reading	**.58**	-.09	**.49**	.11	.13	**-.32**	.06	-.06	17.77	26.26
10. PPVT (main language of testing)	**.53**	.09	.21	.08	.06	-.06	-.04	-.08	62.93	19.81
11. Vocabulary (main language of testing)	**.41**	-.01	**.47**	.15	.11	.11	.19	-.23	17.03	4.98
12. Sentences (main language of testing)	**.34**	-.11	.23	-.02	.03	**-.37**	-.21	.13	15.37	6.78
13. PPVT (other language)	**.56**	.13	**.58**	.23	.04	.04	.00	-.03	30.06	22.93
14. Vocabulary (other language)	**.49**	.20	**.59**	**.39**	.18	.05	.06	.19	6.40	6.20
15. Sentences (other language)	**.45**	.07	**.49**	.18	-.01	-.08	.03	-.02	7.37	4.98
16. Animal House	.07	.15	.01	.09	-.02	-.19	-.24	.06	50.49	10.05
17. Geometric Design	**.56**	.17	**.54**	.25	.18	-.05	.02	.06	11.46	4.29
18. Block Design	.25	.02	**.42**	.11	.07	-.09	-.05	**.30**	11.91	5.38
19. Age		.18	**.73**	-.02	.17	.02	-.14	-.19	5.85	.54
20. Length of time at preschool			.19	-.16	-.09	.06	.12	-.23	21.03	12.23
21. Length of time at school				-.05	.13	.00	.00	-.06	6.57	5.66
22. Mother's education					**.39**	-.14	**.29**	.22	4.31	1.04
23. Father's education						.04	.13	.16	4.55	.80
24. Birth order							-.18	**-.27**	1.31	.46
25. Literary Interests								.16	19.99	3.72
26. Language Background									42.39	22.30

Note: $r > .27$, $p < .05$; $r > .37$, $p < .01$ (one-tailed tests).
Main language of testing was Italian for 27 bilinguals and English for 8 bilinguals.

monolingual group for this experiment, since it had an alpha coefficient of .44. Moreover, unlike, in Experiment 3, Language Background, in this experiment did not correlate negatively and significantly with several of the cognitive measures. However, in the previous experiment all children were tested in English, although for some children the main language spoken at home was Italian. In the present experiment the language of testing corresponded to the children's dominant language, as indicated by parents in Language Background.

The significant background correlates of several of the cognitive measures for both the bilinguals and monolinguals were age and length of time at school, as in Experiment 3. In addition, parental education emerged as a significant correlate of the cognitive measures in the monolingual group but not in the bilingual group. This result was also found in Experiment 3 and it is consistent with the results reported recently by Holobow et al. (1987), and those by Cahill (1987) which were described in Chapter 9.

Group differences

Further analyses, as in Experiment 3 were conducted to examine differences between bilinguals and monolinguals with varying degrees of proficiency in their respective languages. In this experiment all children were first divided into subgroups of high and low Italian proficiency on the basis of a median split. The three Italian verbal tests, PPVT2 (Italian), Vocabulary2 (Italian) and Sentences2 (Italian) were used to assess Italian proficiency and raw scores on each of these tests were converted to z-scores. These three z-scores were then summed and the totals were converted to T-scores. Both the bilinguals and monolinguals with T-scores greater than the median (50.17) were

classified as high on Italian proficiency, whilst the others were classified as low on Italian proficiency.

The bilinguals were further divided into subgroups of those high and low on English proficiency using the same procedure as for Italian proficiency, but with the three English verbal tests: PPVT1 (English), Vocabulary1 (English) and Sentences1 (English). Bilinguals with an English T-score greater than the median (51.54) were classified as high on English proficiency, whilst the others were classified as low on English proficiency. Therefore, as in Experiment 3, six linguistic subgroups were defined, and for simplicity these are henceforth called "groups". In this experiment, Group 1 consisted of 19 monolinguals high on Italian proficiency; Group 2 consisted of 16 monolinguals low on Italian proficiency; Group 3 consisted of 9 bilinguals high on both Italian and English proficiency; Group 4 consisted of 8 bilinguals high on Italian proficiency and low on English proficiency; Group 5 consisted of 8 bilinguals low on Italian proficiency and high on English proficiency; and Group 6 consisted of 10 bilinguals low on both English and Italian proficiency.

The mean Italian T-score for each of the six groups, and the mean English T-score for each of the four bilingual groups are given in Table 10.8. Included in this table are also the group means on the background variables which were examined in Experiment 3, and the cognitive measures. As in the previous experiment, the background variables were employed as covariates in the subsequent analyses, and group differences on the cognitive measures were examined by five independent planned comparisons.

Table 10.8 Summary statistics for the six groups in Experiment 4

Variable	Group 1 (N=19)		Group 2 (N=16)		Group 3 (N=9)		Group 4 (N=8)		Group 5 (N=8)		Group 6 (N=10)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Italian T-score	57.32	4.35	43.90	5.63	58.45	5.36	58.65	6.69	35.84	7.88	42.67	4.84
English T-score	Not appropriate				58.10	3.90	42.03	5.54	60.20	4.42	40.93	5.51
Age	6.18	.41	5.60	.44	6.23	.55	6.00	.38	5.70	.42	5.49	.52
Length of time at preschool	21.47	10.26	24.31	8.85	18.00	9.49	21.75	14.32	18.50	13.81	25.20	11.93
Length of time at school	7.84	2.91	4.19	3.87	11.11	5.93	6.00	5.26	5.75	5.18	3.60	4.01
Mother's education	3.36	1.30	2.43	.88	4.56	.53	4.13	1.46	4.79	.40	3.86	1.25
Father's education	3.37	1.12	2.49	.73	4.67	.71	4.38	.92	4.89	.21	4.31	1.04
Literary Interests	16.32	2.89	17.16	3.88	19.33	3.24	18.50	3.74	21.75	4.56	20.36	3.23
Torrance Fluency	12.63	5.09	11.81	5.09	28.22	9.68	21.13	4.79	16.38	6.52	21.40	16.35
Imagination	14.95	2.04	12.94	2.02	17.89	2.03	14.63	2.62	17.00	4.14	15.70	2.63
Verbal Fluency	22.32	5.58	19.56	3.92	25.56	5.48	24.13	5.30	18.38	6.26	19.60	7.44
Word Discrimination	10.37	2.77	6.50	3.93	9.56	4.16	10.63	3.34	9.50	2.51	8.50	2.84
Word Length	7.42	2.48	4.44	1.93	8.11	2.32	7.50	1.93	8.13	2.85	5.70	3.23
Word Print	3.26	2.58	1.50	1.55	3.33	2.96	1.63	1.85	5.13	2.36	2.10	1.85
Symbol Substitution	2.16	4.50	.06	.25	5.44	4.19	2.25	2.44	3.63	6.02	.60	1.35
Word Order Correction	5.74	3.69	2.44	1.79	9.78	2.28	5.13	2.56	6.13	3.27	3.40	3.60
Word Reading	11.26	26.63	.00	.00	37.67	31.14	11.75	21.51	16.75	24.95	5.50	17.39
Animal House	52.11	6.66	43.00	11.92	50.67	15.77	52.75	3.54	54.50	4.11	45.30	9.43
Geometric Design	13.90	3.21	8.13	3.16	14.33	2.92	12.13	3.64	11.63	4.50	8.20	3.91
Block Design	13.68	2.91	9.94	4.28	14.33	4.98	11.75	4.33	14.25	5.15	8.00	4.92

The first planned comparison in this experiment examined the performance of Group 3 in relation to Groups 1, 4 and 5. Group 5 was included in the first planned comparison here, but not in Experiment 3, because these children were tested in their dominant language, that is, English. On the basis of the Threshold Theory and the results obtained from the previous experiment, it was expected that Group 3 would perform significantly better than the other three groups. Group 3 had attained a high level of proficiency in both Italian and English, whilst the other three groups had attained a high level in only one language. An overall significant difference was found on the first planned comparison [$\underline{T}^2$=.78, $\underline{F}(12, 47)$=3.06, $\underline{p}$<.01]. Further univariate tests indicated significant differences in favour of Group 3 on four of the dependent measures, Torrance Fluency, Imagination, Word Order Correction, and Word Reading, as shown in Table 10.9. Group 3, as shown in Table 16.8, also scored higher than Groups 1, 4 and 5 on Verbal Fluency, Symbol Substitution and Geometric Design, but these differences did not reach statistical significance.

Table 10.9 Planned Comparison I in Experiment 4: Group 3 vs Groups 1, 4 and 5

Measure	t (58)	p
Torrance Fluency	3.12	<.01
Imagination	1.84	<.05
Verbal Fluency	1.38	n.s.
Word Discrimination	-.86	n.s.
Word Length	-.24	n.s.
Word Print	-.81	n.s.
Symbol Substitution	.97	n.s.
Word Order Correction	2.74	<.01
Word Reading	1.84	<.05
Animal House	-.47	n.s.
Geometric Design	.37	n.s.
Block Design	.28	n.s.

Note: All tests for this comparison are one-tailed, since it was predicted that Group 3 would perform significantly better than Groups 1, 4 and 5.

The second planned comparison in this experiment examined the performance of Group 1 in relation to Groups 4 and 5. Each of these groups had attained a high level of proficiency in only one language; Groups 1 and 4 had attained a high level of proficiency in Italian, whilst Group 5 attained a high level in English. On the basis of the Threshold Theory and from the results obtained in the previous experiment, it was predicted that no significant differences would be found on this comparison. Although, an overall significant difference was not found [T^2=.32, $F(12, 47)$=1.34, p>.05], two of the univariate tests indicated a superiority, in favour of Groups 4 and 5. This was for Torrance Fluency and Imagination, as shown in Table 10.10.

Table 10.10 Planned Comparison II in Experiment 4: Group 1 vs Groups 4 and 5

Measure	t (58)	p
Torrance Fluency	-2.66	<.01
Imagination	-2.03	<.05
Verbal Fluency	.33	n.s.
Word Discrimination	-1.07	n.s.
Word Length	-.98	n.s.
Word Print	-.31	n.s.
Symbol Substitution	1.07	n.s.
Word Order Correction	-.31	n.s.
Word Reading	-.01	n.s.
Animal House	.35	n.s.
Geometric Design	-.67	n.s.
Block Design	.00	n.s.

Note: All tests for this comparison are two-tailed, since no differences were predicted.

The third planned comparison in the present experiment examined the performance of Groups 1, 3, 4 and 5 in relation to Groups 2 and 6. Each of the Groups 1, 3, 4 and 5 had attained a high level of proficiency in at least one language whilst the two other groups had attained a high level in neither of their languages. Thus, it was expected that Groups 1, 3, 4 and 5 would perform significantly better than the other two groups. This hypothesis was supported, in that, an overall significant difference was found [T^2=.43, F(12, 47)=1.96, p<.05]. In addition, univariate tests, indicated that the performance of Groups 1, 3, 4 and 5 was significantly superior than Groups 2 and 6 on five of the dependent measures, Word Length, Word Order Correction, Animal

House, Geometric Design and Block Design, as shown in Table 10.11. Groups 1, 3, 4 and 5 also performed higher than the Groups 2 and 6 on the majority of the other cognitive measures given in Table 10.8, but these differences did not reach statistical significance.

Table 10.11 Planned Comparison III in Experiment 4: Groups 1, 3, 4 and 5 vs Groups 2 and 6

Measure	t (58)	p
Torrance Fluency	.03	n.s.
Imagination	1.62	n.s.
Verbal Fluency	.72	n.s.
Word Discrimination	1.38	n.s.
Word Length	2.34	<.05
Word Print	.77	n.s.
Symbol Substitution	1.07	n.s.
Word Order Correction	2.48	<.05
Word Reading	.54	n.s.
Animal House	2.61	<.05
Geometric Design	3.05	<.01
Block Design	2.98	<.01

Note: All tests for this comparison are one-tailed, since it was predicted that Groups 1, 3, 4 and 5 would perform significantly better than Groups 2 and 6.

The fourth planned comparison, as in Experiment 3, examined the performance of Group 2 in relation to Group 6. Both of these groups had attained low levels of proficiency in their respective languages, and on the basis of the results obtained in Experiment 3, no significant differences were expected on this comparison. The multivariate analysis which examined the overall differences between the two groups was nonsignificant [T^2=.32, F(12, 47)=1.25, p>.05], and only one of the univariate tests was significant, as shown in Table 10.12. This indicated a superiority in favour of Group 6 on Torrance Fluency.

Table 10.12 Planned Comparison IV in Experiment 4: Group 2 vs Group 6

Measure	t (58)	p
Torrance Fluency	-2.67	<.05
Imagination	-.65	n.s.
Verbal Fluency	-.29	n.s.
Word Discrimination	.12	n.s.
Word Length	-.69	n.s.
Word Print	-.23	n.s.
Symbol Substitution	.08	n.s.
Word Order Correction	.31	n.s.
Word Reading	.11	n.s.
Animal House	-.65	n.s.
Geometric Design	1.01	n.s.
Block Design	.31	n.s.

Note: All tests for this comparison are two-tailed, since no differences were predicted.

The fifth and final planned comparison in this experiment, examined the performance of Group 4 in relation to Group 5. Both were bilingual groups, but they differed in that, Group 4 had attained a high level of proficiency in only Italian, whilst Group 5 had attained a high level of proficiency in only English. On the basis of the Threshold Theory, no significant differences were expected. Overall, group differences were not found to be significant [T^2=.38, $F(12, 47)$= 1.49, p>.05], and only one of the univariate tests was significant, as shown in Table 10.13. This indicated a superiority on Word Print in favour of Group 5.

Table 10.13 Planned Comparison V in Experiment 4: Group 4 vs Group 5

Measure	t (58)	p
Torrance Fluency	.48	n.s.
Imagination	-1.59	n.s.
Word Fluency	1.65	n.s.
Word Discrimination	.56	n.s.
Word Length	.65	n.s.
Word Print	-3.02	<.01
Symbol Substitution	-.41	n.s.
Word Order Correction	-.68	n.s.
Word Reading	-.30	n.s.
Animal House	-.53	n.s.
Geometric Design	-.01	n.s.
Block Design	-1.00	n.s.

Note: All tests for this comparison are two-tailed, since no differences were predicted.

On the whole, the results from this experiment provide additional support for the Threshold Theory, and they are broadly consistent those found in Experiment 3, in that, an overall bilingual superiority on the cognitive measures was found only for those children who had attained a high degree of bilingualism. In addition, a bilingual superiority was found on two of the creativity measures for those bilinguals who had attained a high level of proficiency in only one of their languages, and on one of the creativity measures for those bilinguals who had attained a low level of proficiency in both languages. However, an overall bilingual superiority was not found for those children who had attained lower degrees of bilingualism, as was found in Experiment 3. These results are discussed further in the following chapter.

CHAPTER 11 OVERVIEW AND FURTHER CONSIDERATIONS

Metalinguistic awareness and creativity are two cognitive areas which have been studied in the bilingual literature, and in both areas a bilingual superiority has frequently been found. This thesis was concerned with examining the two areas further in relation to the Threshold Theory. In addition, the thesis was concerned with the degree of consistency among different metalinguistic awareness tasks, and the relationship between measures of metalinguistic awareness and creativity in monolingual and bilingual children in a cross-cultural study.

Metalinguistic awareness

The results found here were consistent with a number of previous studies which have found moderate and positive correlations among different metalinguistic awareness tasks, thus suggesting that metalinguistic awareness can be viewed as a unitary ability. This notion was investigated in the present thesis by Experiments 1 and 2.

Ten metalinguistic tasks were studied in Experiment 1 with two age groups, each consisting of 20 children. The children were English speaking monolinguals aged between 5 and 9 years. They were divided into two age-level subgroups: the mean ages for the younger and older subgroups were 5 years 11 months and 7 years 7 months, respectively. On the whole, the metalinguistic tasks demonstrated the expected age differentiation, with the older subgroups obtaining higher mean scores. In addition, several significant positive correlations were found among the ten tasks, lending support to the view that there exists a general metalinguistic ability.

Experiment 2 was specifically designed to utilise factor analysis to study metalinguistic awareness, and its relationship to general intellectual development. Because it was found that some of the metalinguistic tasks were rather easy for the older children in Experiment 1, in this study only young children were tested. The subjects were 71 English speaking monolinguals aged 5 or 6 years. Further evidence was found for the notion of a general metalinguistic ability, but the findings also suggested that metalinguistic abilities were not clearly distinguishable, in factorial terms, from other tests of intellectual abilities.

An additional aim of Experiment 2 was to examine the relationship between the metalinguistic awareness and five relevant background variables, namely, length of time at preschool, length of time at primary school, age, sex and parental education. The highest level of education attained by parents was used as an index of SES.

The background variables which were found to be related to several of the metalinguistic tasks and the standard tests in Experiment 2 were length of time at school, age and parental education. Length of time at school and age also correlated significantly with several of the cognitive measures in the monolingual and bilingual groups studied in Experiments 3 and 4. However, parental education correlated positively and significantly with several of the cognitive measures only in the monolingual groups. For the bilinguals in Experiments 3 and 4, parental education was not significantly related to the subjects' test performance generally. This finding is consistent with two recent studies by Cahill (1987) and Holobow et al. (1987), and in order to explain this result Holobow et al. have suggested that bilingualism may help to diminish the effects of SES on cognitive development. One possible way in

which high SES enhances cognitive development in young children is that it provides a more enriched environment for them as compared with children from families low on SES. Such an environment may also be provided overall by bilingualism.

Creativity

The majority of bilingual studies which have examined measures of creativity have usually focused on subjects from the middle and upper-primary or the early high school grades. Only three of the bilingual studies reviewed in Chapter 7 included some children aged 5 or 6 years, but even in these studies most of the subjects were from middle and upper primary school grades. On the other hand, in the creativity field, tests have been developed for assessing creativity in younger children, even for children as young as 3 years. Research on this topic was reviewed in Chapter 8, and two of the creativity tests suitable for 5 and 6 year olds were selected to be examined with bilingual and monolingual children in Experiments 3 and 4. The tests, both divergent thinking tests, were Thinking Creatively in Action and Movement which was developed by Torrance (1981b), and Verbal Fluency from the British Ability Scales (Elliot, 1983a). Satisfactory data on these tests' reliability and validity have been provided by their authors. Correlations among the creativity measures obtained from the two tests in Experiments 3 and 4 were generally moderate, positive and significant, thus lending support to the view that creativity is also a unitary construct in young children, as has been suggested by the majority of previous studies.

The relationship between creativity and the other standard cognitive tests was also examined in Experiment 3 and 4. On the whole, the results were consistent with previous studies which have found varying degrees of overlap between creativity measures and standard intelligence measures. Several studies in the literature have found a significant degree of overlap between these two sets of measures in more heterogeneous samples, as was found for the bilingual group in Experiment 3. In addition, the results of Experiment 4 suggested that there may be a significant relationship between creativity measures and standard cognitive measures in groups which are generally low on creativity, as was found in the monolingual group. However this has not been suggested by previous findings.

Metalinguistic awareness and Creativity

In addition, this thesis addressed the relationship between measures of metalinguistic awareness and measures of creativity in bilingual and monolingual children. Both of these types of measures have been frequently examined in bilingual studies. Previous bilingual studies which have included measures of metalinguistic awareness or measures of creativity were reviewed in Chapters 3 and 7, respectively. However, none of these previous studies has investigated the two types of measures simultaneously.

In Chapter 9 it was hypothesised that there would be positive relationships between measures of metalinguistic awareness and measures of creativity, and this was investigated by Experiments 3 and 4. The hypothesis was based primarily on the notion of the "objectification of language", which has also been proposed for explaining the more widespread cognitive gains associated with bilingualism generally. Contrary to what was hypothesised, no

overall significant relationship between the two types of measures was found for the monolinguals or the bilinguals in Experiment 3, or for the bilinguals in Experiment 4. An overall significant relationship between the measures of metalinguistic awareness and those of creativity was found only for the monolinguals in Experiment 4, but this group performed rather poorly on the creativity measures generally. Thus, on the whole, the results from Experiments 3 and 4 indicate that the two constructs, metalinguistic awareness and creativity are concerned with largely independent and not interrelated cognitive abilities.

Threshold Theory

A further concern of this thesis was to examine the effects of bilingualism on cognitive development, as predicted by the Threshold Theory. The Threshold Theory maintains that there may be levels of linguistic proficiency which bilingual children must attain in order to avoid cognitive deficits and to allow cognitive benefits. On the whole, the data from both Experiments 3 and 4 were consistent with this theory, in that an overall bilingual superiority on the cognitive measures was found only for those bilinguals who had attained high levels of proficiency in Italian and English.

First in Experiment 3, the bilinguals high on both English and Italian (Group 3) were compared to those bilinguals who had attained a high level of proficiency in only English (Group 4) and to those monolinguals who had attained an equally high level of proficiency in English (Group 1). The bilinguals who had attained a high level of proficiency in Italian were not also included in this comparison since these bilinguals were tested in English, although they had attained a relatively high level of proficiency in Italian and

a low level in English (Group 5). On the other hand, in Experiment 4, the two groups of bilinguals who had a high level of proficiency in one language (Groups 4 and 5) were compared to those bilinguals high on both languages, since all groups were given the majority of the tests in their dominant language. In Experiment 4, the dominant language was English for Group 5 and Italian for the other five groups.

The findings from Experiments 3 and 4 supported the first hypothesis, in that significant differences were found in favour of the bilinguals who had attained a high level of proficiency in both languages. In Experiment 3 these bilinguals performed significantly better on Torrance Fluency, Imagination, Word Order Correction, Word Reading and Geometric Design, than did the bilinguals and monolinguals who had attained a high level of proficiency in only English. Similarly, in Experiment 4 the bilinguals who were high on both Italian and English performed significantly better than the bilinguals and monolinguals who had attained a high level in only one language on Torrance Fluency, Imagination, Word Order Correction and Word Reading.

On the basis of the Threshold Theory it was further predicted that there would be no differences between those monolinguals who had attained a high level of proficiency in their single language and those bilinguals who had attained a high level of proficiency in only one of their languages. In order to test this hypothesis in Experiment 3, the monolinguals high on English (Group 1) were compared to the bilinguals high on English only (Group 4), whilst in Experiment 4 the monolinguals high on Italian (Group 1) were compared to both the bilinguals who were high on Italian only (Group 4) and to those bilinguals high on English only (Group 5). In Experiment 4, a significant

difference was found in favour of the bilinguals on two of the creativity measures (Torrance Fluency and Imagination). However, overall the group differences in both experiments were not significant, and this is consistent with the Threshold Theory.

One other prediction was made based on the Threshold Theory. It was expected that bilinguals who had attained a low level of proficiency in both languages and monolinguals who had attained a low level of proficiency in their only language would perform significantly worse than bilinguals or monolinguals who had attained a high level of proficiency in at least one language. In Experiment 3, it was also expected that the bilingual group which was high on Italian but low on English (Group 5) would also perform significantly worse than the other three groups which were high on English (Groups 1, 3 and 4) because this group received the dependent measures in English. This hypothesis was supported in that the three groups which were high on English performed significantly better on all the dependent measures except for Torrance Fluency. Similarly, in Experiment 4 the four groups which had attained a high level of proficiency in at least one language (Groups 1, 3, 4 and 5) performed significantly better overall on the dependent measures than the other two groups which had both attained low levels of proficiency in their respective languages (Groups 2 and 6).

Of further interest was the comparison of those bilinguals who had attained a low level of proficiency on both Italian and English (Group 6) with those monolinguals who were low on English proficiency in Experiment 3 (Group 2), and with those monolinguals who were low on Italian proficiency in Experiment 4 (Group 2). No specific prediction was made since the Threshold

Theory has little to say about these two particular groups. On the whole, differences between the two groups in both experiments were negligible. Only one significant difference was found between the relevant groups in Experiment 4 on Torrance Fluency, in favour of the bilinguals. No significant differences were found between the two groups in Experiment 3.

In each experiment, one final comparison was conducted which provided some additional information. This comparison in Experiment 3 examined the performance of the bilinguals who were high on Italian but low on English (Group 5) in relation to the monolinguals and bilinguals who were low in each of their respective languages (Groups 2 and 6). It was found that the bilingual group high on Italian but low on English performed significantly worse on Imagination, however differences on the other measures were not significant at the .05 level. It is expected though, that this group would have performed significantly better than the other two groups for this comparison if the bilinguals who were high on Italian but low on English had been given the majority of the tests in Italian. Furthermore, no differences would be expected between those bilinguals who were high on Italian (Group 5) but low on English and those that were low on Italian but high on English (Group 6), if both groups had been tested in their dominant language.

In fact many of the earlier studies failed to assess the degree of bilingualism (Peal & Lambert, 1962; Cummins, 1976), and often bilinguals may have been given intellectual tests in their weaker language. Now if the bilinguals were found to perform significantly worse on the various tests in comparison to their monolingual control groups, and this was often the case (Darcy, 1953), then this poorer performance could be attributed to the fact

that the tests were given to the bilinguals in their weaker language, and not to their bilingualism per se.

On the other hand, the last comparison in Experiment 4 examined the performance of the bilinguals who were high on Italian but low on English (Group 4) in relation to the bilinguals who were low on Italian but high on English (Group 5). No significant differences were expected since both groups were tested in their dominant language. This hypothesis was generally supported, in that overall, the differences between the two groups were not significant.

Taken together, the findings from both Experiments 3 and 4 suggest that whilst high levels of performance in two languages may promote some aspects of cognitive development, low levels of bilingualism do not. Thus the results are consistent with the Threshold Theory.

Other theoretical views

A view counter to that of the Threshold Theory has been put forward by Diaz (1985a) and this was briefly described in Chapter 2. Diaz has found results which led him to conclude that the positive effects of bilingualism are not related to high levels of bilingual proficiency but that they may be "related to the initial efforts required to understand and produce second language" (p. 138). However, the results obtained by Diaz have not been replicated up to date.

Recently, Bialystok (1986a, 1986b, 1987, 1988a) has found that bilinguals, irrespective of their degree of bilingualism, generally perform better than

monolinguals on those metalinguistic tasks which place greater demands on the control of linguistic processing. This has been defined as "the executive component responsible for directing attention to the selection and integration of information" (Bialystok, 1988a, p. 561). On the other hand, bilinguals who have attained high levels of proficiency in both languages have been found to perform significantly better on metalinguistic tasks which require more analysed linguistic knowledge. This has been defined as "the skill component responsible for the structuring and explication of linguistic knowledge" (Bialystok, 1988a, p. 561). Bialystok's framework for classifying metalinguistic tasks was also briefly described in Chapter 4, and Bialystok's bilingual studies were summarised in Chapter 3.

The metalinguistic tasks examined in Experiments 3 and 4 were not designed to directly assess Bialystok's views, however, the data were re-examined for this purpose. Three metalinguistic tasks, Word Discrimination, Word Print and Word Order Correction, were classified as requiring more analysed knowledge, whilst the remaining two, Word Length and Symbol Substitution, were classified as requiring more control of linguistic processing. The criteria for classifying metalinguistic tasks in terms of these two processing components are given by Bialystok and Ryan (1985a, 1985b; see also Birdsong, 1989).

In both Experiments 3 and 4 it was found that bilinguals who had attained a high level of proficiency in Italian and English performed significantly better on Word Order Correction than the monolinguals and bilinguals who had attained a high level of proficiency in only one language. This is one of the metalinguistic tasks which has been classified as requiring a high degree of

analysed knowledge, however, a superiority in favour of the highly proficient bilingual group on the other two tasks which assessed this aspect of metalinguistic awareness was not found. Furthermore, there was no evidence that the bilinguals irrespective of their degree of bilingualism were better on the two metalinguistic tasks which may be viewed as assessing control of linguistic processing. Therefore, on the whole, the results of Experiments 3 and 4 are not consistent with Bialystok's views.

In addition, it needs to be noted that Bialystok has not provided any factorial validity for the two processing components she has defined. It may be that these components are largely interdependent, since metalinguistic tasks which require a high degree of analysed knowledge have been found to correlate moderately, positively and significantly with some tasks which place greater demands on the control of linguistic processing by Bialystok (1988a, 1988b). However, the existence of these two components using factor analysis needs to be confirmed, if the two components are to have any role in further theory development concerning metalinguistic awareness and bilingualism.

One of the other issues which has been frequently addressed in the bilingual literature, and which was discussed briefly in Chapter 1, concerns bilinguals who have attained high levels of proficiency in their two languages. Are such bilinguals more intelligent? If this is the case then this factor alone may explain why they attained both a high degree of bilingualism and why they performed significantly better overall on the various cognitive measures. The findings of Experiments 3 and 4 suggest otherwise. Here the bilinguals who had attained a high level of proficiency in both languages were not superior to the respective monolingual and bilingual groups on the performance of one of

their languages. Furthermore, the bilinguals who had attained a high level of proficiency in both of their languages did not perform significantly better on all the cognitive measures. This would have been expected if the bilinguals high on both Italian and English were in fact more intelligent than the monolingual and bilingual groups who had attained a high level of proficiency on only one language. However, this should not be taken to imply that more intelligent children are not expected to perform better on cognitive and academic tests. Rather the results suggest that high levels of bilingualism may enhance some aspects of cognitive functioning to a more marked level of competence than if the development were fuelled by high intelligence alone.

It has also been argued recently by Bowey (1988) that metalinguistic awareness may enhance bilingualism, or that metalinguistic awareness and bilingualism may mutually facilitate each other (see Chapter 3). Similarly, Scott (1973) has argued with reference to creativity, as assessed by divergent thinking tests, that it may both facilitate and be facilitated by bilingualism (see Chapter 7). The notion that metalinguistic awareness and creativity may enhance bilingualism or more generally, second language learning, could be studied further in cases where one can obtain an assessment of the subjects' metalinguistic and creative thinking abilities before the subjects have begun learning a second language (i.e., at the commencement of an immersion bilingual programme). In this way it could be determined if those subjects with superior metalinguistic or creative thinking abilities are more successful in learning or acquiring a second language.

Facilitating second language acquisition

The question of why some children acquire a second language and why others do not is an interesting and an important one. Children who do acquire two languages equally well along side each other may benefit cognitively as suggested by Experiments 3 and 4. Furthermore the benefits may extend to the bilinguals' lifestyle in general. For example, Dodson (1983, p. 401) has suggested that "knowing two languages can give the individual an extra window on the world, increase his understanding, his visions and his insights, and in the process perhaps help him to develop into a more tolerant person than he would otherwise have been" . These views could be investigated empirically by future studies.

A large number of factors, however, have been identified in the literature to explain why some young children are more successful in learning or acquiring a second language and why others are not. Dopke (1986, p. 486) has summarised some of these:

"They are basically sociolinguistic factors such as the amount and variety of exposure to the minority language, the parent's consistency in their language choice, their attitudes towards bilingualism and their confidence in the children's success, and also the children's talkativeness and general temperament".

In addition, Dopke has found that children were more likely to speak a minority language in German-English families who were following the concept of one person-one language, if the respective parent employed a more child-centred mode of interaction than the parent who spoke the majority language. Cahill (1987) has also found that the bilingual children who were more

proficient in their second language, Italian, came from families who put a greater emphasis on the use and correct use of Italian, and who insisted that their children reply in Italian when addressed in Italian.

Further guidelines for parents who are interested in bringing up their children bilingually have been published recently by Arnberg (1987) and Saunders (1988). According to Arnberg (1987, p. 95) an ideal situation for bringing up children bilingually:

"... is one in which parents consistently follow a one person/one language strategy and where the minority language is spoken between the parents and used as the family language, wherever possible. If this is not possible, it is highly advantageous if the non-bilingual parent can at least learn to understand his/her partner's language to some extent. This greatly increases flexibility in the family with regard to language use, makes visits to the minority language country an enjoyable experience for the entire family, and provides good bilingual models for the child (i.e. the child sees that both parents are positive toward bilingualism). The parents should try to be as consistent as possible in each speaking their own language to the child".

Several practical suggestions for parents are also given by Arnberg and Saunders. These include ideas for stimulating the child's use of the minority language inside and outside the home, such as reading to the child and teaching the child to read in the minority language, borrowing library books in the minority language, watching video films and television programmes in the minority language, getting together with other families who share the minority language and culture, and locating shops, banks or restaurants where the minority language is spoken so that the child can see that the language is

useful outside the home. Overall, this area of research is broadly concerned with helping parents who in turn will help their children become linguistically competent in their two languages during early childhood. In this way children will be in a better position to reap the full benefits of bilingualism.

Conclusions

This thesis has provided cross-cultural support for the Threshold Theory, in that, the results from both Experiment 3 which was conducted in South Australia, and Experiment 4 which was conducted in Rome, suggested that whilst high levels of performance in two languages may promote some aspects of cognitive development, lower levels do not. In addition, the thesis has provided support for the notion of a general metalinguistic ability and a general creativity ability in young children. The thesis also addressed the relationship between measures of metalinguistic awareness and measures of creativity. Although a positive relationship was hypothesised between the two sets of measures, overall this relationship was found not to be significant at the .05 level, thus suggesting that metalinguistic awareness and creativity are largely independent cognitive domains in young children.

LIST OF APPENDICES:

APPENDIX 5.1 METALINGUISTIC TASKS IN EXPERIMENT 1

(i) Word Discrimination

Training Task

Instructions: "In this game I want you to tell me if what I say is an animal or not an animal." This will be asked after the presentation of each item. Corrective feedback is given.

Items horse; tree; dog; flower; apple; rabbit

Main Task

Instructions: "In this game I want you to tell me if what I say is one word or two words." This is asked after the presentation of each item.

Items

1. candle
2. the farm
3. over
4. ladder
5. hot day
6. a frog
7. because
8. the rain
9. one box
10. under
11. big bike
12. broken

(ii) Word Length

Instructions: "In this game, I want you to tell me if what I say is a long word or a short word." This is asked after the presentation of each item.

Items

1. truck
2. beautiful
3. butterfly
4. hot
5. bus
6. sharpener
7. interesting
8. sing
9. road
10. eat
11. information
12. caterpillar

(iii) Word Print

Instructions: "I have some puzzles for you to do and some questions to ask you about print. Listen very carefully so that you will know what to do. We will do some practice exercises first."

(These are given on the next page.)

Practice items

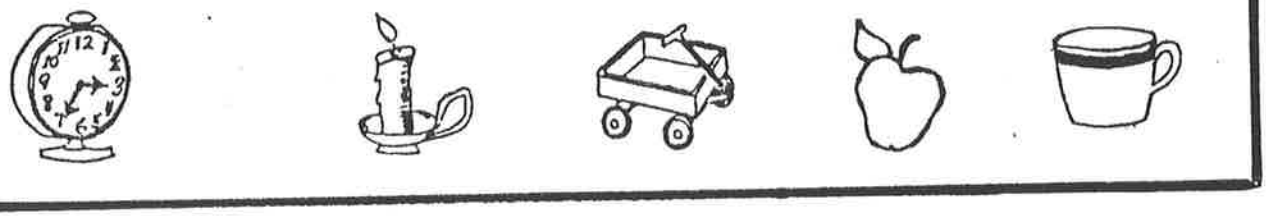
(a) "Look at the long box which has a clock at one end of it. Put your finger on the clock. Now look at the things in that box. Find the thing you can eat. Draw a circle around the thing you can eat."

(b) "Now look at the next long box which has a fish at one end of it. Put your finger on the fish. In that box draw a circle around each thing which has legs-each thing which has legs."

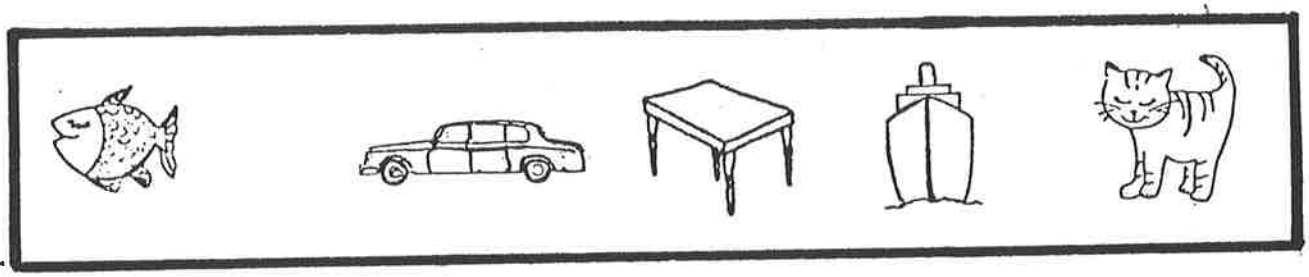
(c) "Now find the box with a balloon at one end. Draw a circle around the first animal in the box. Circle the first animal."

Corrective feedback is provided for the three practice items.

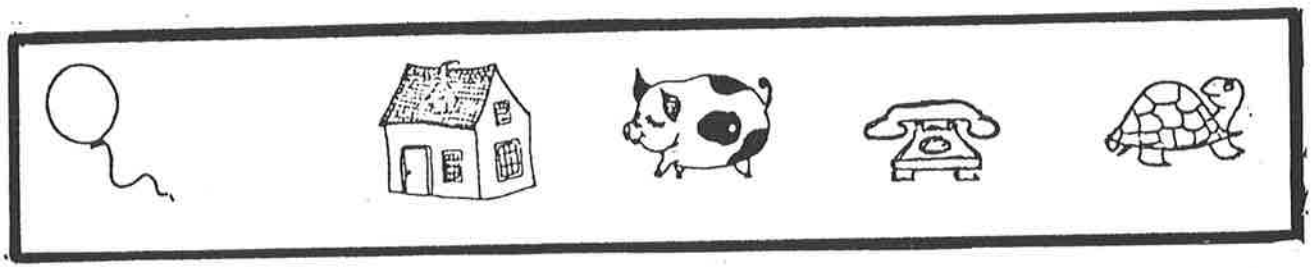
a.



b.



c.



Further instructions: "We have now had our practice. Turn over the page."

(These are given on the next page.)

Items

1. "Put your finger on the wagon. Circle each thing in the box which is a word. Circle each word."
2. "Put your finger on the bed. Circle each thing in the box. Circle each word."
3. "Put your finger on the bucket. Circle each word. Circle each word."
4. "Put your finger on the comb. In that box draw a circle around the first letter in each word. Circle the first letter in each word."
5. "Put your finger on the leaf. Circle the first letter in each word-the first letter in each word."
6. "Put your finger on the cocky. Draw a circle around each word. Circle each word."
7. "Put your finger on the shoe. Circle each word. Circle each word."
8. "Put your finger on the spaceman. In that box circle the very first word-the very first word."
9. "Put your finger on the horse. Circle the very first word-the very first word."
10. "Put your finger on the birthday cake. Circle the first word in the box-the first word."

1.  on 6 little D 3

2.  75 mum z 8 P

3.  K 37 p 464 dad

4.  She made 36 cakes.

5.  Can you eat 10 apples?

6.  M d dog p sit

7.  h 289 television of

8.  On hot days we swim.

9.  A cat likes fish.

10.  He came home. We all played games.

(iv) Phonemic Segmentation

Instructions: "Today we're going to play a tapping game. I'm going to say some real words and some play words, and tap them after I say them. Listen carefully, so you'll find out how to play the game."

Practice items

a. The experimenter first demonstrates this triad: oo, boo, boot. For oo the experimenter taps once. For boo the experimenter taps twice and for boot the experimenter taps three times. "Now, I want you to do it. Say oo. Good. Now, tap it. Say boo. Now tap it. Say boot. Now tap it." If the child makes a mistake corrective feedback is given and the item is repeated.

b. The experimenter presents the first training triad in a different order- boot, oo, boo. "Now, let's do it again to make sure you've got the idea. I'll mix them up and see if I can catch you." Corrective feedback is provided again.

c. The experimenter presents this second training triad: ee, zee, zeek as in the first practice item. Corrective feedback is given.

Instructions: "OK. Now we'll play the real game. I'll say a word or a play word, but I won't tap it because you know how to play the game yourself. So, you say the word after me and then tap it. OK?"

Items

1. them
2. gíth
   á
3. she
4. chog
5 need
6. shé
7. with
   ow
8. théb
9. out
10. the
11. dowk
12. chop
    í
13. thoo
14. neep
    oo
15. down
16. owd

(v) Word Referent

1. "What is this? (pointing to a cat) Why do we call it cat?"
2. "Can a cat be called a gat?"
3. "Why do you think it can/Why do you think it can't?"
4. "Can a cat be called a frog?"
5. "Why do you think it can/Why do you think it can't?"
6. "What is this? (pointing to a table) Can a table be called a shig?"
7. "Why do you think it can/Why do you think it can't?"
8. "What is this? (pointing to a book) Why do we call it book?"
9. "Can a book be called a house?"
10. "Why do you think it can/Why do you think it can't?"
11. "Can a book be called a livre?"
12. "Why do you think it can/Why do you think it can't?"
13. "Do you know that people from a far away country do things differently? They call a cat chat, a book livre, a house maison, a car voiture, and a chair chaise. Why do you think that people from a far away country can call things differently?
14. "Could we also start call things differently?"
15. "Why do you think we could/Why do you think we couldn't?"

(v) Word Renaming

Counter-factual task

The children are told a story about a puppet Mr. Blue who lives in a far away land where everyone has blue hair; walks on their hands and rides three wheeler bikes to work. The children are then asked to be Mr. Blue and to repeat his story; promptings are given. Following this the children are asked three questions:

a. "Is your hair the colour of the earth or sky?"

b. "When you go for a walk, do you put your shoes on the part of the body that has fingers or toes?"

c. "Do the grown-ups ride to work on something that has four wheels or three wheels?"

Main task

A. "Let's call this table a shig." (Small toy table is shown.) The child is asked:

1. "Hand me the shig."

2. "Put the shig next to the truck."

B. "Let's call this boat a cow." (Small toy boat is shown.)

The child is asked:

3. "Put the cow next to the truck."

4. "Hand me the cow."

5. "Does the cow have a funnel or legs?"

6. "Does the cow walk or does it sail?"

C. "Let's call this book a pillow". (Book is shown.)

The child is asked:

7. "Give me the pillow."

8. "Is the pillow hard or soft?"

D. "Let's call this giraffe a truck. (Small toy giraffe is shown.) The child is asked:

9. "Does the truck have wheels or eyes?"

10. "Hand me the truck."

11. "Put the truck next to the table."

12. "Does the truck eat or drive?"

E. "Let's call this truck a table. (Small toy truck is shown.) The child is asked:

13. "Does the table have wheels or legs?"

14. "Put the table on the floor."

F. "Let's call a bird cat?" The child is asked:

15. "Does a cat have two legs or four legs?"

16. "Does a cat walk or does it fly?"

G. "Let's call people fish." The child is asked:

17. "Do fish have arms or fins?"

18. "Do fish live in the sea or in houses?"

(vii) Symbol Substitution

Instructions and items

1. "For this game the way say I is to say ice. So how do we say I am cold?"
2. "For this game the way we say under is to say play. So how do we say The kittens are under the tree?"
3. "For this game the way we say people is to say he. So how do we say People like funny stories?"
4. "And how do we say People drive to work?"
5. "For this game the way we say she is to say fish. So how do we say She likes swimming?"
6. "For this game the way we say up is to say fly. So how do we say The birds are up in the sky?"
7. "For this game the way we say on is to say jump. So how do we say The frog is on the other side?"
8. "And how do we say The children are on the swings?"

(viii) Word Order Judgement

Practice items

a. "This is Mr. P (says hello). Now sometimes he says things the wrong way round like I chocolate like. Does that sound like the wrong way round to you? Can you put it the right way round for Mr. P?"

b. "Now listen to him again, Mother my late is. Does that sound like the right way round or the wrong way round? Can you put it the right way round for Mr. P?

c. "Now listen to him once more, I am hungry. Does that sound like the right way or the wrong way round?"

Instructions: "OK. So now you know how to play the game. Mr. P will say something and you tell him if it is the wrong way or the right way round."

Items

1. The car blue is on the road.
2. Dogs cannot fly.
3. The teacher a book reads.
4. People like funny books.
5. Mice not do like water.
6. The cat with wool is playing.
7. Paul likes to draw.
8. The girl has a green dress.
9. Blackboard teachers write on.
10. There are dogs three.
11. The sky not is green.
12. People do not like noise.
13. Rebecca to school ran.
14. The boy has hair curly.
15. The man is driving a truck.
16. Oranges are not yellow.
17. There are six cats near the house.
18. Rabbits not can sing.

(ix) Word Order Correction

Instructions: "Now this is Miss B (says hello). Miss B has a lot of trouble saying things the right way round. She always says things the wrong way round."

Practice items

a. "For example, I chocolate like. Does that sound like the wrong way round to you? Can you put it the right way round for Miss B?"

b. "Now listen again, Mother late is. Can you put it the right way round for Miss B?

c. "Try this one The girl a cat has. Can you put it the right way round for Miss B?"

Corrective feedback is given for the above practice items.

Instructions: "OK. Now you know how to play the game. I want you to help Miss B say things the right way round."

Items

1. Dad the car washes.
2. I like days hot.
3. The lawn not is wet.
4. The teacher has a coat long.
5. Bananas not are blue.
6. The bird in the tree is.
7. There are dogs three.
8. He an apple ate.
9. Sometimes children not do eat dinner.
10. She the story wrote.
11. They not did go shopping.
12. Mum has a dress new.

(x) Word Unit

Instructions: "Today we're going to play a tapping game. I'm going to say some words and then I'm going to tap once for every word. Listen carefully and I'll show you how to play the game."

Practice items

a. The experimenter demonstrates the first training phrase, his new schoolbag. "His." The experimenter taps once and explains. "I tapped once for his because there was only one word his. His new." The experimenter taps twice. "I tapped one time for his and one time for new. His new schoolbag." The experimenter taps three times. "I tapped three times for his new schoolbag because there were three words, his, new and schoolbag. I tapped one time for his, one time for new, and one time for schoolbag. See the way the game is played? For every word I say, I give a tap. Now I want you to do it. Say his and tap it. Good. Now say his new and tap it. Good. Say his new schoolbag and tap it." If the child makes an error corrective feedback is given.

b. The next training phrase, their new hairbrush is given to the children and corrective feedback is again given.

Instructions: "OK. Now, we'll play the real game. I'll say some words, but I won't tap them because you know how to play the game yourself. So, you say the words after me and tap them as you say them. OK?"

Items

1. his toenail
2. the new shoelace
3. a cowboy
4. a big blackboard
5. her necklace
6. his cold bedroom
7. his football
8. the playground
9. the cold teapot
10. her big raincoat
11. a peanut
12. her new toothbrush

APPENDIX 5.2 SCORING METHOD FOR WORD REFERENT

Items which required an explanation were given a score of 0, 1 or 2.

A score of 0 was used when no specific explanation was given or when the answer was judged to be inappropriate (e.g., "Because").

A score of 1 was used when answer reflected a "rigid" attitude towards language, therefore, if the child held that names can/can't be changed or objects have their names for any of the reasons below.

1) The object has certain empirical features (e.g., "Because it's got words and it's a book").

2) The word has certain characteristics (e.g., "Because it begins with the letter c").

3) Changing names would lead to confusion (e.g., "Cause there is another animal called frog and if this was called frog they would get mixed up").

4) The name in question refers to something else (e.g., "Because frog is another animal that lives in water").

5) The new name or different language is not known (e.g., "Everyone, some people won't know what it means").

6) The new name is not real or unsuitable (e.g., "Because it's a play word. It's not really a word").

7) Different names are not allowed/used in this country (e.g., "Because we live in a different country").

8) Different names are only allowed/used in other countries (e.g., "In a different country we could").

9) Higher authorities would/would not permit it. (e.g., "Because God made the words up").

A score of 2 was given only to "nonrigid" answers which reflected a "playful" or an "arbitrary" attitude towards language, therefore, if the child held that the names of objects can be changed or have names for any of the reasons below.

1) Objects/referents can be called anything (e.g., "Because they call them different names sometimes. They can be any name").

2) Other people use different names or different languages (e.g., "Because other people do and then Australians can").

3) People may want to change names (e.g., "For fun").

4) New names/languages can be learnt (e.g., "Could learn other person's language").

APPENDIX 5.3 DELETED ITEMS FROM METALINGUISTIC TASKS IN EXPERIMENT 1

Task	Items passed by all	Items failed by all	Items which correlated negatively with total scale
1. Word Discrimination	9. one box	None	8. the rain (-.12)
2. Word Length	11. information	None	None
3. Word Print	None	None	None
4. Phonemic Segmentation	None	None	None
5. Word Referent	None	4. Can a gat be called a frog?	2. Can a cat be a gat? (-.37) 10. Why do you think it can (book/ house) or why do you think it can't? (-.19)
6. Word Renaming	1. Hand me the shig. 2. Put the shig next to the truck.	None	None
7. Symbol Substitution	None	None	None
8. Word Order Judgement	3. The teacher a book reads.	None	1. The car blue is on the road. (-.09) 5. Mice not do like water. (-.12) 6. The cat with wool is playing. (-.22) 10. There are dogs three. (-.19) 11. The sky not is green. (-.19) 14. The boy has hair curly. (-.06) 18. Rabbits not can sing. (-.09)
9. Word Order Correction	None	None	None
10. Word Unit	None	None	None

APPENDIX 6.1 MODIFIED AND NEW METALINGUISTIC TASKS IN EXPERIMENT 2

(i) Phonemic Segmentation

Instructions: "Today we're going to play a tapping game. I'm going to say some real words, and I am going to tap out the words. Listen carefully, so you'll find out how to play the game."

Practice items

a. The experimenter first demonstrates this triad: oo, boo, boot. For oo the experimenter taps once and tells the child, "I only tapped once because there was only one sound oo. For boo the experimenter taps twice and tells the child, "I tapped twice because there were two sounds" and the two sounds are spelt out. For boot the experimenter taps three times, and tells the child, "I tapped three times because there were three sounds" and the three sounds are spelt out. The experimenter continues "Now, I want you to do it. Say oo. Good. Now, tap it out. Say boo. Now tap it out. Say boot. Now tap it out. If the child makes a mistake corrective feedback is given and the item is repeated.

b. The experimenter then presents the first training triad in a different order: boot, oo, boo. "Now, let's do it again to make sure you've got the idea. I'll mix them up and see if I can catch you." Corrective feedback is provided again.

c. The experimenter then presents this triad: ee, zee, zeek. Corrective feedback is given.

Instructions: "OK. Now we'll play the real game. I'll say real word or a play word, but won't tap it because you know how to play the game yourself. So, you say the word after me and then tap it out. OK? Tap out the sounds."

Items

1. them
2. gĭth
   á
3. she
4. chog
5. need
6. shé
7. with
   ow
8. théb
9. out
10. the
11. dowk
12. chop
    í
13. thoo
14. neep
    oo
15. down
16. owd

(ii) Word Referent

Instructions: "This game we are going to play is a thinking and a naming game."

Items

1. "What is this? (pointing to a cat) Can a cat be called a gat?"
2. "Why do you think it can/Why do you think it can't?"
3. "OK. Do you know that people from different places do call things differently? In one country they call a cat chat, a book livre, a house maison, a car voiture, and a chair chaise. Why do you think that some people can call things differently?"
4. "Could we learn to call a cat chat like people do from the different country I told you about?"
5. "And could we also change things and start calling cats gats?"
6. "Why do you think we could/Why do you think we couldn't?"
7. "How about if we wanted to change things and call a house crond. Could we do that?"
8. "Why do you think we could do that/Why do you think we couldn't?"

(iii) Symbol Substitution

Instructions: "This is a naming game and we are going to swop words. Listen carefully so you'll find out how to play the game."

Practice items

a. "In this game the way we say apple is to say dog. So the way we say The apple is under the tree is to say The dog is under the tree. OK. Now you try it. If the way we say apple is to say dog, how do we say The apple is under the tree?"

b. "Let's have another practice. For this game the way we say mum is to say dad. So how do we say Mum is working?"

c. "How about this one. If the way to say she is to say he, how do we say She ate lunch?"

Corrective feedback is given on these practice items.

Instructions: "OK. Now we'll play the real game." For each item the child is asked to substitute the second word for the first word, as in the practice trials.

Items

1.	I/ice	in	I am cold
2.	she/fish	in	She likes swimming.
3.	in/jump	in	Frogs are in the water.
4.	people/he	in	People drive to work.
5.	are/up	in	The birds are flying.
6.	with/like	in	Cats play with wool.
7.	were/fast	in	They were running.
8.	they/he	in	They are drinking water.
9.	summer/l	in	Summer is hot.
10.	under/play	in	The kittens are under the tree.

(iv) Word Unit

Instructions: "Today we're going to play a tapping game. I'm going to say some words and then I'm going to tap once for every word. Listen carefully and I'll show you how to play the game."

Practice items

a. "The experimenter demonstrates the first training phrase, his new schoolbag. His." The experimenter taps once and explains. "I tapped once for his because there was only one word his. His new." The experimenter taps twice. "I tapped one time for his and one time for new. His new schoolbag." The experimenter taps three times. "I tapped three times for his new schoolbag because there were three words, his, new, and schoolbag. I tapped one time for his, one time for new, and one time for schoolbag. See the way the game is played? For every word I say I give a tap. Now I want you to do it. Say his and tap it. Good. Now say his new and tap it. Good. Say his new schoolbag and tap it." If the child makes an error corrective feedback is given.

b. The phrase, her fat kitten is given to the children as above with corrective feedback.

c. The phrase, their new hairbrush is given also with corrective feedback.

Instructions: "OK. Now, we'll play the real game. I'll say some words, but I won't tap them because you know how to play the game yourself. So, you say the words after me and tap them as you say them. OK?"

Items

1. his toenail
2. the police
3. the new shoelace
4. a cowboy
5. her new table
6. a big cupboard
7. her necklace
8. his cold bedroom
9. the cold apple
10. his football
11. the playground
12. his guitar
13. a big window
14. the cold teapot
15. her big raincoat
16. her new toothbrush

(v) Supply Initial Consonant

Instructions: "In this word game I am going to say two words that are the same except for the beginning sound. Listen carefully so you'll find out how to play the game."

Practice items

a. "Say the word cat. And now say at. What sound do you hear in cat that is missing from at?"

b. "Say the word boat. And now say oat. What sound do you hear in boat that is missing from oat?"

c. "Say the word fall. And now say all. What sound do you hear in fall that is missing from all?"

Corrective feedback is given.

Instructions: "OK. Now we'll play the real game." The child will be presented with the following pair of words. The child has to repeat the words and then the child will be asked what sound he hears in _____ that is missing from _____.

Items

1. meal-eel
2. fill-ill
3. sit-it
4. land-and
5. near-ear
6. pair-air
7. bend-end
8. task-ask
9. date-ate
10. kin-in
11. wheat-eat
12. think-ink

APPENDIX 9.1 QUESTIONNAIRES EMPLOYED IN EXPERIMENT 3

(i) Background Information

Name of child: .....

Sex: .....

Date of birth: .....

School attending: .....

Child's grade: .....

Month child commenced reception (if applicable): .....

Length of time child attended kindergarten and/or preschool (if applicable): .....

Languages spoken at home: .....

.....

Other children

Name	Sex	Age
.....		
.....		
.....		
.....		

Address: .....

.....

Highest level of education attained (please tick one for each parent):

	Mother	Father
Primary school		
Four years or less of secondary school		
Completed secondary school (course other than matriculation or equivalent)		
Completed technical qualifications (e.g., plumber)		
Matriculation		
Completed tertiary degree/diploma		

* Note * Please give more details if your level of education is not described by the above categories.

.....

.....

.....

.....

(ii) Literary Interests

1. My child enjoys reading.

   never / sometimes / often / most of the time / always

2. My child visits libraries.

   never / sometimes / often / most of the time / always

3. My child makes up stories.

   never / sometimes / often / most of the time / always

4. My child likes to learn new words.

   never / sometimes / often / most of the time / always

5. Adults read to my child.

   never / sometimes / often / most of the time / always

6. My child learns nursery rhymes.

   never / sometimes / often / most of the time / always

7. My child likes to talk with adults.

   never / sometimes / often / most of the time / always

8. My child makes up jokes.

   never / sometimes / often / most of the time / always

(iii) Language Background

1. (a) Is Italian or an Italian dialect spoken in your home?

yes/no

(b) If yes, please indicate:

only standard Italian / only Italian dialects / combination of both

(c) If an Italian dialect/s is spoken in your home, please specify dialect/s or give Italian region/s associated with dialects. .....

.....

(d) Specify any languages other than Italian or English spoken in the home. .....

.....

(e) What does your child prefer to speak?

only English / mostly English / both / mostly Italian / only Italian

(f) What language did your child hear from an early age?

only English / mostly English / both / mostly Italian / only Italian

(g) What languages did your child speak before s/he started school?

only English / mostly English / both / mostly Italian / only Italian

2. Extent to which your child hears Italian from the family and the extended family:

(a)	Father	never / sometimes / often / mostly / always
(b)	Mother	never / sometimes / often / mostly / always
(c)	Brothers/Sisters	never / sometimes / often / mostly / always
(d)	Paternal Grandparents	never / sometimes / often / mostly / always
(e)	Maternal Grandparents	never / sometimes / often / mostly / always
(f)	Paternal Relatives	never / sometimes / often / mostly / always
(g)	Maternal Relatives	never / sometimes / often / mostly / always

3. Extent to which your child speaks Italian to the family and the extended family:

(a)	Father	never / sometimes / often / mostly / always
(b)	Mother	never / sometimes / often / mostly / always
(c)	Brothers/Sisters	never / sometimes / often / mostly / always
(d)	Paternal Grandparents	never / sometimes / often / mostly / always
(e)	Maternal Grandparents	never / sometimes / often / mostly / always
(f)	Paternal Relatives	never / sometimes / often / mostly / always
(g)	Maternal Relatives	never / sometimes / often / mostly / always

4. Other forms of exposure that the child has to the Italian language:

(a) Are there Italian books and newspapers in the home?

never / sometimes / often / most of the time / always

(b) Are Italian letters received and written by members in the home?

never / sometimes / often / most of the time / always

(c) Are Italian radio programmes listened to in the home?

never / sometimes / often / most of the time / always

(d) Are Italian television programmes and films watched in the home?

never / sometimes / often / most of the time / always

(e) Do you listen to Italian music in the home?

never / sometimes / often / most of the time / always

APPENDIX 9.2 MODIFIED METALINGUISTIC TASKS IN EXPERIMENT 3

(i) Word Discrimination

Training task

Instructions: "In this game I want you to tell me if what I say is an animal or not an animal." This is asked after the presentation of each item. Corrective feedback is given.

Items horse; tree; dog; flower; apple; rabbit.

Main task

Instructions: "In this game I want you to tell me if what I say is one word or two words." This is asked after the presentation of each item.

Items

1. candle
2. the farm
3. over
4. ladder
5. hot day
6. a frog
7. because
8. the rain
9. one box
10. under
11. big bike
12. broken
13. an egg
14. red bag
15. winter
16. happy

(ii) Word Length

Instructions: "In this game, I want you to tell me if what I say is a long word or a short word." This is asked after the presentation of each item.

Items

1. truck
2. beautiful
3. butterfly
4. hot
5. bus
6. sharpener
7. interesting
8. sing
9. road
10. eat
11. information
12. caterpillar
13. rope
14. run
15. afternoon
16. cigarette

APPENDIX 9.3 NEW ITALIAN AND ENGLISH VERBAL TESTS IN EXPERIMENT 3

(i) PPVT2 (Italian) (Dunn & Dunn, 1981)

Istruzioni per i soggetti meno di otto anni

I disegni sulle pagine A, B, e C sono usate per la prova iniziale. Cominciare il test dicendo:

"Voglio che tu guardi a certo disegni con me."

Mostrare Pagina A e dire,

"Vedi tutti i disegni su questa pagina." (Mostrare tutte e quattro i disegni.) "Io diro' una parola; dopo uoglio che tu mi mostri il disegno per la parola che io ho detto. Proviamo. Metta il dito su ___" (Pagina A, prima parola per questa prova).

Se il soggetto fa la risposta guista, mostrare Pagina B, dicendo:

"Va bene. Adesso metta il dito su ____" (Pagina B, prima parola per questa prova). Se il soggetto fa la risposta guista di nuovo, mostrare Pagina C, dicendo:

"Bene! Fammi vedere ___" (Pagina C, prima parola per questa prova).

Dall' inizio, se il soggetto sceglie il disegno sbagliato, prima di mostrare il prossimo disegno, indicare la risposta guista dicendo, per esempio:

"Hai tentato bene, ma questa e' la risposta guista."

Allo stesso tempo, spiegare brevamente perche' la risposta non e' guista. Ripetere il item finiche' il soggetto faccia la risposta guista; dopo dare il prossimo item. Con i bambini piccoli o handicapati, forse sia necessario dare altre prove. Nei tali casi, usare quante prove siano necessari. Continaure con le pagine di prova finche' il soggetto risponde

corretamente a tre parole consecutive senza auita.

Quando la prova e' finita, trovare il punto iniziale del test, indicato sulla pagina per le risposte. Dopo dire:

"Bene! Adesso ti faccio vedere altri disegni. Ogni volta che dico una parola, tu devi trovare il meglio disegno per la parola. Pui' avanti, forse tu non sia sicura di quello che vuole dire una parola, ma in ogni caso voglio che tu guardi attentamenta a tutti i designi, e scegli quello che tu pensi sia guisto. Fammi vedere (parola iniziale)."

Communiciando dal punto iniziale, dare gli item finiche' il soggetto faccia il primo sbaglio. Se il soggetto faccia il primo sabaglio prima di fare otto risposte consecutive, dare gli altri item nell'ordine discendente finche' il soggetto faccia otto risposte consecutive senza uno sbaglio. Dopo che il soggetto faccia otto risposte consecutive senza uno sbaglio, dare gli altri item finche' faccia sei sbagli in otto risposte consecutive.

Prove

Pagina	Prova iniziale	Prova X	Prova Y	Prova Z
A	bambolla (4)	forchetta (1)	tavola (2)	macchina (3)
B	uomo (2)	pettine (3)	calzino (4)	bocca (1)
C	dondolando (3)	bevendo (4)	camminando (1)	salendo (2)
D	ruota (4)	cerniera (2)	fune (1)	rastrello (3)
E	gigante (1)	sposa (3)	strega (4)	regale (2)

Item

1 autobus (4)
2 mano (1)
3 letto (3)
4 trattore (2)
5 armadio (1)
6 serpa (4)
7 barca (2)
8 gomma (3)
9 muca (1)
10 lampada (4)
11 tamburro (3)
12 ginocchio (4)
13 elicottero (2)
14 gomito (4)
15 benda (4)
16 penna (1)
17 vuoto (3)
18 recinto (4)
19 incidente (2)
20 rete (2)
21 strapando (4)
22 vela (1)
23 misurando (2)
24 sbucciando (3)
25 gabbia (1)
26 arnese (4)
28 stendendo (1)
29 freccia (2)
30* attacando (2)
31 nido (1)
32 busta (2)
33 uncino (3
34 incollando (4)
35** carezzando (1)
36 pinguino (1)
37 cucendo (2)
38 consegnando
39 tuffando (2)
40*** paracadute (3)
41 peloso (4)
42 vegetale (4)
43 spalla (3)
44 gocciolando (2)
45 artiglio (4)
46 decorato (3)
47 struttura (1)
48 foresta (3)
49 rubinetto (2)
50 gruppo (3)
51 gambo (3)
52 vaso (3)
53 pedale (1)

27 quadrato (4)
55 sopprendente (4)
56 scorza (2)
57 meccanico (2)
58 tamburello (1)
59 disappunto (4)
60 aggiudicando (3)
61 brocca (3)
62 rocchetto (1)
63 segnale (1)
64 tronco (2)
65 umano (2)
66 narice (1)
67 disaccordo (1)
68 esausto (2)
69 vite (4)
70 cerimonia (4)
71 casseruola (2)
72 veicolo (4)
73 globo (3)
74 ordinando (3)
75 morsa (2)
76 strisciante (2)
77 isola (1)
78 spatola (3)
79 cooperazione (4)
80 scalpo (4)
54 capsula (2)
82 donnola (2)
83 demolendo (4)
84 balcone (1)
85 medaglione (1)
86 stupito (3)
87 tubolare (1)
88 zanna (1)
89 catenaccio (3)
90 comunicazione (4)
91 falegname (2)
92 isolamente (1)
93 gonfio (3)
94 costa (3)
95 aggiustabile (2)
96 fragile (3)
97 assalendo (1)
98 elettrodomestico (1)
99 pyramide (4)
100 ardendo (1)
101 alzando (1)
102 arco (4)
103 farendo una conferenza (4)
104 decrepito (4)
105 contemplando (2)
106 scatola (1)
107 dissenzionando (3)

81 ramoscello (2)
109 solenne (3)
110 tiro all'arco (2)
111 trasparente (3)
112 tosse (1)
113 utensile (2)
114 agrume (3)
115 pedone (2)
116 parallelogramma (1)
117 dormendo (3)
118 penisola (4)
119 tappezzeria (2)
120 barricata (4)
121 quartetto (4)
122 tranquillo (3)
123 abrusivo (1)
124 affaticato (3)
125 sferico (2)
126 siringa (2)
127 felino (2)
128 arido (4)
129 esterno (1)
130 costellazione (4)
131 cornea (2)
132 mercantile (1)
133 ascendendo (3)
134 filtrazione (1)
135 consumando (4)
108 anello (4)
136 cascata (4)
137 perpendicolare (3)
138 riempendo (1)
139 emissione (3)
140 artiglio (3)
141 ira (3)
142 incandescente (4)
143 arrogante (2)
144 confidando (3)
145 rombo (3)
146 nautico (3)
147 tangente (1)
148 inclemente (4)
149 traiettoria (1)
150 inccatento (1)
151 vagabondo (3)
152 giubliante (2)
153 rubacchiare (4)
154 risposo (2)
155 carogna (3)
156 indigente (2)
157 convesse (1)
158 emaciate (2)
159 divergenza (4)
160 dromedario (2)
161 abbellendo (2)
162 emtomolgo (3)

163 costringere (1)

164 debole (1)

165 antropoide (3)

166 spetro (4)

167 incertezza (2)

168 vetroso (1)

169 obelisco (1)

170 goffrato (4)

171 ambularco (2)

172 calice (2)

173 tangenza (3)

174 cupola (4)

175 omuncolo (4)

* Punto inziale per bambini di 5 anni

** Punto inziale per bambini di 5 anni e mezzo

*** Punto iniziale per bambini di 6 anni

(ii) Vocabulary2 (Italian)

Instructions for this test are the same as those used in the Vocabulary subtest from the WPPSI which have been published into Italian by Organizzazioni Speciali (Wechsler, 1973).

Items

1. forchetta
2. bottiglia
3. gattino
4. ruota
5. cuscino
6. pettine
7. quadrato
8. foglia
9. cammello
10. saltare
11. spada
12. bollire
13. tappeto
14. danneggiato
15. lumaca
16. cercare
17. investigatore
18. ovale
19. pedale
20. prigioniero
21. telegramma
22. stracciare

(iii) Sentences2 (Italian)

Instructions for this test are the same as those used in the Sentences subtest from the WPPSI which have been published into Italian by Organizzazioni Speciali (Wechsler, 1973).

Items

A. Il gatto.

B. I bambini giocano.

C. Noi andiamo a scuola.

1. Anna ha una palla bianca.

2. Il libro e' sul banco della maestra.

3. Paulo ha tre penne blu e due gomme.

4. Maria ha due fratelli e un piccolo cane nero.

5. I bambini vanno spesso al mare quando i giorni sono molto caldi.

6. Ogni giorno Marco compra un gelato e la cioccolata alla scuola.

7. Papa' va a lavorare in citta' con la sua macchina nuova.

8. D'inverno quando fa freddo e piove tutte le persone usono un ombrello.

9. La prossima settimana noi prendiamo il treno con la nostra maestra e insieme andiamo in montagna.

10. Alle tre le strade vicino le scuole sono sempre piene di traffico. Questo e' un pericolo per i bambini.

(iv) Vocabulary2 (English)

Instructions are the same as those used in the Vocabulary subtest from the WPPSI (Wechsler, 1967).

Items

1. fork
2. bottle
3. kitten
4. wheel
5. pillow
6. comb
7. square
8. leaf
9. camel
10. square
11. sword
12. boil
13. carpet
14. damaged
15. snail
16. search
17. detective
18. oval
19. pedal
20. captive
21. telegram
22. shred

(v) Sentences2 (English)

Instructions are the same as those used in the Sentences subtest from the WPPSI (Wechsler, 1967).

Items

A. The cat.

B. The children play.

C. We go to school.

1. Anne has a white ball.

2. The book is on the teacher's desk.

3. Paul has three blue pens and two rubbers.

4. Mary has two brothers and a small white dog.

5. Children often go to the beach when the days are very warm.

6. Every day Mark buys an ice-cream and some chocolate at school.

7. Dad goes to work in the city with his new car.

8. In winter when it is cold and wet everyone carries an umbrella.

9. Next week we are catching the train with our teacher and together we are going hiking.

10. At three o'clock the roads near schools are always busy with traffic. This is a hazard for children.

APPENDIX 9.4 DELETED TEST ITEMS FROM RELEVANT SCALES IN EXPERIMENT 3

(i) PPVT2 (Italian)

The lowest item administered was 1 and the highest item was 71, in accordance with the standard test instructions (Dunn & Dunn 1981). No item was passed by all the bilinguals, whilst the following nine items were failed by all the group:

49. rubinetto
61. brocca
62. rocchetto
64. tronco
67. disaccordo
68. esausto
69. vite
70. casseruola
71. veicolo

(ii) Vocabulary2 (Italian)

These four items were failed by all the bilingual children:

11. spada
14. danneggiato
20. prigioniero
21. telegramma

(iiii) Sentences2 (Italian)

No item was passed by all the bilingual children, whilst these were failed by all:

8. D'inverno quando fa freddo e piove tutte le persone usono un ombrello.
9. La prossima settimana noi prendiamo il treno con la nostra maestra e insieme andiamo in montagna.
10. Alle tre le strade vicino le scuole sono sempre piene di traffico. Questro e' un pericolo per i bambini.

(iv) PPVT2 (English)

The lowest item administered was 9 and the highest item was a 122 in accordance with the standard test instructions (Dunn & Dunn, 1981). The following 16 items were passed by all the monolinguals:

9. cow
10. lamp
11. drum
12. knee
13. helicopter
14. elbow
15. bandage
16. feather
18. fence
19. accident
20. tearing
21. sail
22. measuring
25. cage
29. arrow
32. envelope

In addition, these 10 items were failed by all the monolingual children:

106. canister

109. solemn

110. archery

112. husk

115. pedestrian

116. parallelogram

117. slumbering

118. peninsula

121. quartet

122. tranquil

(v) Sentences2 (English)

No item was failed by all the monolinguals, whilst these items were passed by all:

A. The cat.

B. The children play.

C. We go to school.

APPENDIX 10.1 MODIFIED QUESTIONNAIRES AND ITALIAN TRANSLATIONS IN EXPERIMENT 4

(i) Background Information

Name of child: .....

Sex: .....

Date of birth: .....

School: .....

Grade: .....

Date child commenced school: .....

If the child has attended preschool, please indicate the length of time in months and/or years: .....

Languages spoken in the home (Italian/Italian dialect/other languages)

.....

Other children

Name	Sex	Age
.....		
.....		
.....		
.....		

Address: .....

.....

Highest level of education attained by parents of the child.

Father .....

Mother .....

(ii) Italian translation of Background Information:

Informazioni Generali

Nome del bambino/della bambina: .....

Sesso: .....

Data di nascita: .....

Scuola: .....

Classe: .....

La data che ha cominciato la scuola: .....

Se ha fatto l'asilo si prega di indicare per quanto tempo in mesi e/o anni

.....

Lingue parlate in casa (italiano/un dialetto italiano/altre lingue)

.....

Altri bambini

Nome	Sesso	Eta'
.....		
.....		
.....		
.....		

Indrizzo: .....

.....

Titolo di studio conseguito dai genitori

Padre: .....

Madre: .....

(iii) Language Background

1. (a) Is English spoken in the home? yes / no

(b) Are other languages spoken in the home? yes / no

Please specify .....

(c) What does your child prefer to speak?

only Italian / mostly Italian / both / mostly English / only English

(d) What language did your child hear from an early age?

only Italian / mostly Italian / both / mostly English / only English

(e) What languages did your child speak before s/he commenced school?

only Italian / mostly Italian / both / mostly English / only English

2. Does your child hear English from the following?

(a) Father never / sometimes / often / mostly / always

(b) Mother never / sometimes / often / mostly / always

(c) Brothers/Sisters never / sometimes / often / mostly / always

(d) Paternal Grandparents never / sometimes / often / mostly / always

(e) Maternal Grandparents never / sometimes / often / mostly / always

(f) Paternal Relatives never / sometimes / often / mostly / always

(g) Maternal Relatives never / sometimes / often / mostly / always

3. Does your child speak English to the following?

(a)	Father	never / sometimes / often / mostly / always
(b)	Mother	never / sometimes / often / mostly / always
(c)	Brothers/Sisters	never / sometimes / often / mostly / always
(d)	Paternal Grandparents	never / sometimes / often / mostly / always
(e)	Maternal Grandparents	never / sometimes / often / mostly / always
(f)	Paternal Relatives	never / sometimes / often / mostly / always
(g)	Maternal Relatives	never / sometimes / often / mostly / always

4. Other forms of exposure that the child has to the English language:

(a) Are there English books and newspapers in the home?

never / sometimes / often / mostly / always

(b) Are English letters received and written by members in the home?

never / sometimes / often / mostly / always

(c) Are English radio programmes listened to in the home?

never / sometimes / often / mostly / always

(d) Are English television programmes and films watched in the home?

never / sometimes / often / mostly / always

(e) Do you listen to English music in the home?

never / sometimes / often / mostly / always

(iv) Italian translation of Language Background:

Informazioni sulle Lingue Parlate

1. (a) Si parla l'inglese in casa? sì / no

(b) Si parlano altre lingue in casa? sì / no

Quali sono? .....

(c) Quale lingua preferisce parlare suo figlio/sua figlia?

solo l'italiano / quasi sempre l'italiano / tutte e due / quasi sempre l'inglese / solo l'inglese

(d) Quale lingua ha sentito suo figlio/sua figlia da una eta' precoce?

solo l'italiano / quasi sempre l'italiano / tutte e due / quasi sempre l'inglese / solo l'inglese

(e) Quale lingua ha parlato suo figlio/sua figlia prima che ha cominciato l'asilo o la scuola?

solo l'italiano / quasi sempre l'italiano / tutte e due / quasi sempre l'inglese / solo l'inglese

2. Si prega di indicare se suo figlio/sua figlia sente l'inglese da queste persone:

(a) Padre mai / qualche volta / spesso / quasi sempre / sempre

(b) Madre mai / qualche volta / spesso / quasi sempre / sempre

(c) Fratelli/Sorelle mai / qualche volta / spesso / quasi sempre / sempre

(d) Nonni Paterni mai / qualche volta / spesso / quasi sempre / sempre

(e) Nonni Materni mai / qualche volta / spesso / quasi sempre / sempre

(f) Parenti Paterni mai / qualche volta / spesso / quasi sempre / sempre

(g) Parenti Materni mai / qualche volta / spesso / quasi sempre / sempre

3. Si prega di indicare se suo figlio/sua figlia parla l'inglese a queste persone:

(a) Padre mai / qualche volta / spesso / quasi sempre / sempre

(b) Madre mai / qualche volta / spesso / quasi sempre / sempre

(c) Fratelli/Sorelle mai / qualche volta / spesso / quasi sempre / sempre

(d) Nonni Paterni mai / qualche volta / spesso / quasi sempre / sempre

(e) Nonni Materni mai / qualche volta / spesso / quasi sempre / sempre

(f) Parenti Paterni mai / qualche volta / spesso / quasi sempre / sempre

(g) Parenti Materni mai / qualche volta / spesso / quasi sempre / sempre

4. (a) Ci sono libri e giornali inglesi nella casa?

mai / qualche volta / spesso / quasi sempre / sempre

(b) Le lettere inglese sono ricevute e scritte da persone nella casa?

mai / qualche volta / spesso / quasi sempre / sempre

(c) Ascoltate i programme inglesi sulla radio nella casa?

mai / qualche volta / spesso / quasi sempre / sempre

(d) I programme e i film inglesi sono guardati nella casa?

mai / qualche volta / spesso / quasi sempre / sempre

(e) Ascoltate la musica inglese nella casa?

mai / qualche volta / spesso / quasi sempre / sempre

(v) Italian translation of Literary Home Interests:

Interessi Litterari

1. Al mio figlio/alla mia figlia piace la lettura.
   mai / qualche volta / spesso / quasi sempre / sempre

2. Mio figlio/mia figlia frequenta le biblioteche.
   mai / qualche volta / spesso / quasi sempre / sempre

3. Mio figlio/mia figlia inventa le storie.
   mai / qualche volta / spesso / quasi sempre / sempre

4. Al mio figlio/alla mia figlia piace imparare le parole nuove.
   mai / qualche volta / spesso / quasi sempre / sempre

5. Gli adulti leggono al mio figlio/alla mia figlia.
   mai / qualche volta / spesso / quasi sempre / sempre

6. Mio figlio/mia figlia si impara le filastrocche.
   mai / qualche volta / spesso / quasi sempre / sempre

7. Al mio figlio/alla mia figlia piace parlare con gli adulti.
   mai / qualche volta / spesso / quasi sempre / sempre

8. Mio figlio/mia figlia inventa gli scherzi.
   mai / qualche volta / spesso / quasi sempre / sempre

APPENDIX 10.2 ITALIAN TRANSLATION OF THE CREATIVITY TESTS IN EXPERIMENT 4

(i) Thinking Creatively in Action and Movement/
Pensando Creativamente con gli Azioni e il Movimento (Torrance, 1981b)

Activita' 1 (Quante Maniere?)

Istruzioni: "Oggi ci divertiremo a fare movimento in maniere interessante. Voglio che tu pensa di caminare e di correre in tante maniere quante ne puoi. Vedi questo pezzo di nastro rosso? Cominceremo a correre e a caminare da qui, e andremo dall'altro lato della stanza finche' arriveremo al pezzo di nastro giallo".
(Caminare fra i due pezzi di nastro con il bambino e dargli degli esempi- correre, saltellare, saltare, caminare lentamente.)

"Adesso sta a te a caminare e a correre per me. Pensa a tante maniere quante ne puoi. Mentre che tu fai movimento, io mi siedo qui e scrivo. Adesso puoi cominciare". (None dare gli indizii ai bambini ma continuare motivandogli di mostrare tante maniere per traversare la stanza. Elencare ogni risposta.)

Activita' 2 (Puoi Muovere Come?)

Istruzioni: "Adesso faremo altre cose divertente. Questa volta faremo finta. Qualche volta faremo finta che siamo uccelli, elefanti, o cavalli. Altre volte faremo finta che stiamo gettando o acchiappando una palla." (Mostrare queste cose e incoraggiare il bambino di farele con lei.)

"Adesso io diro' alcune cose e tu le fai. Non devi dirmi nulla. Me le lo puoi mostrare solo." (Fare un cerchio attorno il numero indicato nel manuale che corrisponde con la risposta del bambino.)

1. Puoi muovere come un albero nel vento? Immagini che sei un albero e che il vento mena. Fammi vedere come muoveresti.

2. Puoi muovere come un coniglio? Immagini che sei un coniglio e che qualcuno ti sta cacciando. Fammi vedere come saltelleresti.

3. Puoi muovere come un pesce? Immagini che sei un pesce nel fuime o nel laghetto. Fammi vedere come nuoteresti.

4. Puoi muovere come un serpente? Immagini che sei un serpente strisciando nell'erba. Fammi vedere come striscieresti.

5. Puoi muovere come stessi guidando una macchina? Immagini che stai in macchina sull' autostrada. Fammi vedere come guideresti.

6. Puoi spingere un elefante? Immagini che un elefante grande sta sopra quello che vuoi. Fammi vedere come lo spingeresti per farlo spostare sopra la cosa che vuoi.

Activita' 3 (Quante Altre Maniere?)

Istruzioni: "Ecco un bicchiere proprio come uno in cui si beve l'acqua. Lo sai mettere nell' cestino? Fammi vedere come la faresti. Bravo/a. Adesso vedremo in quante altre maniere lo puoi mettere nel cestino. Non devi dire nulla. Fammelo vedere solo. Ho molti bicchieri e puoi usare quante ne vuoi." (Elencare ogni risposta. Accettare le risposte verbali dai bambini che si sentono inhibiti di fare recitazione.)

Activita' 4 (Cosa Sai Fare Con Un Bicchiere Di Carta?)

Istruzioni: "Ne hai pensato a tante maniere in cui si puo' mettere un bicchiere di carta nel cestino. Ma qualche volta non vuoi mettere il bicchiere nel cestino. Invece forse vorresti giocare con il bicchiere o vorresti immaginare che sia qualcosa altro. Vedremo quante cose diverse sai fare con questo bicchiere. Fammele vedere o dimmele. Ho molti bicchieri che puoi usare." (Elencare ogni risposta.)

(ii) Verbal Fluency/Fluidita' Verbale

Tempo: Ci sono 30 secondi per le prove 1 e 2. Mettere in moto il cronometro alla parola "Cominicia".

Procedura: Usare la lode e il incoraggiamento liberalmente per tutte le prove nel test.

(i) Dire, "Guarda bene attorno a questa stanza e dimmi il nome di tutte le cose che vedi qui ... Sei pronto/a? Comincia." Il bambino deve essere incoraggiato con tali commenti come "Bene, che altro vedi? Guarda attorno alla stanza." eccetera

Se dopo dieci secondi il bambino non ha risposto, dire "Ci sono tante cose qui, e' vero? Dimmene una." Se il bambino non risponde, mostrare una sedia e dire "Cosa e' questa?"

Usare la lode e il incoraggiamento liberalmente e se necessario, mostrare gli altri oggetti finche' il bambino risponde.

Non si possono dare altri esempi durante la amministrazione delle prove 1 e 2.

1 Dire, "Voglio che tu mi dica il nome di tante cose per mangiare quante ne puoi. Sei pronto/a. Comincia." Mettere in moto il cronometro. Il tempo concesso e' di 30 secondi.

2 Dire, "E adesso voglio che tu mi dica il nome di tanti animali quante ne puoi. Sei pronto/a. Comincia." Mettere in moto il cronometro. Il tempo concesso e' di 30 secondi.

ii Aprire il libretto a pagina ii.

Dire, "Questo e' un altro tipo di giuoco. Io ti faro' vedere disegni come questo (mostrare) e voglio che tu mi dica che cosa possono essere - lo puoi voltare vice versa se vuoi. Che cosa puo' essere questo? ..."

Se dopo di 10 secondi il bambino non abbia risposto, dire "Penso che questo sembri come una lecca-lecca o sia un carro armato. Adesso dimmi qualcosa altro." Se il bambino ancora non risponde, dire, "Puo' essere anche una cannucia in o bicchiere on una casseruola" (mostrare il disegno).

3, 4 Per la prossima pagina nel libretto, dire "Adesso prova questo. Puoi voltare il disegno vice versa se vuoi. Cosa puo' essere questo ...?"

iii Dire, "Adesso voglio che tu mi dica quello che tu pensi succederebbe se qualche cosa strana accadesse. Per esempio, cosa pensi che succederebbe se i bambini avessero due teste?"

Ripetere e dare la loda a qualsiasi risposta data dal bambino.

Senza riguardo alle risposte del bambino, dire, "Allora potrebbero parlare con se stesso, avrebbero bisogna di due spazzoline, potrebbero vedere due strade a una volta, avrebbero bisogna degli specchi pui' larghi. Vedi, tutte queste specie di cose strane possono succedere.

Notare: Non dare gli esempi gia' data da loro.

5 Dire, "Cosa pensi che succederebbe se tutti dovessero caminare con le mani invece dei piedi?"

Se il bambino non risponde, dargli prova iv, altrimenti continuare con prova 6.

iv Dire, "Proveremo questo. Cosa pensi che succederebbe se le piante e gli alberi potessero caminare?"

Repetere e dare la lode per qualsiasi risposta data dal bambino. Senza riguardo alle risposte date, dire "Allora dovresti guardare le piante o loro se ne andassero, se ne fuggissero se le vorremo mangiare, e se mettessero nella strada del traffico."

6 Dire, "Cosa pensi che succederebbe se non ce ne fossero scuole?"

APPENDIX 10.3 ITALIAN VERSION OF METALINGUISTIC TASKS IN EXPERIMENT 4

(i) Word Discrimination/Discriminazione delle Parole

Compito iniziale

Istruzioni: "In questo giuoco voglio che tu mi dici se quello che dico e' un animale o se non e' un animale." Questo sara' chiesto dopo la presentazione di ogni item. Le risposte saranno corrette.

Item cavallo; albero; cane; fiore; mela; coniglio

Compito principale

Istruzioni: "In questo giuoco voglio che tu mi dici se quello che dico e' una parola o se sono due parole."

Questo sara' chiesto dopo la presentazione di ogni item.

Item

1.	candela	9.	dei letti
2.	il nido	10.	indietro
3.	davanti	11.	tre bici
4.	albero	12.	rotondo
5.	due mele	13.	un uovo
6.	un treno	14.	borsa blu
7.	siccome	15.	inverno
8.	la neve	16.	felice

(ii) Word Length/Lunghezza delle Parole

Istruzioni: "In questo giuoco voglio che tu mi dici se quello che dico e' una parola lunga o se e' una parola corta". Questo sara' chiesto dopo la presentazione di ogni item.

Item

1. treno
2. bellissimo
3. pasticcino
4. caldo
5. scala
6. temperamatite
7. interessante
8. canti
9. via
10. mangi
11. informazioni
12. bicchiere
13. fune
14. corsa
15. pomeriggio
16. sigaretta

(iii) Word Print/Parole Scritte

Istruzioni: "Io ho alcuni giochi per te e alcune domande sulla stampa. Ascolta molto attentamente cosi' saprai quello che devi fare. Primo faremo qualche prova." Gli item sono sulla prossima pagina.

(Vedere la prossima pagina.)

Item

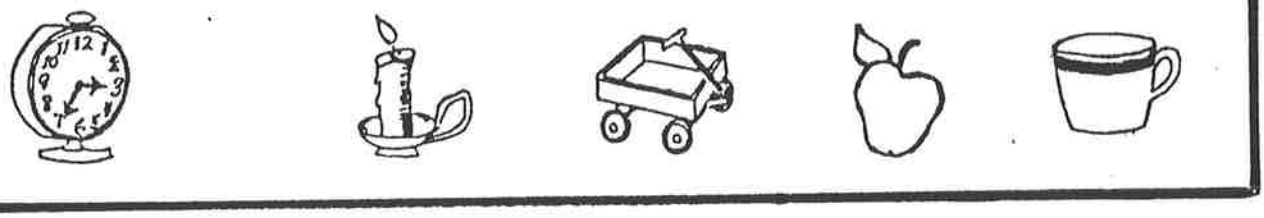
a. "Guarda alla striscia che ha una sveglia a uno dei lati. Metti il dito sulla sveglia. Adesso guarda alle cose in quella striscia. Trova la cosa che ti puoi mangiare. Fa' un cerchio attorno alla cosa che puoi mangiare."

b. "Adesso guarda la prossima striscia che ha un pesce a uno dei lati. Metti il dito sul pesce. In quella striscia fa' un cerchio attorno ad ogni cosa che ha i piedi-ad ogni cosa che hai i piedi."

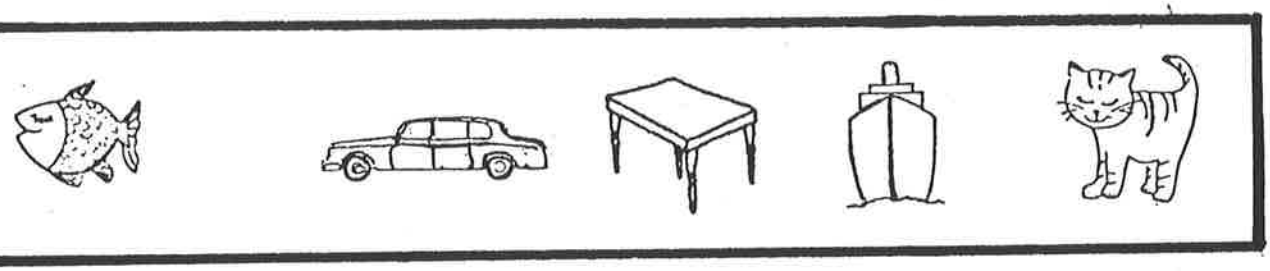
c. "Adesso trova la striscia con un pallone a uno dei lati. Fa' un cerchio attorno il primo animale. Fa' un cerchio attorno al primo animale."

Le tre prove saranno corrette.

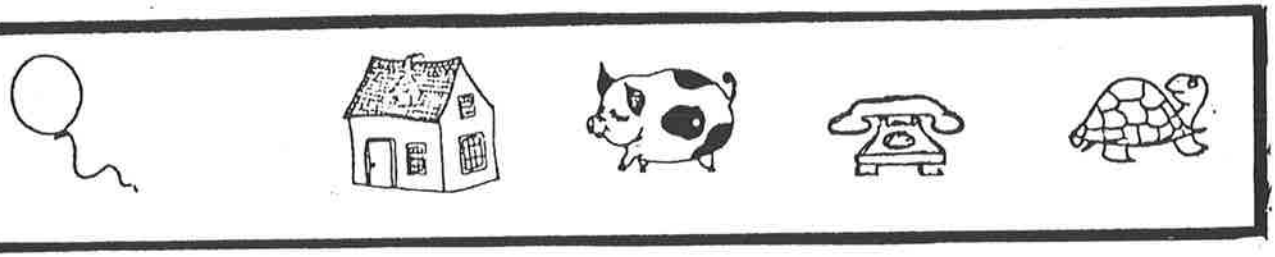
a.



b.



c.



Istruzioni: "Adesso abbiamo fatto la prova. Vediamo la prossima pagina."

Item (Vedere la prossima pagina.)

1. "Metti il dito sul carro. Fa' un cerchio ad ogni cosa nella striscia che e' una parola. Fa' un cerchio attorno ad ogni parola."

2. "Metti il dito sul letto. Fa' un cerchio attorno ad ogni parola nella striscia. Fa' un cerchio attorno ad ogni parola."

3. "Metti il dito sul secchio. Fa' un cerchio attorno ad ogni parola. Fa' un cerchio attorno ad ogni parola."

4. "Metti il dito sul pettine. In questa striscia fa' un cerchio attorno alla prima lettera in ogni parola-la prima lettera in ogni parola."

5. "Metti il dito sulla foglia. Fa' un cerchio attorno alla prima lettera in ogni parola-la prima lettera in ogni parola."

6. "Metti il dito sull' uccello. Fa' un cerchio attorno ad ogni parola. Fa' un cerchio attorno alla prima parola-la prima parola."

7. "Metti il dito sulla scarpa. Fa' un cerchio attorno ad ogni parola. Fa' un cerchio attorno ad ogni parola."

8. "Metti il dito sull'astronauta. In questa striscia fa' un cerchio attorno alla prima parola-la prima parola."

9. "Metti il dito sul cavallo. Fa' un cerchio attorno alla prima parola-la prima parola."

10. "Metti il dito sulla torte. Fa' un cerchio attorno alla prima parola nella striscia-la prima parola."

1.  su 6 piccolo D 3

2.  75 mamma z 8 p

3.  K 37 p 464 papà

4.  Ha fatto 36 paste.

5.  Puoi mangiare 10 mele?

6.  M d cane p siediti

7.  h 289 televisione di

8.  Quando i giorni sono caldi nuotiamo.

9.  I pesci piacciono ai gatti.

10.  Lui è venuto a casa. Abbiamo tutti giocato.

(iv) Symbol Substitution/Sostituzione dei Simboli

Istruzioni: "Questo e' un giuoco con i nomi e scambieremo le parole. Ascolti con attenzione, cosi' saprai come si gioca."

Item

a. "In questo giuoco la maniera in cui diremo mela e' cane, cosi' la maniera in cui diremo La mela e' sotto l'albero e' Il cane e' sotto l'albero. Adesso prova tu. Se la maniera in cui diremo mela e' cane come diremo La mela e' sotto l'albero?

b. Faremo un'altra prova. Per questo giuoco, la maniera in cui diremo mamma e' papa', allora come diremo Mamma lavora?"

c. Prova questa. Se la maniera in cui diremo lei e' lui come diremo Lei ha mangiato la colazione?" Le item a, b e c saranno corrette.

Istruzioni: Va bene, adesso faremo il propio giuoco. Le risposte non vengono corrette per i 12 item. In ogni caso, la prima parola deve essere sostituita per la seconda parola.

Item

1.	io/ghiaccio	in	Io ho freddo.
2.	lei/pesci	in	Lei nuota bene.
3.	nell'/saltono	in	Le rane sono nell'acqua.
4.	persone/lui	in	Le persone vanno a lavoro.
5.	stanno/su	in	Gli uccelli stanno volando.
6.	con/piacciono	in	I gatti giocano con la lana.
7.	stavano/veloce	in	Loro stavano correndo.
8.	loro/lui	in	Loro bevono l'acqua.
9.	l'estate/io	in	L'estate e' calda.
10.	sotto/giocano	in	I gatti sono sotto l'albero.

(v) Word Order Correction/Correzione dell' Ordine delle Parole

Istruzioni: "Queste e' la Signorina B (lei dice ciao'). La Signorina B ha molto difficolta dicendo le cose in maniera corretta. Dice sempre le cose in maniera sbagliata."

Item

a. "Per esempio, Mi la cioccolata piace. Ti pare in maniera sbagliata? Puoi mettere quello che ha detto in una maniera corretta?

b. Adesso ascolta di nuovo, Mamma il fa pranzo. Puoi mettere quello che ha detto in una maniera corretta?

c. E' prova questa, La ragazza un ha gatto. Puoi mettere quello che ha detto in una maniera corretta? Le risposte per item a, b, e c saranno corrette.

Istruzioni: "Va bene. Adesso sai come si fa questo giuoco. Voglio che tu aiuti la Signorina B a dire le cose in una maniera corretta." Le risposte per i 12 item non vengono corrette.

Item

1. Papa' la lava macchina.
2. Mi piacciono fiori quei.
3. L'erba e' bagnata non.
4. La maestra ha giacche due.
5. Le banane sono blu non.
6. L'uccello sull' e' albero.
7. Ci sono cani tre.
8. Lui una ha mangiato mela.
9. Qualche volta i bambini mangiano la cena non.
10. Lei il ha scritto libro.
11. Loro sono andati non al negozio.
12. Mamma ha vestiti tanti.

APPENDIX 10.4 ITALIAN TRANSLATION OF WORD READING IN EXPERIMENT 4

Word Reading/Parole di Lettura (Elliot, Murray & Pearson, 1983)

Istruzioni: Dire, "Ecco una carta con tante parole. Vedremo quante di queste puoi leggere. Leggeli ad alta voce per me."

Cominciare con la prima parola.

Continuare, dando incoraggiamento adatto finche' il bambino/la bambina ha sbagliato dieci parole consecutive. Dopo questo dire, "Sono un po' difficile adesso, e' vero? Guarda a tutte le altre parole, e se conosci qualcuna, me lo fai sapere." Non dare auita, dare soltanto incoraggiamento come "sì" e "bene".

Item					
1.	il	2.	su	3.	sopra
4.	va	5.	lui	6.	va
7.	saltare	8.	tu	9.	cassa
10.	pesce	11.	uno	12.	tazza
13.	furgone	14.	se	15.	fuori
16.	disse	17.	acqua	18.	uccello
19.	legno	20.	correndo	21.	finestra
22.	nave	23.	sveglia	24.	uomini
25.	scavare	26.	anello	27.	cancello
28.	denaro	29.	magro	30.	luce
31.	giacca	32.	mattone	33.	olio
34.	calcagno	35.	carte	36.	tappeto

37. pelle	38. battere	39. interruttore
40. sport	41. edificio	42. scrivendo
43. guanto	44. esercito	45. raccolto
46. viaggiare	47. arrampicare	48. signore
49. vitello	50. cuoio	51. credere
52. idea	53. catena	54. prato
55. raccogliere	56. invitare	57. nemico
58. favore	59. squallido	60. ospite
61. territorio	62. comportamento	63. massiccio
64. errore	65. barba	66. drogheria
67. incontro	68. statua	69. soffitto
70. trasparente	71. universale	72. esperienza
73. pasta	74. tentacolo	75. oscuro
76. carattere	77. esercitare	78. diametro
79. curiosita'	80. ambiente	81. zanzara
82. nomade	83. velocita'	84. letale
85. divulgare	86. caos	87. accentuare
88. rischio	89. aborigene	90. criterio

APPENDIX 10.5 DELETED TEST ITEMS FROM RELEVANT SCALES IN EXPERIMENT 4

(i) PPVT2 (Italian)

In the monolingual group the lowest item given was 1 and the highest item was 120, in accordance with the standard test instructions (Dunn & Dunn, 1981). These 10 items were passed by all the monolinguals:

1. autobus
2. mano
3. letto
4. trattore
5. armadio
6. barca
7. gomma
10. lampada
11. tamburro
19. incidente

In addition, these seven items were failed by all the monolinguals:

105. contemplando
112. tosse
113. utensile
114. agrume
115. pedone
119. tappezaria
120. barricata

(i) PPVT2 (Italian (continued)

In the bilingual group the lowest item given was 1 and the highest item was 136, in accordance with the standard test instructions (Dunn & Dunn, 1981). No item was passed by all the bilinguals whilst the following 11 items were failed by all:

113. utensile

118. penisola

121. quartetto

125. sferico

128. arido

131. cornea

132. mercantile

133. ascendendo

134. filtrazione

135. consumando

136. cascata

(iii) Sentences 2 (Italian)

In both the monolingual and the bilingual group Item 1 was passed by all the children:

1. Il gatto

(iv) Block Design

In both the monolingual and the bilingual group Item 1 was passed by all the children. For this item the children were asked to copy a design which consisted of two red blocks and a white block placed side by side.

(v) Word Reading

No item was failed by all the bilinguals, whilst one item was failed by all the monolinguals:

78. diametro

(vi) Word Length

These three items correlated negatively with the total Word Length scale in the bilingual group:

4. caldo (r= -.05)

8. canti (r= -.07)

10. mangi (r= -.07)

(vii) Word Print

This item correlated negatively with the total Word Print scale in the monolingual group:

9. I pesci piacciono ai gatti. (r= -.38)

(viii) Literary Interests

These two items correlated negatively with the total Literary Interests scale in the monolingual group:

3. Mio figlio/mia figlia frequenta le biblioteche. (r= -.15)

7. Al mio figlio/alla mia figlia piace parlare con gli adulti. (r= -.03)

REFERENCES

Ahukanna, J., Lund, N., & Gentile, J. (1981). Inter and intralingual interference effects in learning a third language. Modern Language Journal, 65, 281-287.

Akhurst, R. A. (1978). Creative thought in children. Educational Review, 30, 195-207.

Albaum, G. (1977). Birth order and creativity: Some further evidence. Psychological Reports, 40, 792-794.

Ali, A. (1987). A comparative study of achievement motivation, performance and creativity of destitute and nondestitute children of Ajmer schools. Indian Psychological Review, 32, 34-40. (From Psychological Abstracts, 1989, 76, Abstract No. 3212).

Aliedin, M. T. (1979). Torrance indicators of creative thinking: A developmental study. Dissertation Abstracts International, 39, 4129-A.

Aliotti, N. C., Britt, M. J., & Haskins, J. P. (1975). Relationship among creativity, intelligence and achievement measures in upward bound students. Psychology in the Schools, 12, 423-427.

Alvarez, P. A. (1984). The relationship between bilingualism and nonverbal creative behavior among limited-English proficient and Spanish-English proficient Hispanic girls of primary school age. Dissertation Abstracts International, 45, 121-A. (University Microfilms No. 84-09, 494).

Anastasi, A. (1982). Psychological testing (fifth ed.). New York: Macmillan Publishing Co.

Arnberg, L. (1987). Raising children bilingually: The preschool years. Clevedon: Multilingual Matters.

Aronsson, K. (1981). The bilingual preschooler as grammarian: Children's paraphrases of ungrammatical sentences. Psychological Research Bulletin, 21, 1-26.

Babu, N. (1984). Perception of syntactic ambiguity by bilingual and unilingual tribal children. Psycho-Lingua, 14, 47-54.

Bachtold, L., & Worley, P. (1986). Imagination, originality and temperament of preschool children. The Journal of Creative Behavior, 20, 141-142.

Bain, B. (1975). Toward an integration of Piaget and Vygotsky: Bilingual considerations. Linguistics, 160, 5-19.

Baker, C. B. (1988). Key issues in bilingualism and bilingual education. Clevedon: Multilingual Matters.

Barton, D. (1985). Awareness of language units in adults and children. In A. W. Ellis (Ed.), Progress in the psychology of language (Vol. 1, pp. 187-205). New York: Erlbaum.

Bates, E. (1976). Language and context: The acquisition of pragmatics. New York: Academic Press.

Bates, E. (1979). The emergence of symbols: Cognition and communication in infancy. New York: Academic Press.

Bayard-de-volo, C. L., & Fiebert, M. S. (1977). Creativity in the preschool child and its relationship to parental authoritarianism. Perceptual and Motor Skills, 45, 170.

Benelli, B. (1978). Effetti del bilinguismo sull' evoluzione del realismo nominale [Effects of bilingualism on the development of nominal realism]. Quaderni per la Promozione del Bilinguismo, 19/20, 1-21.

Ben-Zeev, S. (1977a). The influence of bilingualism on cognitive strategy and cognitive development. Child Development, 48, 1009-1018.

Ben-Zeev, S. (1977b). The effects of bilingualism on children from Spanish-English low economic neighborhoods on cognitive development and cognitive strategy. Working Papers on Bilingualism, 14, 83-122.

Ben-Zeev, S. (1977c). Mechanisms by which childhood bilingualism affects understanding of language and cognitive structures. In P. A. Hornby (Ed.), Bilingualism: Psychological, social and educational implications (pp. 29-55). New York: Academic Press.

Ben-Zeev, S. (1984). Bilingualism and cognitive development. In N. Miller (Ed.), Bilingualism and language disability: Assessment and remediation (pp. 55-80). London: Croom Helm.

Bereiter, C., & Englemann, S. (1966). Teaching disadvantaged children in the preschool. Englewood Cliffs, NJ: Prentice-Hall.

Berthoud-Papandropoulou, I. (1978). An experimental study of children's ideas about language. In A. Sinclair, R.J. Jarvella, & W. J. M. Levelt (Eds.), The child's conception of language (pp. 55-82). Berlin: Springer-Verlag.

Bialystok, E. (1986a). Children's concept of word. Journal of Psycholinguistic Research, 15, 13-33.

Bialystok, E. (1986b). Factors in the growth of linguistic awareness. Child Development, 57, 498-510.

Bialystok, E. (1987). Development of word concept by bilingual children. Studies in Second Language Acquisition, 9, 133-140.

Bialystok, E. (1988a). Levels of bilingualism and levels of linguistic awareness. Developmental Psychology, 24, 560-567.

Bialystok, E. (1988b). Aspects of linguistic awareness and reading comprehension. Applied Psycholinguistics, 9, 123-139.

Bialystok, E., & Ryan, E. B. (1985a). A metacognitive framework for the development of first and second language skills. In D. L. Forrest-Pressley, G. E. MacKinnon, & T. G. Waller (Eds.), Metacognition, cognition and human performance (Vol. 1, pp. 207-252). New York: Academic Press.

Bialystok, E., & Ryan, E. B. (1985b). Toward a definition of metalinguistic skill. Merrill-Palmer Quarterly, 31, 229-251.

Birdsong, D. (1989). Metalinguistic awareness and interlingual competence. Berlin: Springer-Verlag.

Bizzarri, H. H. (1983). Language and thought in bilingual children. Rassegna Italiana di Linguistica Applicata, 15, 223-233.

Bohannon, III, J. N., & Warren-Leubecker, A. (1984). Word awareness and early reading. Child Development, 55, 1541-1548.

Bowey, J. A. (1986a, August). Childhood bilingualism and metalinguistic development. Paper presented at the Fourth National Development Conference, Sydney.

Bowey, J. A. (1986b). Syntactic awareness in relation to reading skills and ongoing reading comprehension monitoring. Journal of Experimental Child Psychology, 41, 282-299.

Bowey, J. A. (1986c). Syntactic awareness and verbal performance from preschool to fifth grade. Journal of Psycholinguistic Research, 15, 285-307.

Bowey, J. A. (1988). Metalinguistic functioning in children. Deakin University, Victoria, Australia: Deakin University Press.

Bowey, J. A., & Patel, R. K. (1988). Metalinguistic ability and early reading achievement. Applied Psycholinguistics, 9, 367-383.

Bowey, J. A., & Tunmer, W. E. (1984). Word awareness in children. In W. E., Tunmer, C. Pratt, & M. L. Herriman (Eds.), Metalinguistic awareness in children: Theory, research and implications (pp. 73-104). Berlin: Springer-Verlag.

Bowey, J. A., Tunmer, W. E., & Pratt, C. (1984). Development of children's understanding of the metalinguistic term word. Journal of Educational Psychology, 76, 500-512.

Bredart S., & Rondal, J. A. (1982). L' analyse du language chez l' enfant: Les activities metalinguistiques [Language analysis in children: Metalinguistic activities]. Bruxelles: Pierre Mardaga.

Brown, R. L., Fournier, J. F., & Moyer, R. H. (1977). A cross cultural study of Piagetian concrete reasoning and science concepts among rural 5th grade Mexican and Anglo-American students. Journal of Research in Science Teaching, 14, 329-334.

Bruck, M., Lambert, W.E., & Tucker, G. R. (1974). Bilingual schooling through the elementary grades: The St. Lambert project at grade seven. Language Learning, 24, 183-204.

Bruck, M., Lambert, W. E., & Tucker, G. R. (1977). Cognitive consequences of bilingual schooling: The St. Lambert project through grade six. Linguistics, 187, 13-33.

Bruen, H., Schawarcz, J. H., & Barihbaum. L. (1984). Examining social aspects of creativity: A multi-medial approach. Journal of Creative Behavior, 18, 41-44.

Buros, O. K. (Ed.). (1978). Mental measurements yearbook. (Vols. 1-2, 8th ed.). New Jersey: The Gryphon Press.

Busse, T. V., Blum, P., & Gutride, M. (1972). Testing conditions and the measurement of creative abilities in lower-class preschool children. Multivariate Behavioral Research, 7, 287, 298.

Calfee, R.C., Lindamood, P., & Lindamood, C. (1973). Acoustic-phonetic skills and reading - kindergarten through twelfth grade. Journal of Educational Psychology, 64, 293-298.

Cahill, D. (1987). Bilingual development of Italo-Australian children. Australian Review of Applied Linguistics, Series 8, Number 4, 101-127.

Carlucci, A. (1988). Le abilita' metalinguistiche: Una ricerca nella scuola elementare [Metalinguistic abilities: A study in the primary school]. Unpublished undergraduate thesis, University of Rome, "La Sapienza".

Carringer, D. C. (1974). Creative thinking abilities of Mexican youth: The relationship of bilingualism. Journal of Cross-Cultural Psychology, 5, 492-504.

Chaudron, C. (1983). Research on metalinguistic judgements: A review of theory, methods and results. Language Learning, 33, 343-377.

Chorney, M. (1978). The relationship of bilingualism and creativity. Unpublished honours thesis, University of Adelaide.

Cicirelli, V. G. (1966). Religious affiliation, socioeconomic status, and creativity. Journal of Experimental Education, 35, 90-35.

Cito, C. (1987). Le abilita' metalinguistiche in bambini provenienti da contesti socio-culturali differenti [Metalinguistic abilities in children from different socio-economic backgrounds]. Unpublished undergraduate thesis, University of Rome, "La Sapienza".

Clyne, M. G. (Ed.). (1986). An early start: Second language at primary school. Melbourne: River Seine Publications.

Clyne, M. (1987). Don't you get bored speaking only English: Expressions of metalinguistic awareness in a bilingual child. In R. Steele, & T. Threadgold (Eds.), Language topics: Essays in honour of Michael Halliday (Vol. 1, pp. 85-103).

Cropley, A. J. (1966). Creativity and intelligence. British Journal of Educational Psychology, 36, 259-266.

Cropley, A. J. (1967). Creativity. London: Longmans, Green and Co.

Cummins, J. (1976). The influence of bilingualism on cognitive growth: A synthesis of research findings and explantory hypotheses. Working Papers on Bilingualism, 9, 1-43.

Cummins, J. (1978a). Bilingualism and the development of metalinguistic awareness. Journal of Cross-Cultural Psychology, 9, 131-149.

Cummins, J. (1978b). Language and children's ability to evaluate contradictions and tautologies: A critique of Osherson and Markman's findings. Child Development, 49, 895-897.

Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. Review of Educational Research, 49, 222-251.

Cummins, J. (1981a). Bilingualism and minority-language children. Ontario: The Ontario Institute for Studies on Education.

Cummins, J. (1981b). The role of primary language development in promoting educational success for language minority students. In Schooling and language minority students: A theoretical framework (California State Department of Education, pp. 3-49). Los Angeles: Evaluation, Assessment and Dissemination Center.

Cummins, J. (1984). Bilingualism and cognitive functioning. In S. Shapson, & F. D'Oyley (Eds.), Bilingual and multicultural education: Canadian perspectives (pp. 55-67). Clevedon: Multilingual Matters.

Cummins, J. (1987). Bilingualism, language proficiency, and metalinguistic development. In P. Homel, M. Palij, & D. Aaranson. (Eds.), Childhood bilingualism: Aspects of linguistic, cognitive, and social development (pp. 57-73). Hillsdale, NJ: Lawrence Erlbaum Associates.

Cummins, J. (1989). Language and literacy acquisition in bilingual contexts. Journal of Multilingual and Multicultural Development, 10, 17-31.

Cummins, J., & Gulustan, M. (1974), Some effects of bilingualism on cognitive functioning. In S. T. Carey (Ed.), Bilingualism, biculturalism and education (pp. 129-136). University of Alberta: S. T. Carey.

Cummins, J., & Mulcahy, R. (1978). Orientation to language in Ukranian-English bilingual children. Child Development, 49, 1239-1242.

Cummins, J., Swain, M., Nakajima, K., Handscombe, J., Green, D., & Tran, C. (1984). Linguistic interdependence among Japanese and Vietnamese immigrant students. In C. Rivera (Ed.), Communicative competence approaches to language proficiency assessment: Research and application (pp. 60-81). Clevedon: Multilingual Matters.

D'Alessio, M., & Manetti, L. (1976). Sulle prove di creativita' di Wallach & Kogan [Wallach and Kogan's creativity tasks]. In M. D'Alessio, & L. Mannetti (Eds.), Sul pensiero creativo: Ipotesi e contributi di ricerca [Creative thinking: Hypotheses and research contributions] (pp. 30-49). Roma: Bulzoni editore.

Damm-Luhr, I. P. A. (1987). The effects of bilingualism on some aspects of metacognitive development. Dissertation Abstracts International, 47, 4320-B. (University Microfilms No. 87-02,3929.

Darcy, N. T. (1953). A review of the literature on the effects of bilingualism upon the measurement of intelligence. The Journal of Genetic Psychology, 82, 21-57.

Darcy, N. T. (1963). Bilingualism and the measurement of intelligence: A review of a decade of research. The Journal of Genetic Psychology, 103, 259-282.

De Avila, E. A., & Duncan, S. F. (1979). Bilingualism and the meta set. Journal of the National Association for Bilingual Education, 3, 1-20.

Dewing, K. (1970). The reliability and validity of selected tests of creative thinking in a sample of seventh-grade West Australian children. British Journal of Educational Psychology, 40, 35-42.

Diaz, R. M. (1985a). Bilingual cognitive development: Addressing three gaps in current research. Child Development, 56, 1376-1388.

Diaz, R. M. (1985b, June). Bilingualism and intelligence: The state of the art. Paper presented at the conference of Minority Languages and Education, University of Barcelona.

Diaz, R. M., & Hakuta, K. (1981). Bilingualism and cognitive development: A comparison of balanced and nonbalanced bilinguals. Unpublished manuscript, Yale University, Department of Psychology.

Diebold, A. R. (1968). The consequences of early bilingualism on cognitive development and personality formulation. In E., Norbeck, D., Price-Williams, & N. M., McCord (Eds.), The study of personality (pp. 218-245). New York: Holt, Rinehart and Winston.

Dhillon, P. K., & Mehra, D. (1987). The influence of social class and sex on primary school children's creative thinking. Asian Journal of Psychology and Education, 19, 1-10. (From Psychological Abstracts, 1989, 76, Abstract No. 11468).

Dines, E. R. (1979). Social class differences in children's language. Unpublished doctoral dissertation thesis, Monash University, Melbourne.

Dodson, C. J. (1983). Living with two languages. The Journal of Multilingual and Multicultural Development, 4, 401-414.

Donaldson, M. (1978). Children's minds. London: Croon Helm.

Dopke, S. (1986). Discourse structures in bilingual families. Journal of Multilingual and Multicultural Development, 7, 493-507.

Dopke, S. (1988). The role of parental techniques in bilingual German-English families. The International Journal of the Sociology of Language, 72, 101-112.

Downing, J. (1984). Task awareness in the development of reading. In J. Downing & R. Valtin (Eds.), Language awareness and learning to read (pp. 27-55). New York: Springer-Verlag.

Downing, J., & Valtin, R. (Eds.). (1984). Language awareness and learning to read. New York: Springer-Verlag.

Duncan, S. E., & De Avila, E. A. (1979). Bilingualism and cognition: Some recent findings. Journal of the National Association for Bilingual Education, 4, 15-50.

Dudek, S. Z., (1974). Creativity in young children-attitude or ability. Journal of Creative Behavior, 8, 282-292.

Durga, R. (1978). Bilingualism and interlingual interference. Journal of Cross-Cultural Psychology, 9, 401-415.

Dunn, L. M., & Dunn, L. M. (1981). Peabody Picture Vocabulary Test-revised: Manual for Forms L and M. Circle Pines, Minnesota: American Guidance Service.

Eckstein, A. (1986). Effect of the bilingual program on English language and cognitive development. In M. Clyne (Ed.), An early start: Second language at primary school (pp. 82-98). Melbourne: River Seine Publications.

Edwards, D., & Christophersen, H. (1988). Bilingualism, literacy and meta-linguistic awareness in preschool children. British Journal of Developmental Psychology, 6, 235-244.

Eisenmann, R., & Schussel, N. (1970). Creativity, birth-order, and preference for symmetry. Journal of Consulting and Clinical Psychology, 34, 275-280.

Elliot, C. D. (1983a). British Ability Scales: Manual 1, introductory handbook (rev. ed.). Windsor: NFER-Nelson.

Elliot, C. D. (1983b). British Ability Scales: Manual 2, technical handbook. Windsor: NFER-Nelson.

Elliot, C. D., Murray, D. J., & Pearson, L. S. (1983). British Ability Scales: Manual 3, directions for administration and scoring (rev. ed.). Windsor: NFER-Nelson.

Esquivel, G. B., & Lopez, E. (1988). Correlations among measures of cognitive ability, creativity, and academic achievement for gifted and minority children. Perceptual and Motor Skills, 67, 395-398.

Fang, F. (1985). An experiment on the use of classifiers by 4-to 6-year olds. Acta Psychologica Sinica, 17, 384-392. (From Psychological Abstracts, 1987, 74, Abstract No. 727).

Feldman, C., & Shen, M. (1971). Some language-related cognitive advantages of bilingual five-year olds. The Journal of Genetic Psychology, 118, 235-244.

Ferguson, C. A. (1983). Language separation in young bilinguals. Osmanic Papers in Linguistics, 9, 39-60.

Forrest-Pressley, D., & Waller, T. G. (1984). Cognition, metacognition, and reading. New York: Springer-Verlag.

Foster-Meloni, C. (1978). Code switching and interference in the speech of an Italian/English bilingual child: Age 6:5 to 8 years. Rassegna Italiana di Linguistica Applicata, 10, 89-95.

Galambos, S. J., & Goldin-Meadow, S. (1983). Learning a second language and metalinguistic awareness. In A. Chukerman, M. Marks, & J. S. Richardson (Eds.), Papers from the nineteenth regional meeting of the Chicago Linguistic Society (pp. 117-133). Chicago: Chicago University Society.

Galambos, S. J., & Hakuta, K. (1988). Subject-specific and task-specific characteristics of metalinguistic awareness in bilingual children. Applied Psycholinguistics, 9, 141-162.

Gandolfi, M., & Benelli, B. (1979). Il bilinguismo e il problema della convenzionalita' del linguaggio: Uno studio sperimentale [Bilingualism and the problem with the convention of language: An experimental study]. Quaderni per la Promozione del Bilinguismo, 25/26, 2-24.

Garcia, E. E. (1986). Bilingual development and the education of bilingual children during early childhood. Childhood Journal of Education, 95, 96-121.

Garton, A., & Pratt, C. (1989). Learning to be literate: The development of spoken and written language. Oxford: Basil Blackwell.

Genesee, F., Tucker, G. R., & Lambert, W. E. (1975). Communication skills of bilingual children. Child Development, 46, 1010-1014.

Gerald, P. J. (1985). Cognitive flexibility in bilingual preschool children. Dissertation Abstracts International, 45, 3971-B. (University Microfilms No. 85-02, 701).

Gilchrist, M. (1972). The psychology of creativity. Carlton, Victoria: Melbourne University Press.

Gleitman, L. R., Glietman, H., & Shipley, E. F. (1972). The emergence of a child as grammarian. Cognition, 1, 137-164.

Gottfried, A. W. (1985). Measures of socioeconomic status in child development research: Data and recommendations. Merrill-Palmer Quarterly, 31, 85-92.

Gowan, J. C., & Torrance, E. P. (1965). An intercultural study of non-verbal ideational fluency. The Gifted Child Quarterly, 9, 13-15.

Hakes, D. T. (in collaboration with J. S. Evans & W. E. Tunmer). (1980). The development of metalinguistic abilities. Berlin: Springer-Verlag.

Hakes, D. T. (1982). The development of metalinguistic abilities: What develops? In S. A. Kuczaj II (Ed.), Language development: Language, thought and culture (pp. 163-210). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Hakuta, K. (1986). Mirror of language: The debate on bilingualism. New York: Basic Books.

Hakuta, K. (1987). Degree of bilingualism and cognitive ability in mainland Puerto Rican children. Child Development, 58, 1372-1388.

Hakuta, K., & Diaz, R. M. (1985). The relationship between degree of bilingualism and cognitive ability: A critical discussion and some longitudinal data. In K. E. Nelson (Ed.), Child's language: Volume 5 (pp. 310-344). Hillsdale, NJ: Erlbaum.

Hakuta, K., Ferdman, B. M., & Diaz, R. M. (1987). Bilingualism and cognitive development: Three perspectives. In S. Rosenberg (Ed.), Advances in applied psycholinguistics: Reading, writing and language learning (Vol. 2, pp. 284-319). New York: Cambridge University Press.

Hakuta, K., & Garcia, E. E. (1989). Bilingualism and education. American Psychologist, 44, 374-379.

Haley, G. L. (1984). Creative response styles: The effects of socioeconomic status and problem-solving training. Journal of Creative Behavior, 18, 25-40.

Harley, B., Hart, D., & Lapkin, S. (1986). The effects of early bilingual schooling on first language skills. Applied Psycholinguistics, 7, 295-322.

Harrington, D. M., Block, J., & Block, J. H. (1983). Predicting creativity in preadolescence from divergent thinking in early childhood. Journal of Personality and Social Psychology, 45, 609-623.

Hay, W. L. (1963). Statistics for psychologists. New York: Holt, Rinehart and Winston.

Heausler, N. L., & Thompson, B. (1988). Structure of the Torrance Tests of Creative Thinking. Educational and Psychological Measurements, 48, 463-468.

Hocevar, D. (1980). Intelligence, divergent thinking and creativity. Intelligence, 4, 25-40.

Hoffman, M. N. H. (1934). The measurement of bilingual background. New York: Bureau of Publications, Teachers College Cambridge University.

Hoffmann, C. (1985). Language acquisition in two trilingual children. Journal of Multilingual and Multicultural Development, 6, 479-495.

Holobow, N. E., Genesee, F., Lambert, W. E., Gastright, J., & Met, E. (1987). Effectiveness of partial French Immersion for children from different social class and ethnic backgrounds. Applied Psycholinguistics, 8, 137-152.

Holtzman, W. H. (1980). Divergent thinking as a function of the degree of bilingualism of Mexican-American and Anglo fourth-grade students. Dissertation Abstracts International, 41, 1490-A. (University Microfilms No. 80-21, 448).

Huba, M. E., & Kantos, S. (1985). Measuring print awareness in young children. The Journal of Educational Research, 78, 272-279.

Ianco-Worrall, A. (1972). Bilingualism and cognitive development. Child Development, 23, 1390-1400.

Jacobs, J. F., & Pierce, M. L. (1966). Bilingualism and creativity. Elementary English, 43, 499-503.

Jakobovits, L. A. (1970). Foreign language learning. Rowley, Massachusetts: Newbury House Publishers.

Jarial, G. S. (1985). Creativity and birth order. Journal of Creative Behavior, 19, 139.

Jespersen, O. (1922). Language: Its nature, development and origin. London: Allen & Unwin.

Kaltsounis, B. (1974). Race, socioeconomic status and creativity. Psychological Reports, 35, 164-166.

Katchan, O. (1986). Early bilingualism: Friend or foe? In I. Kurcz, G. W. Shugar, & J. H. Danks (Eds.), Knowledge and language (pp. 667-690). Amsterdam, North-Holland: Elsevier Science Publishers.

Kazelskis, R., Jenkins, J. D., & Lingle, R. K. (1972). Two alternative definitions of creativity and their relationships with intelligence. Journal of Experimental Education, 41, 58-62.

Kershner, J. R., & Ledger, G. (1985). Effect of sex, intelligence, and style of thinking on creativity: A comparison of gifted and average IQ children. Journal of Personality and Social Psychology, 48, 1033-1040.

Kessler, C., & Quinn, M. E. (1980). Positive effects of bilingualism on science problem-solving abilities. Georgetown University Round Table on Language and Linguistics, 295-308.

Kessler, C., & Quinn, M. E. (1987). Language minority children's linguistics and cognitive creativity. Journal of Multilingual and Multicultural Development, 8, 173-186.

Koulos, F. (1986). Bilingualism, sex differences and creativity. Unpublished honours thesis, University of Adelaide.

Kucera, H., & Francis, W. W. (1967). Computational analysis of present-day American English. Providence, Rhode Island: Brown University Press.

Lambert, W. E. (1975). Cultural and language as factors in learning and education. In A. Wolfgang (Ed.), Education of immigrant students: Issues and answers (pp. 55-83). Toronto: The Ontario Institute for Studies in Education.

Lambert, W. E., Just, M., & Segatowitz, N. (1970). Some cognitive consequences of following the curricula of early school grades in a foreign language. Monograph Series on Language and Linguistics, 23, 229-279.

Lambert, W. E., & Tucker, G. R. (1972). Bilingual education of children: The St. Lambert Experiment. Massachusetts: Newbury House Publishers.

Lambert, W. E., Tucker, G. R., & d'Anglejan, A. (1973). Cognitive and attitudinal consequences of bilingual schooling: The St. Lambert Project through grade five. Journal of Educational Psychology, 65, 141-159.

Landry, R. G. (1973a). The relationship of second language learning and verbal creativity. The Modern Language Journal, 57, 110-113.

Landry, R. G. (1973b). The enhancement of figural creativity through second language learning of the elementary school level. Foreign Language Annuals, 7, 111-115.

Landry, R. G. (1974). A comparison of second-language learners and monolinguals on divergent thinking tasks at elementary school level. Modern Language Journal, 58, 10-15.

Lee, L. L. (1971). Northwestern Syntax Screening Test. Evanston, Illinois: Northwestern University Press.

Leopold, W. F. (1939-1949). Speech development of a bilingual child (Vols. 1-4). Evanston and Chicago: Northwestern University.

Leopold, W. F. (1961). Patterning in children's language learning. In S. Saporta (Ed.), Psycholinguistics (pp. 350-358). New York: Holt, Rinehart and Winston.

Levene, E. B. (1984). Creativity and child-rearing: A developmental analysis. Dissertation Abstracts International, 45, 1296-A.

Levine, A. S. (1984). Creativity and intelligence in three-year old children. Dissertation Abstracts International, 44, 2576-B.

Lentin, L. (1973). Il bambino e la lingua parlata [Children and the spoken language]. Roma: Armando (originally published in 1972).

Lichtenwalner, J. S., & Maxwell, J. W. (1969). The relationship of birth order and socio-economic status to the creativity of preschool children. Child Development, 40, 1241-1247.

Liedtke, W. W., & Nelson, L. D. (1968). Concept formation and bilingualism. The Alberta Journal of Educational Research, 14, 225-232.

Lindholm, K. J. (1980). Bilingual children: Some interpretations of cognitive and linguistic development. In K. E. Nelson (Ed.), Children's language: Volume 2 (pp. 216-266). New York: Gardner Press.

Lissitz, R. W., & Willhoft, J. L. (1985). A methodological study of the Torrance Tests of Creativity. Journal of Educational Measurement, 22, 1-11.

Lombardo, S. (1988). Abilita' metalinguistiche in bambini dialettofoni [Metalinguistic awareness in diglossic children]. Unpublished undergraduate thesis, University of Rome, "La Sapienza".

Lovell, K., & Shields. J. B. (1967). Some aspects of a study of the gifted child. British Journal of Educational Psychology, 37, 201-108.

Lundberg, I., Frost, J., & Peterson, O. (1988). Effects of an extensive program for stimulating phonological awareness in preschool children. Reading Research Quarterly, 23, 263-284.

Lundberg, I., Wall, S., & Olofsson, A. (1980). Reading and spelling skills in the first school years predicted from phonemic awareness skills in kindergarten. Scandinavian Journal of Psychology, 21, 159-173.

Maccoby, E. E., & Jacklin, C. N. (1974). The psychology of sex differences. Stanford: Stanford University Press.

MacNab, G. L. (1979). Cognition and bilingualism: A reanalysis of studies. Linguistics, 17, 231-255.

Macnamara, J. (1966). Bilingualism and primary education: A study of Irish experience. Edinburgh: Edinburgh University Press.

Magiste, E. (1984). Learning a third language. Journal of Multilingual and Multicultural Development, 5, 415-421.

Malakoff, M. E. (1988). The effects of language of instruction on reasoning in bilingual children. Applied Linguistics, 9, 17-38.

Mannetti, L. (1976a). Classe sociale e pensiero creativo [Social class and creative thinking]. In M. D' Alessio & L. Mannetti (Eds.), Sul pensiero creativo: Ipotesi e contributi di ricerca [Creative thinking: Hypotheses and research contributions] (pp. 75-83). Roma: Bulzoni editore.

Mannetti, L. (1976b). Pensiero creativo e ordine di nascita [Creative thinking and birth order]. In M. D'Alessio & L. Mannetti (Eds.), Sul pensiero creativo: Ipotesi e contributi di ricerca [Creative thinking: Hypotheses and research contributions] (pp. 58-63). Roma: Bulzoni editore.

McLaughlin, B. (1984a). Early bilingualism and cognitive-verbal development. In M. Paradis & Y. Lebrun (Eds.), Early bilingualism and child development (pp. 19-45). Lisse: Swets & Zetlinger BV.

McLaughlin, B. (1984b). Second language acquisition in childhood: Volume 1. preschool children. Hillsdale, NJ: Lawrence Erlbaum Associates.

Mearig, J. S. (1967). Sex and cultural differences in performance on certain verbal creativity measures. Journal of Educational Psychology, 61, 114-116.

Merino, R. A. (1984). The effects of L1 and L2 instruction on the metalinguistic awareness of Spanish-speaking children. Dissertation Abstracts International, 44, 2394-A. (University Microfilms No. 83-21, 620).

Mishra, C. (1987). Locus of control and creativity across SES and subcultures. Journal of the Indian Academy of Applied Psychology, 13, 57-63. (From Psychological Abstracts, 1989, 76, Abstract No. 1105).

Mohanty, A. K. (1982). Bilingualism among Kond tribals in Orissa (India): Consequences, issues, and implications. Indian Psychologist, 1, 34-44.

Mohanty, A. K., & Babu, N. (1983). Bilingualism and metalinguistic ability among Kond tribals in Orissa, India. The Journal of Social Psychology, 121, 15-22.

Mohanty, A. K., & Das., S. P. (1987). Cognitive and metalinguistic ability of unschooled bilingual and monolingual tribal children. Psychological Studies, 32, 5-8 (From Psychological Abstracts, 1988, 75, Abstract No. 23027).

Morais, J., Bertelson, P., Cary, L., & Alegria, J. (1986). Literary training and speech segmentation. Cognition, 24, 45-64.

Moran III, J. D., Milgram, R. M., Sawyer, J. K., & Fu, V. R. (1983). Original thinking in preschool children. Child Development, 54, 921-926.

Nesdale, A. D., Herriman, M. L., & Tunmer, W. E. (1984). Phonological awareness in children. In W. E. Tunmer, C. Pratt, & M. L. Herriman (Eds.), Metalinguistic awareness in children: Theory, research and implications (pp. 56-72). Berlin: Springer-Verlag.

Ogletree, E. J., & Ujlaki, W. (1973). Effects of social class status on tests of creative behavior. Journal of Educational Psychology, 67, 149-152.

Okoh, N. (1980). Bilingualism and divergent thinking among Nigerian and Welsch school children. The Journal of Social Psychology, 110, 163-170.

Olive, H. (1972). A note on sex differences in adolescents' divergent thinking. The Journal of Psychology, 82, 39-42.

Oksaar, E. (1980). The multilingual language acquisition project. International Review of Applied Psychology, 29, 268-269.

Oksaar, E. (1981). Linguistic and pragmatic awareness in monolingual and multilingual children. In P. S. Dale & D. Ingram (Eds.), Child language: An international perspective (pp. 272-285). Baltimore: University Park Press.

Oksaar, E. (1983). Language acquisition in the early years: An introduction to paedolinguistics (K. Turfler, Trans.). London: Batsford Academic and Educational Ltd. (Original work published 1977).

Oren, D. L. (1981). Cognitive advantages of bilingual children related to labelling ability. Journal of Educational Research, 74, 163-170.

Osherson, D. E., & Markman, E. (1975). Language and the ability to evaluate contradictions and tautologies. Cognition, 3, 213-226.

Ottavi, E. (1988). Le abilita' metalinguistiche nella scuola media [Metalinguistic abilities in junior high school]. Unpublished undergraduate thesis, University of Rome, "La Sapienza".

Pandey, A. C., & Pandey, R. N. (1984). A study of creativity in relation to sex of high school students. Indian Psychological Review, 26, 53-57. (From Psychological Abstracts, 1987, 74, Abstract No. 27876).

Palij, M., & Homel, P. (1987). The relationship of bilingualism to cognitive development: Historical, methodological and theoretical considerations. In P. Homel, M. Palij & D. Aaranson (Eds.), Childhood bilingualism: Aspects of linguistic, cognitive, and social development (pp. 131-148). Hillsdale, NJ: Lawrence Erlbaum Associates.

Papandropoulou, I., & Sinclair, H. (1974). What is a word?: Experimental study of children's ideas on grammar. Human Development, 17, 241-258.

Pattnaik, K., & Mohanty, A. K. (1984). Relationships between metalinguistic and cognitive development of bilingual and unilingual tribal children. Psycho-Lingua, 14, 63-70.

Peal, E., & Lambert, W. E. (1962). The relation of bilingualism to intelligence. Psychological Monographs: General and Applied, 76, 1-23.

Perfetti, C. A., Beck, I., Bell, L. C., & Hughes, C. (1987). Phonemic knowledge and learning to read are reciprocal: A longitudinal study of first grade children. Merrill-Palmer Quarterly, 33, 283-319.

Piaget, J. (1929). The child's conception of the world (Trans. J. & A. Tomlinson). London: Kegan Paul, Trench, Truber and Co.

Piers, E., Daniels, J., & Quakenbush, J. (1960). Identification of creativity in adolescents. Journal of Educational Psychology, 51, 346-351.

Pinker, S. (1979). Bilingual and monolingual children's awareness of words. Unpublished honours thesis. McGill University, Montreal.

Powers, S., & Lopez, R. (1985). Perceptual, motor, and verbal skills of monolingual and bilingual Hispanic children: A discrimination analysis. Perceptual and Motor Skills, 60, 1003-1109.

Pratt, C., & Nesdale, W. C. (1984). Pragmatic awareness in children. In W. E. Tunmer, C. Pratt, & M. L. Herriman (Eds.), Metalinguistic awareness in children: Theory, research and implications (pp. 105-125). Berlin: Springer-Verlag.

Pratt, C., Tunmer, W. E., & Bowey, J. A. (1984). Children's capacity to correct grammatical violations in sentences. Journal of Child Language, 11, 129-141.

Price-Williams, D. R., & Ramirez III, M. (1977). Divergent thinking, cultural differences and bilingualism. The Journal of Social Psychology, 103, 3-11.

Raina, M. K. (1969). A study of sex differences on creativity in India. Journal of Creative Behavior, 3, 111-114.

Raina, T. (1980). Sex differences in creativity in India: A second look. Journal of Creative Behavior, 14, 218.

Ramirez, C. M. (1987). Developmental linguistic independence and bilingual education: Cummins and beyond. International Journal of the Sociology of Language, 63, 81-98.

Reisman, E. K., Floyd, B., & Torrance, E. P. (1981). Performance on Torrance's Thinking Creativity in Action and Movement as a predictor of cognitive development of young children. The Creative Child and Adult Quarterly, 6, 205-209.

Ricciardelli, L. A. (1984). Bilingual and metalinguistic awareness: The word-referent relationship. Unpublished honours thesis, University of Adelaide.

Richards, R. L. (1976). A comparison of selected Guilford and Wallach-Kogan creative thinking tests in conjunction with measures of intelligence. Journal of Creative Behavior, 10, 151-164.

Richardson, A. G. (1985). Sex differences in creativity among a sample of Jamaican adolescents. Perceptual and Motor Skills, 60, 424-426.

Rimm, S. B. (1980). Group Inventory for Finding Creative Talent: Manual for administration. Watertown, Wisconsin, Educational Assessment Service.

Rimm, S. B. (1983). PReschool and Kindergarten Interest DEscriptor: Manual for adminstration. Watertown, Wisconsin: Educational Assessment Service.

Rimm, S. (1984). The characteristics approach: Identification and beyond. Gifted Child Quarterly, 28, 181-187.

Rimm, S., & Davis, G. A. (1976). GIFT: An instrument for the identification of creativity. Journal of Creative Behavior, 10, 178-182.

Rimm, S., & Davis, G. A. (1980). Five years of international research with GIFT: An instrument for the identification of creativity. Journal of Creative Behavior, 14, 35-46.

Robinson, W. P. (1978). Language management in education. Sydney: George Allen and Unwin.

Rogers, D. W. (1968). Visual expressions: A creative advantage of the disadvantaged. The Elementary School Journal, 68, 394-399.

Rosenblum, T., & Pinker, S. A. (1983). Word magic revisited: Monolingual and bilingual children's understanding of the word-object relationship. Child Development, 54, 773-780.

Rueda, R. (1983). Metalinguistic awareness in monolingual and bilingual mildly retarded children. National Association for Bilingual Education Journal, 8, 55-86.

Rump, E. E. (1979). Divergent thinking, aesthetic preferences and orientation towards arts and sciences. Unpublished doctoral dissertation, University of Adelaide.

Runco, M. A., & Bahleda, M. D. (1987). Birth-order and divergent thinking. Journal of Genetic Psychology, 148, 119-125.

Ryan, B., & Ledger, G. W. (1984). Learning to attend to sentence structure: Links between metalinguistic development and reading. In J. Downing & R. Valtin (Eds.), Language awareness and learning to read (pp. 149-171). New York: Springer-Verlag.

Saer, D. J. (1923). The effect of bilingualism on intelligence. The British Journal of Psychology, 14, 25-38.

Sakoda, J. M., Cohen, B. H., & Beall, G. (1954). Test of significance for a series of statistical tests. Psychological Bulletin, 51, 172-174.

Sattler, J. M. (1982). Assessment of children's intelligence and special abilities. Boston: Allyn and Bacon.

Saunders, G. (1988). Bilingual children: From birth to teens. Clevedon: Multilingual Matters.

Savoca, A. J. (1965). The effects of rewards, race, IQ and socio-economic status on creative production of preschool children. Dissertation Abstracts, 26, 2327.

Saywitz, K., & Wilkinson, C. (1982). Age-related differences in metalinguistic awareness. In S. A. Kuczaj (Ed.), Language development: Language, thought and culture (pp. 229-250). Hillsdale, NJ: Lawrence Erlbaum Associates.

Schmitz, E. A. (1981). The nature of the relationship between creativity and intelligence of children. Dissertation Abstracts International, 41, 4570-A.

Scribner, S., & Cole, M. (1981). The psychology of literacy. Cambridge, Mass: Harvard University Press.

Scott, S. (1973). The relation of divergent thinking of bilingualism: Cause or effect. Unpublished manuscript, McGill University, Montreal.

Scotti, D. (1973). Prime parole [First words]. Brescia: Scuola.

Sellwood, R. M. (1974). Birth order and creativity. Dissertation Abstracts International, 35, 3598-B.

Sinclair, A. (1986). Metalinguistic knowledge and language development. In I. Kurcz, Shiugar, G. W. & Danks, J. H. (Eds.), Knowledge and language (pp. 609-627). Amsterdam, North-Holland: Elsevier Science Publishers.

Sinclair, A., Jarvella, R. J., & Levelt, W. J. M. (Eds.). (1978). The child's conception of language. New York: Springer-Verlag.

Singh, S. P. (1970). Creativity abilities: A cross-cultural study. Journal of Social Psychology, 81, 125-126.

Skutnabb-Kangas, T. (1984). Bilingualism or not: The education of minorities (L. Malnberg & D. Crane, Trans.). Clevedon: Multilingual Matters. (Original work published 1981).

Slobin, D. I. (1978). A case study of early language awareness. In A. Sinclair, R. J. Jarvella & W. J. M. Levelt (Eds.), The child's conception of language (pp. 45-54). New York: Springer-Verlag.

Smith, N. E. (1983). Some light on the problem of bilingualism as found from a study of the progress in mastery of English among pre-school children of non-American ancestry in Hawaii. Genetic Psychology Monographs, 21, 119-284.

Smith, C. L., & Tager-Flusberg, H. (1982). Metalinguistic awareness and language development. Journal of Experimental Child Psychology, 34, 449-468.

SPSS Inc. (1986). SPSS-X user's guide. New York: McGraw-Hill.

Srivastava, A. L., & Khatoon, R. (1980). Effect of difference between mother tongue and another tongue as medium of instruction on achievement, mental ability and creativity of the VII standard children. In E. Annamalai (Ed.), Bilingualism and achievement in schools (pp. 31-48). Mysore: CIIL.

Stanovich, K. E., Cunningham, A. E., & Cramer, B. B. (1984). Assessing phonological awareness in kindergarten children: Issues of task comparability. Journal of Experimental Child Psychology, 38, 175-190.

Staffieri, R. J. (1970). Birth order and creativity. Journal of Clinical Psychology, 26, 65-66.

Starkweather, E. K. (1964). Problems in the measurement of creativity in preschool children. Journal of Education Psychology, 1, 109-113.

Tegano, D. W., Moran, III, J. D., & Godwin, L. J. (1986). Cross-validation of two creativity tests designed for preschool children. Early Childhood Research Quarterly, 1, 387-396.

Thomas, J. (1988). The role played by metalinguistic awareness in second and third language learning. Journal of Multilingual and Multicultural Development, 9, 235-246.

Thompson, B. (1984). Canonical correlation analysis. Beverly Hills: Sage.

Thompson, G. G. (1952). Child psychology. Boston: Houghton Mifflin Co.

Torneus, M. (1984). Phonological awareness and reading: A chicken and egg problem? Journal of Educational Psychology, 6, 1346-1358.

Thorndike, R. L., Hagen, E. P., & Sattler, J. M. (1986). The Stanford Binet Intelligence Scale: Fourth edition technical manual. Chicago: The Riverside Publishing Co.

Titone, R. (1981). Educazione bilingue precoce e svilluppo cognitivo [Childhood bilingual education and cognitive development]. Eta' Evolutiva, 8, 91-100.

Titone, R. (1985). A crucial psycholinguistic prerequisite to reading: Children's metalinguistic awareness. Lenguas Modernas, 12, 44-53.

Tizard, B., & Hughes, M. (1984). Young children learning. Cambridge: Harvard University Press.

Torrance, E. P. (1962). Guiding creative talent. Englewood Cliffs, NJ: Prentice-Hall.

Torrance, E. P. (1966). Torrance Tests of Creative Thinking: Norms-technical manual. Princeton, N.J.: Personnel Press.

Torrance, E. P. (1967). The Minnesota studies of creative behavior: National and international extension. Journal of Creative Behavior, 1, 137-154.

Torrance, E. P. (1971). Are Torrance Tests of Creative Thinking based against or in favor of "disadvantaged" groups? Gifted Child Quarterly, 15, 75-80.

Torrance, E. P. (1972a). Torrance Tests of Creative Thinking: Directions manual and scoring guide, Figural Test booklet A (rev. ed.). Massachusetts: Personnel Press.

Torrance, E. P. (1972b). Predictive validity of the Torrance Tests of Creative Thinking. Journal of Creative Behavior, 6, 236-252.

Torrance, E. P. (1974a). Torrance Tests of Creative Thinking. Bensenville, Illinois: Scholastic Testing Service.

Torrance, E. P. (1974b). Torrance Tests of Creative Thinking: Directions manual and scoring guide, Verbal Test booklet A (rev. ed.). Massachusetts: Personnel Press.

Torrance, E. P. (1974c). Torrance Tests of Creative Thinking: Directions manual and scoring guide, Verbal Test booklet B (rev. ed.). Massachusetts: Personnel Press.

Torrance, E. P. (1974d). Torrance Tests of Creative Thinking: Directions manual and scoring guide, Figural Test booklet B (rev. ed.). Massachusetts: Personnel Press.

Torrance, E. P. (1979). The search for satori and creativity. New York: Creative Education Foundation.

Torrance, E. P. (1981a). Predicting the creativity of elementary school children (1958-1980) - and the teacher who "made a difference". Gifted Child Quarterly, 25, 55-61.

Torrance, E. P. (1981b). Thinking Creatively in Action and Movement: Administration, scoring and norms manual. Bensenville, Illinois: Scholastic Testing Service.

Torrance, P., & Aliotti, N. C. (1969). Sex differences in levels of performance and test-retest reliability on the Torrance Tests of Creative Thinking ability. Journal of Creative Behavior, 3, 52-57.

Torrance, E. P., Dogan, N., & Horng, R. (1981). Cummulative bibliography on the Torrance Tests of Creative Thinking. Georgia: University of Georgia.

Torrance, E. P., & Hall, L. K. (1980). Assessing the further reaches of creative potential. Journal of Creative Behavior, 14, 1-19.

Torrance, E. P., Wu, J., Gowan, J. C., & Aliotti, N. C. (1970). Creative functioning of monolinguals and bilingual children in Singapore. Journal of Educational Psychology, 61, 72-75.

Trites, R. (1984). Early immersion in French at school for Anglophone children: Learning disabilities and prediction of success. In M. Paradis & Y. Lebrum (Eds.), Early bilingualism and child development (pp. 95-133). Lisse: Swets & Zeitlinger B. V.

Tsushima, W. T., & Hogan, T. (1975). Verbal ability and school achievement of bilingual and monolingual children of different ages. Journal of Educational Research, 68, 349-353.

Tunmer, W.E., & Bowey, J.A. (1984). Metalinguistic awareness and reading acquisition. In W.E. Tunmer, C. Pratt, & M.L. Herriman (Eds.), Metalinguistic awareness in children: Theory, research and implications (pp. 144-168). Berlin: Springer-Verlag.

Tunmer, W. E., Bowey, J. A., & Grieve, R. (1983). The development of young children's awareness of the word as a unit of spoken language. Journal of Psycholinguistic Research, 12, 567-594.

Tunmer, W. E. & Grieve, R. (1984). Syntactic awareness in children. In W. E. Tunmer, C. Pratt & M. L. Herriman (Eds.), Metalinguistic awareness in children: Theory, research and implications (pp. 56-72). Berlin: Springer-Verlag.

Tunmer, W. E., Herriman, M. L., & Nesdale, A. R. (1988). Metalinguistic abilities and beginning reading. Reading Research Quarterly, 23, 134-158.

Tunmer, W. E., & Myhill, M. E. (1984). Metalinguistic awareness and bilingualism. In W. E. Tunmer, C. Pratt, & M. L. Herriman. (Eds.), Metalinguistic awareness in children: Theory, research and implications (pp. 188-205). Berlin: Springer-Verlag.

Tunmer, W. E., & Nesdale, A. R. (1982). The effects of digraphs and psuedowords on phonemic segmentation in young children. Applied Psycholinguistics, 3, 299-311.

Tunmer, W. E., & Nesdale, A. R. (1985). Phonemic segmentation skill in beginning reading. Journal of Educational Psychology, 77, 417-427.

Tunmer, W. E., Pratt, C., & Herriman, M. L. (Eds.). (1984). Metalinguistic awareness in children: Theory, research and implications. Berlin: Springer-Verlag.

Valtin, R. (1984a). The development of metalinguistic abilities in children learning to read and write. In J. Downing & R. Valtin (Eds.), Language awareness and learning to read (pp. 207-226). New York: Springer-Verlag.

Valtin, R. (1984b). Awareness of features and functions of language. In J. Downing & R. Valtin (Eds.), Language awareness and learning to read (pp. 227-260). New York: Springer-Verlag.

Van Kleeck, A. (1982). The emergence of linguistic awareness: A cognitive framework. Merrill-Palmer Quarterly of Behavior and Development, 28, 238-265.

Vildomec, V. (1963). Multilingualism. Leyden, Netherlands: A. W. Sythoff.

Vygotsky, S. K. (1962). Thought and language. Cambridge, Massachusetts: Massachusetts Institute of Technology. (Original work 1934).

Wagner, D. A. (1980). Cognitive perspectives on bilingualism in children. International Review of Applied Psychology, 29, 31-41.

Wagner, R. K., & Torgesen, J. K. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. Psychological Bulletin, 101, 192-212.

Wallach, L., Wallach, M. A., Dozier, M. G., & Kaplan, N. E. (1977). Poor children learning to read do have trouble with auditory discrimination but do not have trouble with phonemic recognition. Journal of Educational Psychology, 69, 36-39.

Wallach, M. A., & Kogan, N. (1965). Modes of thinking in young children: A study of the creativity-intelligence distinction. New York: Holt, Rinehart and Winston.

Wang, R. R. (1982). The relation between bilingualism and creative thinking. Dissertation Abstracts International, 43, 1870-A. (Microfilms University No. 82-26, 795).

Ward, W. C. (1968). Creativity in young children. Child Development, 39, 737-754.

Ward, W. C. (1974). Creativity (?) in young children. Journal of Creative Behavior, 8, 101-106.

Warren-Leubecker, A. R. (1985). Three types of metalinguistic awareness and their relation to reading readiness and reading achievement. Dissertation Abstracts International, 45, 2714B. (University Microfilms No. 84-25, 187).

Warren-Leubecker, A. R. (1987). Competence and performance factors in word order awareness and early reading. Journal of Experimental Child Psychology, 43, 62-80.

Warren-Leubecker, A., & Carter, B. W. (1988). Reading and growth in metalinguistic awareness: Relation to socioeconomic status and reading readiness skill. Child Development, 59, 728-747.

Watson, A. (1979). Units of Print Test. Paddington, Australia: Alexander Mackie College of Advanced Education.

Watson, A. (1984). Cognitive development and units of print in early reading. In J. Downing & R. Valtin (Eds.), Learning awareness and learning to read (pp. 93-118). New York: Springer-Verlag.

Webster, M. T. (1987). The relationship between metalinguistic ability and second language learning. Dissertation Abstracts International, 7, 4008-A. (University Microfilms No. 87-04,579).

Wechsler, D. (1967). Manual for the Wechsler Preschool and Primary Scale of Intelligence. New York: The Psychological Corporation.

Wechsler, D. (1973). Scala Wechsler a Livello Prescolare e di Scuola Elementare: Manuale [Wechsler Preschool and Primary Scale of Intelligence: Manual]. Firenze: Organizzazione Speciali.

Weinreich, U. (1963). Languages in contact. London: Mouton & Co. (Originally published as No. 1 in the series "Publishers of the linguistic circle of New York" in 1953).

Wells, G. (1985). Language development in the pre-school years. Cambridge: Cambridge University Press.

Whitaker, J. H., Rueda, R. S., & Prieto, A. G. (1985). Cognitive performance as a function of bilingualism in students with mental retardation. Mental Retardation, 6, 302-307.

Wilks, L., & Thompson, P. (1979). Birth-order and creativity in young children. Psychological Reports, 45, 443-449.

Williams, A. (1989, April 9). Language revolution in schools. Sunday Mail, p. 36.

Willows, D. M., & Ryan, E. B. (1986). The development of grammatical sensitivity and its relationship to early reading achievement. Reading Research Quarterly, 21, 253-266.

Withey, C. (1974). The relationship of bilingualism and biculturalism to divergent thinking. Unpublished honours thesis, University of Adelaide.

Yamamoto, K. (1965). Effects of restriction on range and test unreliability on correlation between measures of intelligence and creative thinking. British Journal of Educational Psychology, 35, 300-305.

Yopp, H. K. (1988). The validity and reliability of phonemic awareness tests. Reading Research Quarterly, 23, 159-177.

Yoshioka, J. G. (1929). A study of bilingualism. Journal of Genetic Psychology, 36, 473-479.

Zarnegar, Z., Hocevar, D., & Michael, W. B. (1988). Components of original thinking in gifted children. Educational and Psychological Measurements, 48, 5-16.

Zhiukov, S. F. (1988). The development of morphological concepts in the youngest school children. In J. A. Dowing (Ed.), Cognitive Psychology and reading in the U.S.S.R. (Trans. J. A. Downing & D. B. Elkonin, pp. 313-331). North-Holland: Elsevier Science Publishers. (Original work 1965).