



MEMORY FOR INFORMATION PRESENTED IN A
SECOND LANGUAGE

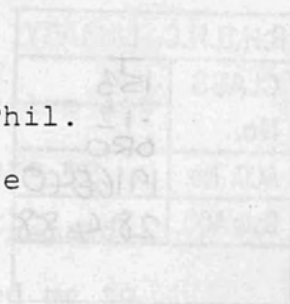
by

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Subjects in the second test were 32 students studying in England. They were asked to read the same news bulletins but questions were half in Farsi and half in English. The results of the second experiment (students) showed no difference due to the language of the bulletins or the questions.

In the third experiment a total of 48 adults and students were tested in the same manner as the second group. Out of 48 subjects, 15 were students, 15 were adults (non-students) living in London and 18 adults (non-students) living in Tehran, Iran. This experiment showed that there were

Abstract

Iranian bilinguals whose first language was Persian (Farsi) and second language English were compared for their ability to remember information from visually presented news bulletins.

Four different experiments were conducted and subjects were asked to read two news bulletins, each in one of the two languages and were asked questions in the corresponding language. They were also tested for their comprehension of two similar bulletins, each in one of the two languages, by answering questions with the text still present.

In the first experiment 32 adults were tested. The results showed that more information was remembered in the first (native) language in both immediate and delayed recall, even when the results were adjusted for differences in the comprehension test between the two languages.

Subjects in the second test were 32 students studying in England. They were asked to read the same news bulletins, but questions were half in Farsi and half in English. The results of the second experiment (students) showed no difference due to the language of the bulletins or the questions.

In the third experiment a total of 48 adults and students were tested in the same manner as the second group. Out of 48 subjects, 16 were students, 16 were adults (non-students) living in London and 16 adults (non-students) living in Tehran, Iran. This experiment showed that there were

differences between the groups in the effect of test language on memory. The superiority of the Farsi test was greater in the Tehran group and absent in the student group and the London group. Adjusting the results for differences in comprehension did not change these conclusions.

The fourth experiment tested 64 students in Tehran studying English for their first degree. Subjects were given unlimited time to read the texts as in previous experiments, or a restricted time. No effect of the time factor was found. Subjects were divided into more fluent and less fluent groups in English on the basis of the comprehension test. The fluent group showed superior memory in both languages. Results were also affected by question language, which interacted with text language. Results were superior when text and questions were in the same language.

Overall in the four experiments recall of information in English text was inferior to recall of information in Farsi text mainly in groups which had not used English much. Better comprehension and greater experience in using the second language reduced this difference.

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Introduction

Multilingualism in general and bilingualism in particular is one of the areas which needs to be given attention from different perspectives. It is the consequences of technology and world progress today which bring about the natural tendency for individuals to learn a language other than their own.

CHAPTER I: INTRODUCTION

Bilingual individuals using two different sets of coding systems are interesting subjects for the study of their information processing, learning, memory and thinking. It is also interesting to find out whether they are different from monolinguals in these areas. Le Gornic (1979) states: 'in a bilingual, the processing or acquisition of information can be separated from the information itself'. Similarly, Rose (1975) mentions the importance of bilinguals in this phrase: 'the bilingual is the subject par excellence for investigation of cognitive processes'.

1. Comparison of Bilinguals and Monolinguals

Due to the reasons mentioned above, there have been studies carried out on bilingualism, each examining this issue from one aspect and trying to answer many questions, but there have not been definite answers to these. For example, Rose (1975) questioned a number of people about their self-evaluation of bilingual memory processes in connection with translation. He found that while most subjects felt that they mentally translate, the vast majority also felt that they remembered the communication language. In

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Due to the reasons mentioned above, there have been studies carried out on bilingualism, each examining this issue from one aspect and trying to answer many questions, but there have not been definite answers to these. For example, Rose (1975) questioned a number of people about their self-evaluation of bilingual memory processes in connection with translation. He found that while most subjects felt that they mentally translate, the vast majority also felt that they remembered the communication language. In

connection with the last judgement it should be noted that empirical studies indicate that bilinguals recall information in the correct language if they recall it at all. Taken together, the two judgements may indicate an operation by which a language 'tag' is added to information stored in long-term memory regardless of any translation process.

Dornic (1980) states that in some industrialised countries, over 10% of inhabitants receive, store, organise and use information in a language different from their dominant language. Most often this brings about a lower information processing capacity. In a number of everyday situations, particularly those involving complex tasks, high mental load or stress, the bilingual using his non-dominant language is inevitably inferior, his language processing can be slowed down or rendered less precise. 'While it is true that for basic psychological research in cognitive process, a balanced bilingual (who is native-like in both of his languages) is an ideal subject, from the practical point of view the non-balanced one is more important. This is because he represents the most typical group of bilinguals in the world today. It is this type of bilingual who frequently faces serious problems when having to process information in his weaker language' (Dornic, 1980). Furthermore what is interesting is that even in balanced bilinguals there might be a latent dominance which becomes apparent in a situation involving stress. The stress may be an environmental stress like noise, as well as emotional or social stress. The imbalance may become evident in various forms: most often, speed of processing (reaction time) is affected in the first place. The fact that reaction time is affected and information processing can be

slowed down implies that more complex activities like remembering information may be affected as well.

Dornic (1979) investigated the difference in speed between the dominant and subordinate language of bilinguals and mainly focussed on comprehension and production of spoken language. He mentions that 'It is these simple processes that most often cause a chain reaction - a considerable deterioration in more complex operations'. He adds: 'if a person is slower in performing an extremely simple comprehension task in his second language, he will also comprehend less when listening to a lecture in that language.' Speed increases as a function of experience with a language, both for comprehension and production.

Although the results of research in recent years are not clear, most of it indicates that comprehension speed in the bilingual's second language is generally slower than in his first language, even after using the second language for many years. This is even true for high-frequency words where one would expect complete automaticity of decoding (Dornic, 1979 and Mägiste, 1979).

Lambert's study (1955) in which the purpose was to measure decoding time for verbal material in bilinguals showed that speed of response depended clearly on experience with a language. Dornic (1977b) in a similar experiment, reports the same results, i.e., the speed of response was repeatedly shown to be slower in the language with which the bilinguals have had relatively less experience.

Macnamara (1967b) found that bilinguals could match words with pictures much faster in their dominant language. Similarly, Scherer and Wertheimer (1964) as well as Kolers (1966a) found that bilinguals comprehend material in their dominant language better than in their subordinate language.

To name colours, digits or pictures in a second language is slower and this is especially clear under stress. Although verbal labels for colours and digits are usually well learned in both of the bilingual's languages, most of the measurements for reaction time are reported to be faster in the first language than in the second language (Dornic, 1979; Preston and Lambert, 1969; and Hamers and Lambert, 1972).

In Ervin's test (1961), the subject had to name common objects in pictures. Subjects were far better in their stronger language. Italian bilinguals were tested for recall of pictorial material using English and Italian during learning and during recall. Pictures easier to name in the bilingual's more fluent language were recalled significantly more often in that language, regardless of the language of learning. Optimal circumstances for recall of such pictures were learning and recall in the dominant language, if exposure-time during learning was controlled. The worst condition for recall was learning in the dominant language and recall in the other language.

Guttierrez-Marsh and Hipple Maki (1976) gave subjects a simple arithmetic task and found that they performed more slowly in their second language. Macnamara, Krauthamer and Bolgar (1968) did not find any difference in a simple number-

naming task between bilinguals with 'some knowledge' of a second language and bilinguals who were 'equally competent' in both languages. In this respect Dornic (1979) believes that the discrepancies reported in the literature may often be related to the difference in the ways the subjects had learned their languages, or to other factors that are extremely difficult to control in the process of estimating a bilingual's background.

Papioannou and Padilla (1982) have looked at word formation from trigrams in Greek-English bilinguals. From the results it is apparent that the English-dominant subjects formed more words in English while the Greek-dominant subjects used the trigrams to form more words in Greek regardless of the language of instruction. Balanced bilinguals fell midway between both dominant language groups. This study favours the idea that non-balanced bilinguals are more efficient in their better language as far as this particular ability is concerned. This also may be true of non-balanced bilinguals' memory which will be investigated in the present paper.

Although the studies carried out were done for different purposes, there is one common point about all of them which draws the attention, and that is faster and better information processing in bilinguals' dominant language. This can be observed both in simple reaction time and in comprehension and production processes.

Despite different research done in the field of bilingualism, such as that concerned with reaction time and word formation in the two languages of bilinguals, matching words with

pictures, comprehension of material in the dominant and non-dominant language and naming colours, digits or pictures in a second language, all of which have greatly added to our knowledge in the field, we still know little about bilinguals' performance (such as recall) when presented with a sequence of information such as a passage of prose. It would be informative to find out if bilinguals presented with a piece of prose in both of their languages would produce better results in the memory for their dominant language. Recall for information presented in a passage to monolinguals received attention for the first time by Bartlett and was introduced in his book in 1932. He pointed out: 'most of the memory that we experience in everyday life is not concerned with isolated items. Most of the memory that we experience in everyday life is concerned with sequences of events which typically form part of an organised whole. So a passage of prose seems more likely than a list of unrelated words to provide an analogue to memory in everyday life'.

A study carried out by Skotko (1979) with an educational purpose as its aim stresses the point that a minimum proficiency in a second language must be obtained before a student can learn effectively in that language. He compares two groups of 16 subjects each, in which one group had English as their first language and Spanish as their second language and the other group vice versa. They were presented with two texts; one in English and one in Spanish and later were asked eight questions from each text. The result was that the main effects for text and questions were both significantly reliable, performance being better with the first language.

Together with the rest of the research mentioned earlier it can be concluded that information processing is more efficient in the dominant language. The present study aims to investigate the recall in bilinguals' two languages. The incentive for this investigation was the problem of forgetting names, things to be done and other similar memory problems in a second language (English) which was noticed by the author and her friends. It was carried out to find out empirically if this was related to language problems which a bilingual may have. In this research a group of Iranian bilinguals will be compared for their retention of information presented in prose in their first and second language.

There were several differences between the present research and that carried out by Skotko (1979). 1. In his experiment he used a recognition method while in the present experiment a recall task was used. 2. His subjects were young school children, but here they are adults. 3. He used two types of bilinguals: Spanish preference and English preference; while for all the subjects in the present experiments, only one language (Farsi) was the preferred language. 4. Skotko's major purpose of the experiment was to discriminate between two models of semantic memory. The present experiments were done with the purpose of finding out the difference in ability to recall in two languages. In the present experiment short-term recall and long-term recall were both measured, while in Skotko's study only short-term recall was measured.

2 Storage systems of bilinguals

It seems appropriate to discuss the important issue of the storage system in bilinguals. The question of whether information in bilinguals' memory is stored as concepts or

language-attached units, has received a good deal of attention.

Two main hypotheses have been proposed: the separate-storage hypothesis and the common-store hypothesis. In the first one it is assumed that the bilingual has two language-specific memory systems and the storage in either one of these depends on the language of input while in the second hypothesis the assumption is that items are stored in the bilingual's memory in the form of language-free concepts, regardless of the language of input. According to the separate storage hypothesis translation of a word would be regarded as a new item while it would be regarded as an old item in a common-store hypothesis. Kolers (1968) demonstrated these two storage systems in an interesting way. He regards the mind as a storage tank and languages as taps. There are two possibilities: (a) that there is only one tank in which all the information is stored. According to his need, a bilingual chooses one tap or the other. The taps are the rules of grammar. The information being tapped would always be the same, but its appearance and form would differ; (b) that the information in the mind is kept in two different tanks depending fundamentally on the language that was used to put it there. There will be also one tap for each of the tanks. In this situation, a bilingual person has access to different information when he uses the different taps. To examine these two hypotheses, Kolers uses word-association tests. From the results he concluded that neither of the two hypotheses could be accepted on its own.

As it is mentioned by Dornic (1979), most of bilingual memory research has given support to the common-store hypothesis. Some of the studies will now be discussed. Kolers (1966b) was the first to demonstrate the 'bilingual equivalent effect', i.e., that translation equivalents behave as old items, in short-term memory. Kintsch (1970) observed false recognitions of translation equivalents, and Kintsch and Kintsch (1969) found interlingual interference in paired associated learning. Young and Saegert (1966) and Young and Webber (1967) observed that associations formed in one language can interfere with or facilitate the information of new associations in another language. Young and Navar (1968) demonstrated interlingual retroactive inhibition. They showed that forgetting in one language occurs as a function of associations formed in the other language. Lopez and Young (1974) found positive transfer effects to be uniform both between and within languages. Wolf (1977), using primes and targets in her experiment, proved that priming due to semantic relatedness occurs even if the prime and the target are not in the same language. McLeod (1976), using the 'savings method' as a measure of long-term retention, also provided support for common-store theory. Support for the separate-storage model is much less. For example, Goggin and Wickens' (1971) demonstration of release from proactive interference as a result of language change in short-term memory can be interpreted as giving support to that hypothesis. Most often however, the fact that bilinguals can store information about the language of input surprisingly well is thought of as supporting the idea of language specific storage.

Dornic (1979) believes that it is more sensible, as in many similar cases in which problems are formulated in an extreme manner, to accept a commonsense hypothesis and expect both language-specific storage and language-free storage to take place, depending on the task demand.

Hines (1978) investigated the relationship between the bilingual's two languages concerning information processing. Bearing in mind that two models of independence and inter-dependence have been proposed, he tries to show that none of these extreme models alone would answer the question of translation, for which according to his experiments the inter-dependence model would be useful, and the question of avoiding intrusions during normal speech, for which the independence model would be useful.

There are also other studies carried out concerning bilingualism which are not directly related to this thesis. For example, dual coding (verbal/non-verbal) was the subject in question for Paivio and Lambert (1981) and Paivio and Derochers (1980). The study compared the effect of verbal/non-verbal and bilingual coding on recall. The results of the two experiments were completely consistent with predictions from the bilingual dual coding hypothesis. Paivio and Derochers proposed that the bilingual's two verbal systems and a common imagery system are all partially interconnected but capable of functioning independently.

3 Comprehension and Retention of Prose

There are a number of factors which are important in understanding and retaining information from passages of prose.

These factors may be named as follows: context, pictorial setting, title, instruction, reader's background and schemata.

To discuss the context, first we have to bear in mind that, to understand the language, the meaning of words should be understood, then comes the meaning of the sentence and finally the meaning of the passage as a whole. These are all related to the context of which they are a part. Although the meaning of the words remains almost the same, in a different context they may give us a different impression of the situation. For example, a 'mess' in a yard suggests a very different situation from a 'mess' on a desk or a 'mess' in which someone finds himself. Similarly the meaning of a sentence depends very much on the context in which it is read. 'The cupboard was a large one' in a context with the idea of trying to put something on top of it means something different from the situation of trying to put something inside by pushing it to the back of the cupboard. The first one means it is tall and the second one means it is deep. Kolers (1968) in order to show the necessity of having the appropriate context to understand any simple sentence, mentions the interesting story of bewilderment of a foreign visitor to New York when he saw a sign saying 'Bus Stop, No Standing'. Lacking the context that would be familiar to any New Yorker driving a car, he at first took the sign to mean that he was supposed to sit down while waiting for the bus.

It is very important to notice that it is essential to comprehend before trying to remember. Bransford and Johnson (1973) proved this in connection with pictorial settings : in general, the context influences the way in which we process

prose material. It influences our interpretation of words, sentences and even the whole passage, whether these be ambiguous or straightforward. All that is mentioned above comes under a single cognitive process which is known as the schema (Schank and Abelson, 1977). A schema can be considered as generalised knowledge about events, situations or objects. In a simple way, it can be said that people have schemata for how to build a house, what happens in a restaurant or how to prepare a dish of rice. As an example, if a friend begins to tell us about having dinner in a restaurant one would try to fit the incoming information into our existing framework of knowledge pertaining to restaurants - our restaurant schema. This schema consists of four main components: entering, ordering, eating and leaving. Each of these components is subdivided into several other components. Each subcomponent could be broken down further. Thus the components in the schema can be thought of as sub-schemata. In a test carried out by Bower, Black and Turner (1979), they found out that although eating at a restaurant could be described in many ways, yet there was extensive agreement in the language people used to describe the event and out of 730 actions mentioned in all by the subjects, only four were completely unique, given only by one person. Particular actions, for example, were mentioned by almost all of the subjects. This test showed that subjects had similar schemata for eating at a restaurant. As soon as someone says 'I had lunch at a new restaurant', the word restaurant would activate our restaurant schema, preparing us to hear about the quality of the food, the prices and other things. It is as though the schema has slots. As we listen, we fill in the open slots by the details of what we were

listening to. So the result is a combined knowledge of our schema for restaurant plus the information received from what we heard. If the information is not provided to fill in the slots, usually the person fills them by assigning them typical values. This depends upon the person's history. When all the slots are filled, the schema has been introduced and the comprehension process has been completed. One important point about schemata is that, they are usually modified by new information. For instance, a schema for eating at a restaurant for a child does not have the step of 'leaving a tip'. As he grows older and pays tips, this would be included in his schema. The ability to construct and to modify schemata contributes greatly to our ability to learn.

Schemata have an important role in how people process prose material. It is believed that the comprehension process involves the schemata that the reader selects for the reading task as well as the information that is presented in the passage itself. If there is not an appropriate schema available, it means that the text or whatever is being studied would be difficult to understand or interpret. To appreciate the close relation between comprehension and memory, try to imagine the frustrating moments when you have read a difficult and complicated section and want to remember what you have read. It is probably hard to remember, or at least few facts have been retained.

4 Depth of Processing

Any stimulus in our surroundings, either simple or complicated, has to be analysed in order to be comprehended and remembered.

Earlier, the multi-store approach of Atkinson and Shiffrin (1968), in which three kinds of memory store have been postulated (sensory store, the short-term store and the long-term store) was believed to describe the basic structure of memory. In the multi-store model, each store acted as a separate box, the purpose of which was the storage of information. This view is now considered to be too rigid.

Craik and Lockhart (1972) have proposed a more flexible 'levels of processing' view of memory. They suggested that information is analysed in stages or levels of processing. It is said that preliminary levels of analysis are concerned with the physical characteristics of the stimulus, like its shape, sound and brightness, while in higher levels, the meaning and its connection and relation to other information already in the system is considered. In other words, the levels range from shallow to deep. Each analysis can produce a memory trace. Trace durability is assumed to be entirely dependent on level of processing. According to this theory, rehearsal can maintain a trace but cannot strengthen it; only deeper processing leads to an increase in trace strength. It should be noted that depth of processing concerns the meaningfulness of the stimulus rather than the number of analyses performed on it. In the levels of processing theory, a primary or short term memory system is postulated which is assumed to be a flexible central processor and can operate at any of several levels, in any of several encoding dimensions. It is more like the original concept of William James.

We have to bear in mind that primary memory has a limited capacity which is related to the limited attentional capacity.

The depth of processing is determined by the task demand, i.e., semantic processing would require deeper processing compared to a simple task of counting the letters contained in a word. Rehearsal is carried out in primary memory in 'chunks', i.e., we can rehearse a sound, a letter, a word, an idea or an image. This may stop us forgetting or be used as a basis for deeper processing.

Atkinson and Shiffrin (1968), proposing their multi-store model, emphasised the fact that long-term storage of information is often dependent on the amount of rehearsal in the short-term store. The overt rehearsal technique proved this to be right to some extent (Rundus and Atkinson, 1970). When a list of words belonging to different semantic categories was presented to subjects, it became apparent that rehearsal according to list category played a more active role in recall than the amount of rehearsal. In other words the quality of rehearsal could be much more important than the quantity.

Craik and Lockhart (1972) distinguished between two types of rehearsal: maintenance rehearsal, which simply involves the repetition of processing activities already carried out; and elaborative rehearsal, which involves a deeper or more thorough analysis of the stimulus. They assumed that only elaborative rehearsal enhanced long-term retention and maintenance rehearsal was not beneficial for it. This statement was rather controversial, since there was evidence against it. For example the effect of

maintenance rehearsal is shown to be greater in the case of repeated items than in the case of one presentation with an equal length of rehearsal time, i.e., rehearsal for 4 seconds on each of three presentations is more effective than rehearsal for 12 seconds after one presentation (Rundus, 1977).

Also it was found by Glenberg, Smith and Green (1977) that a nine-fold increase in rehearsal time increased the probability of correct recognition while the increase of recall was very small. It could be said that recognition memory is more sensitive than recall to the effects of maintenance rehearsal. It would be more logical to think of rehearsal activities as a continuum ranging between pure maintenance and highly elaborative instead of the notion of a dichotomy. Further studies support the idea that better recall is based on deeper processing and also on elaboration, such as making more connections at a given level of processing between the input and information in memory.

It is very likely that in a second language elaboration would probably be weaker because it requires extra processing.

This extra processing most probably involves the setting up of translational as well as informational links between the second and the first language. Initially the subject may translate information mentally into the first language into a convenient form, from there this translated form may be connected with other additional information. Thus the gap between the input and the links is greater than if the informational links were set up directly in the second language. This may therefore weaken elaboration because less direct and relevant links to the input are available.

Although the levels of processing approach does not have the rigidity of multi-store views, it faces criticism on several points, like amnesics (who can process information at a deep level but cannot remember the topic of conversation). Another problem about this theory is concerned with the meaning of 'depth' and its measurement. Also the theory only puts emphasis on the relation between deeper processing and meaningfulness rather than explaining the reason for it.

According to Eysenck (1984) 'any complete theory would have to take account of the fact that learning and memory depends upon at least four major factors: 1. The nature of the task given to the subjects; 2. The kind of stimulus material presented to the subjects; 3. The individual characteristic of the subjects (e.g., their relevant knowledge); 4. The nature of the retention test used to measure memory' (p.114) .

The main decision in the present study was to select a type of material which would be as meaningful as possible and very similar to information one would receive in normal everyday life. It was also essential to measure the retention

rather than recognition ability if the task was to be similar to what we do in normal life. The nature of the task was to read information (presented as news bulletins) as one would read and attain information from a newspaper or a book. The characteristics of the subjects were also taken into account, since it was mainly a specific group (Iranian bilinguals) having problems remembering everyday life information.

5 Retention of Prose in a Second Language

Bartlett was the first one to divert the attention in the field of memory from the classical work of Ebbinghaus to the more practical side of it. He used stories, passages of prose, pictures and American Indian picture-writing to investigate the retention of meaningful material. As he pointed out, most of the memory that we experience in everyday life is concerned with sequences of events, not isolated items. His most characteristic experimental method was that of serial reproduction, in which a subject would attempt to recall the same material on several occasions.

Bartlett, in attempting to explain the results of his famous experiment on the reproduction of an Indian folk tale, used the concept of 'schema' which was borrowed from the neurologist Sir Henry Head. As discussed above, a schema is an organised framework of knowledge. He suggested that our knowledge of the world comprises a set of models or schemata based on past experience. When we attempt to learn something new, we base our learning on already existing schemata. When these conflict with what is being remembered, distortions occur, as in the case of his subjects who modified the story

to make it more consistent with their own view of the world. We use what has been retained with our pre-existing schemata to try to recreate the original. For thirty years following the publication of 'Remembering' by Bartlett (1932), there was relatively little development in our understanding of memory for prose. In recent years, however, with the trend away from the artificiality of the classical verbal-learning tradition, there has been a considerable growth of interest in the topic of memory for prose, approached initially from the viewpoint of interference and information theory and more recently, through the rapid growth in the area of psycholinguistics (Baddeley, 1976).

It seems appropriate to investigate the subject of memory for prose in a second language to find out the difference, if there is any. The majority of research carried out in the field of bilingualism is concerned with more basic cognitive processes like reaction time measurements, naming objects in a second language and so on. Certainly each of these researches is informative, but, as Bartlett said, what we experience in everyday life is concerned with sequences of events, not isolated items. The present experiments were carried out with the objective of investigating the memory for 'real-life' information presented in a second language.

According to many findings mentioned before, bilinguals, especially non-balanced ones are slower and less efficient in their second (subordinate) language. Such inefficiency in memory was noticed by the present author in some Iranian bilinguals. The hypothesis was that the ability to remember in one's second language would be less than in one's first

or native tongue. This could be because of less experience that one may have with a second language and this may cause less and slower comprehension. Because bilinguals are slower, they probably elaborate incoming information less and use narrower coding. More time is used on basic processes, leaving less for elaboration. Limited knowledge of vocabulary, grammar and syntax plus less usage of the second language, may contribute towards explaining this hypothesis.

First it was necessary to conduct a pilot study into the suitability of various types of material. Examples of Farsi literature and their translations were considered. For two reasons they were found unsuitable: firstly because they did not contain enough information in them to be used for recall purposes and secondly they seemed to be insufficiently interesting to hold the subject's attention to the end of the text. Then passages from an 'O Level' geography book were translated and six subjects were tested. They were found to be hard to comprehend for the subjects. Finally, it was decided that news bulletins might be a suitable type of material for this purpose, containing enough information and at the same time being interesting for the reader because of its close connection to everyday life and also because of the fact that they were straightforward to comprehend and a familiar form of input. Besides the very factual nature of the information meant that the retention of the information was relatively straightforward in comparison to, say a philosophical or literary text, where information has first to be extracted on the basis of the subject's own interpretation and then retained in that form. Since it was supposed that bilinguals could be slower in comprehending

information, to ensure the whole text was covered, it was decided to allow the subjects to read the text and complete the questions in their own time. For the reasons mentioned above, the experiments were carried out using news bulletins, as explained in the 'Test material' section later.

CHAPTER II - EXPERIMENTS

Method

Experiment I

Aims

The main purpose of this experiment was to find out if the language of the text had an effect on recall by bilinguals. Prose was chosen as test material for two reasons. First, it is very similar to real life situations. Second, because little research had been carried out on this subject. It has been mentioned earlier in the introduction that different texts were considered in a pilot study and it was decided that the news bulletin was most suitable for this purpose.

While comparing bilinguals' ability to remember in two languages, two factors were taken into consideration.

1. It had to be ensured that the subjects' comprehension was adequate. In order to ensure that, it was decided that separate texts would be given for comprehension and recall, one in each language. Two texts were used for recall. To measure comprehension two additional texts of news bulletins were prepared. These two texts were very similar in nature to those used for recall. All texts were available in both languages and the assignment of texts to conditions was balanced (see chart of arrangement, p.27).

2. The second point to be considered in this experiment was to find out if the subjects' retention over time differed in their two languages. A short-term recall and a long-term recall test was given. Differences between languages could be due both to comprehension and decay. By using comprehension scores as a covariate the comprehension component could be removed. If retention over time differed in the two languages,

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differences would increase in the long-term recall test compared with the short-term recall test.

Subjects

The subjects were 15 male and 17 female Iranians residing in England. Their ages were between 35 and 60. Their native language was Farsi (Persian) and they had learnt English either in high-school or taken English courses later. They were non-balanced bilinguals. Their comprehension of English was measured during the experiment. All the subjects were volunteers. Fifteen subjects were rejected, four for not following the instructions correctly, three for switching the order of the question sheets, four who were absent for the second session, one for being unable to read Farsi, though she could speak it, and three did not continue because the English texts were too hard for them to understand.

Test Material

News items from BBC Radio World Service were recorded and a News Bulletin from BBC Television was kindly provided by Dr. C. Berry, Department of Psychology, North East London Polytechnic, which is appreciated and acknowledged.

They were translated into Farsi by the present author. Four texts were needed altogether, two for memory tests; one in Farsi and one in English; and two for comprehension, one in Farsi and one in English. Since it was intended to have 10 questions for short-term recall (STR) and 10 question for long-term recall (LTR), each text had to be long enough for this purpose. Each text was between 400 and 450 words.

In each of the four texts different news 'items' were put together. They consisted of home news, foreign news, news from Ireland and some regional news. (The texts are in the Appendix). The four texts in total, each in two languages, Farsi and English, were numbered 1, 2, 3 and 4 with the initials 1F (Farsi) and 1E (English) and so on for texts numbers 2, 3 and 4. Twenty questions were devised for each text. Questions were in the same language as each text. These were divided into two sets of 10 questions. One set was called 1 to 10 and the other set was called 11 to 20. One set was to be used for STR and the other set for LTR. Having four texts in two languages and two sets of questions produces a wide range of possible combinations. It was decided that text numbers 1 and 2 should be always used together and 3 and 4 together to avoid complications. In half of the subjects texts 1 and 2 were used for memory and texts 3 and 4 for comprehension. For the other half, they were switched, so that 1 and 2 were used for comprehension and 3 and 4 for memory. The following chart shows how these were administered for the first four subjects. (See next page).

For the next four subjects, the memory and comprehension texts were switched, i.e., 3 and 4 were used for memory and 1 and 2 for comprehension. The next eight subjects were tested in the same manner as the first eight, except that their sets of questions for STR and LTR were switched. In order to have 32 subjects, the same combinations were repeated once more. The design of the experiment was split plot with one between subjects factor (assignment of texts to conditions with eight levels) and two within subjects factors ('delay' and 'language of text' each with two levels).

Procedure

The subjects were tested for their STR and LTR and
compared their performance in the two languages. The purpose of the
Chart of the arrangement of the first experiment
(Comprehension sheets were randomized and given together) *

Subject No	Text language & question set	Memory texts No. 1 & 2		Comprehension texts No. 3 & 4	
1	Text language →	1F	2E	3F	4E
	STR question set →	1-10	1-10	1-10+ *	1-10+ *
	LTR question set →	11-20	11-20	11-20	11-20
2	Text language →	1F	2E	4F	3E
	STR question set →	1-10	1-10	1-10 *	1-10 *
	LTR question set →	11-20	11-20	11-20	11-20
3	Text language →	1E	2F	3F	4E
	STR question set →	1-10	1-10	1-10 *	1-10 *
	LTR question set →	11-20	11-20	11-20	11-20
4	Text language →	1E	2F	4F	3E
	STR question set →	1-10	1-10	1-10 *	1-10 *
	LTR question set →	11-20	11-20	11-20	11-20

Procedure

The subjects were tested for their STR and LTR and comprehension. They were informed that the purpose of the experiment was to find out if there was a difference between remembering information in their native language compared with their second language. Each subject had to be tested on two consecutive days. From 32 subjects, 20 were tested by the author and 12 were self-administered. (The reason for doing so was because either they did not live in London and the questionnaire had to be posted to them or they were occupied during the day time and preferred to complete the questionnaire during their free time).

The instructions were given orally if they were tested by the experimenter. In the case of self-administered subjects, they were written down on a separate sheet and attached to the test. The instructions were as follows for the two texts used for STR: "Please read the news bulletin once carefully. You can read it at your own pace. Then put it aside and answer the questions related to it. Leave out the questions which you do not recall. Follow the same instructions for the second text in the other language". For LTR, the instruction was as follows and was given the next day: "The questions that you are given are related to the text that you read yesterday. Please answer the questions that you remember and leave blank the ones you've forgotten. Please keep them in the same language order as you did yesterday".

After their STR and LTR had been tested, the subjects had to read two more texts, this time for comprehension, one in Farsi and one in English. They had to answer 20 questions for each text. The following instructions were given for this section: "Please read the news bulletin once and then answer the questions related to it. Kindly refer to the text if you've forgotten the answer or are not sure of its correctness. In other words answer all the questions. Please follow the same instructions for the second text".

To score the results, it was decided that a 'full credit' would be given to the right answer. No half credits were given. If the answers were neither completely correct nor wrong, they were treated as wrong ones (no credit was given).

Results

The average number of correct answers in each condition is shown in Table 1. Subjects were compared mainly for their recall of information in the native and second language. Analyses of variance and covariance (using comprehension score as the covariate) were performed to analyse the data. A split-plot design was used. The between subjects effects were: groups (assignment of passages) and the within subjects effects were: delay, text language and their interactions with each other.

None of the between subjects effects were significant. The results of the within subjects analysis showed that text language ($F = 6.69$; d.f. 1,24; $p < .025$) and delay ($F = 51.63$; d.f. 1,24; $p < .001$) were significant. None of the other within subjects effects or interactions were significant.

Table 2 shows all the results of the analyses.

Text language	STR	LTR	Comprehension
Farsi	6.37	4.03	18.75
English	5.28	3.47	17.34

Table 1. Mean recall for Farsi and English texts (out of 10) and mean comprehension (out of 20)

A related T test was carried out on comprehension scores, Farsi versus English. The result was significant at the 5 percent level ($T(31) = 2.30, p < 0.05$).

Table 2. ANOVA Results for recall, Experiment I (non-students)

Source	SS	df	Var. est.	F	Significance
<u>Between Subjects</u>	526.55	31	16.98	-	-
groups	84.80	7	12.11	0.65	n.s.
passages	[0.20]	[1]	0.20	0.01	n.s.
other	[84.60]	[6]	14.10	0.76	n.s.
Bet.Subs.within groups	441.75	24	18.40	-	-
<u>Within Subjects</u>	382.75	96	3.98	-	-
delay	126.00	1	126	51.63	p < 0.001
delay x groups	34.63	7	4.94	2.02	n.s.
delay x Sub.w.g.	58.63	24	2.44	-	-
text language	21.95	1	21.95	6.69	p < 0.025
text lang. x group	7.69	7	1.09	0.33	n.s.
text lang. x sub. w.g.	78.62	24	3.28	-	-
delay x text lang.	4.05	1	4.05	2.57	n.s.
delay x text lang. x group	13.35	7	1.90	1.21	n.s.
delay x text lang. x sub.w.g.	37.75	24	1.57	-	-
TOTAL	909.30	127	7.15		

Table 2. ANOVA Results for recall, Experiment I (non-students)

Source	df	ΣY^2	ΣX^2	ΣXY	Adjusted		F	Sig.
					ΣY^2	df		
<u>Between subjects</u>	31	526.55	266.1	80.4	-	-	-	-
groups	7	84.8	73.47	52.63	64.51	7	0.48	n.s.
passages	1	0.19	0.78	0.39	0.32	1	0.01	n.s.
other	6	84.61	72.69	52.24	64.49	6	0.56	n.s.
subjects within groups	24	441.75	192.63	27.77	437.75	23	-	-
<u>Within subjects</u>	96	382.75	-	-	-	-	-	-
delay	1	126.0	-	-	-	-	-	-
delay x groups	7	34.63	-	-	-	-	-	-
delay x subjects	24	58.63	-	-	-	-	-	-
within groups	1	21.95	13.78	17.4	10.62	1	6.98	p < 0.025
text language	7	7.69	25.47	2.87	8.75	7	0.82	n.s.
text language	24	78.62	325.81	118.98	35.18	23	-	-
x subjects within groups	1	4.05	-	-	-	-	-	-
delay x text	7	13.35	-	-	-	-	-	-
language	24	37.75	-	-	-	-	-	-
delay x text	7	13.35	-	-	-	-	-	-
language x groups	24	37.75	-	-	-	-	-	-
delay x text	7	13.35	-	-	-	-	-	-
language x text	24	37.75	-	-	-	-	-	-
x subjects within groups	7	13.35	-	-	-	-	-	-

Table 3. Covariance results. Experiment 1 (non-students)
(No adjustment was possible for the factors involving 'delay')

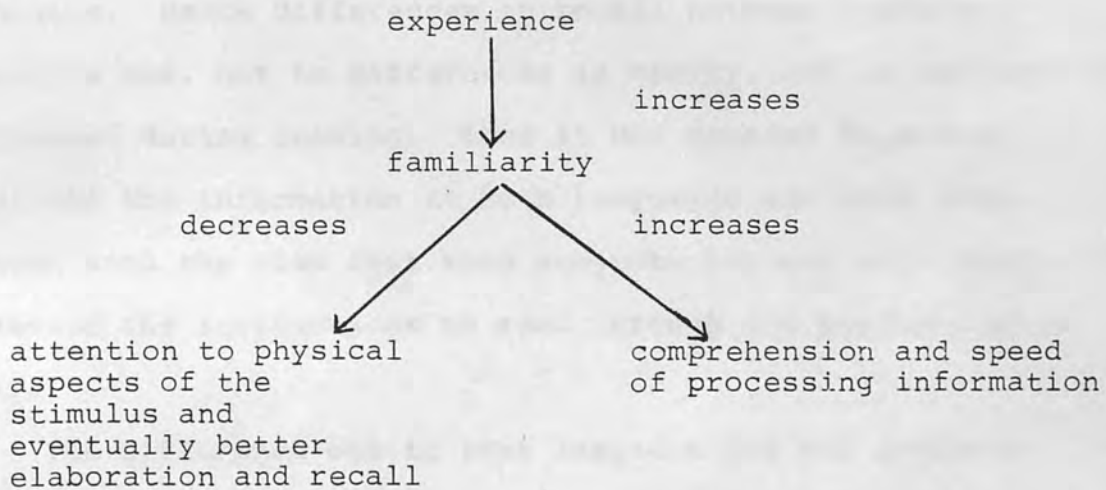
Discussion

The results of the first experiment support the hypothesis that more information is remembered in a bilingual's first (preferred or dominant) language. The difference due to language of text occurred both in short-term recall and long-term recall and this difference was not significantly different in the two cases. This effect is present even when covariance is used to adjust the memory data for differences between languages in the comprehension scores.

The results follow the same pattern as earlier studies comparing bilinguals' abilities in their two languages (Dornic, 1979; Preston and Lambert, 1969 and Hamers and Lambert, 1972) in measurement of reaction time; (Skotko, 1979) in answering questions in the second language; (Guttierrez-Marsh and Hipple-Maki, 1976) in simple mathematical problems and (Ervin, 1961) in naming common objects in the stronger language.

The difference found in text language could be related to comprehension as the result of the t test on comprehension scores showed better comprehension in Farsi. Using comprehension scores as a covariate, which adjusts retention scores to take into account this difference in comprehension between Farsi and English, there was still a significant difference in recall associated with text language. The comprehension text measured subject's ability to understand the information with the text still present. However this method of measuring comprehension certainly does not include ease or fluency of comprehension which is likely to be much greater in Farsi due to life-time experience of the native language. This must

have given subjects a great deal of familiarity with Farsi vocabulary which they lack in English. The subjects in this experiment, being unfamiliar with pronunciation and the exact meaning of some of the words and names of people and places mentioned in the texts, probably paid extra attention to these factors rather than rehearsal and elaboration which no doubt are important in retaining information received from the environment. What improves familiarity could be continued exposure or experience after initial basic learning of a second language. The following diagram illustrates this idea:



According to Oldfield and Wingfield (1965) speed and accuracy of naming objects and pictures increases with familiarity of a name, as measured by its frequency of occurrence in the Thorndike-Lorge (1944) word count (in monolinguals). This is also likely to apply to this group of bilinguals. The subjects of this experiment were both unbalanced and compound bilinguals. They were compound bilinguals since they acquired their second language in a different cultural background (Iran) from that natural to

the language, so called by Weinreich (1953) and Ervin and Osgood (1954). They were also unbalanced bilinguals since they only started the use of their second language 2-3 years before these experiments and only outside their home environment, which means that their native language is still far better than their second language.

Although comprehension was adequate for understanding the English text, reading of English would have certainly been slower. Had a time limit been enforced there would have been a possibility that the subjects would have failed to complete reading of the text, especially in the second language. Hence differences in recall between languages would be due, not to differences in memory, but in information processed during reading. Thus it was decided to ensure that all the information in both languages was read once, though with the risk that some subjects may not have completely observed the instructions to read through the passages once only.

The difference due to text language did not increase in long-term recall. This implies that the difference is due to early processing stages, possibly in comprehension, and not to trace decay. In theory use of the comprehension scores as a covariate should have eliminated this possibility but doubts about the adequacy of this procedure were discussed above. To overcome this, there is a need to use subjects with English and Farsi more equally matched in comprehension.

In this experiment the question language used was the same as the text language. The effect of question language was examined in Experiment II which extended the study to subjects with different background in the second language. The decision to have a different type of subject was taken for two reasons: firstly, to find out if students differ from older adults and secondly, because they were easily available as subjects.

The subjects were 32 Iranian students. Sixteen of the subjects were undergraduates in Colleges of the University of London, 4 were postgraduates in the University of Manchester, 6 were undergraduates from Universities of the United States and 5 were students who had passed their 'A' levels and were going to enter university in a few months. From 32 subjects, 19 were male and 13 were female. All the subjects had learned Farsi as their first language. Minimum Farsi education was 5th grade and maximum 12th grade (in Iran, children start school at the age of seven and grades go up to twelve). All 32 subjects were volunteers. Three subjects were dropped; two for misunderstanding the instructions and the third because of her inability to read Farsi.

Material

The material was the same texts used for Experiment I. Only texts 1 and 3 and their translations were used for this experiment. No significant differences between texts were

Experiment II

The purpose of this experiment was to test a group with more balanced ability in Farsi and English and find out if the language of the questions was varied it would make any difference.

Subjects

The subjects were 32 Iranian students. Sixteen of the subjects were undergraduates in Colleges of the University of London, 4 were postgraduates in the University of Manchester, 6 were undergraduates from Universities of the United States and 6 were students who had passed their 'A' levels and were going to enter university in a few months. From 32 subjects, 19 were male and 13 were female. All the subjects had learned Farsi as their first language. Minimum Farsi education was 5th grade and maximum 12th grade (in Iran, children start school at the age of seven and grades go up to twelve). All 32 subjects were volunteers. Three subjects were dropped: two for misunderstanding the instructions and the third because of her inability to read Farsi.

Test Material

The material was the same texts used for Experiment I. Only texts 1 and 3 and their translations were used for this experiment (no significant differences between texts were

found in Experiment 1). This was decided because in this experiment, subjects were supposed to read only one text for memory and one for comprehension, but answer half of the questions in the same language as the text language and the other half in the alternative language. Of the 20 questions for each text in the previous experiment, the odd numbered questions were separated from the even numbered ones. One set was given in Farsi and one in English, half the subjects having the odd numbers in Farsi and evens in English and the other half the other way.

Procedure

Subjects were told that the purpose of the experiment was to find out the difference in bilinguals' ability to retain information in their two languages.

The instructions were given orally as follows: 'Please read the news bulletin once carefully. Do not read more than once, then put it aside and answer the questions which are related to the same text. For the questions for which you do not remember the answers, leave them blank. Please answer the Farsi questions in Farsi and English questions in English'. For the comprehension section, the instructions were as follows: 'In this section you will read another news bulletin, please read it once. When you are answering the questions, if you've forgotten the answer or are not sure of its correctness, please refer to the text and find the right answer for that question. In other words, all the questions either in Farsi or English must be answered'. At the end of the instructions there was an extra line to remind them not

to read the second text before the first one. (i.e., the text for comprehension.) In cases where the subjects had to administer the test themselves, the same instructions were written and had to be read before starting the text (it was attached to the front page of the news bulletin).

Of the 32 subjects, 16 subjects were given text No.1 for memory and text No.3 for comprehension. The other 16 subjects were given the reverse arrangement. The comprehension test was always in the same language as memory. To balance out the language, half the subjects were tested on Farsi text and the other half on English text. The question sheets, i.e, 10 questions in English and 10 in Farsi, were given in two different orders. For 16 subjects, the same language questions as the text they had read were given first and opposite language questions next and the remaining 16 subjects were given the opposite language question sheet first and the same language sheet next. The aim was to find out if switching language between text and questions would have any effect. To make it clear, the following chart shows the experimental design.

Subject No.		Text Language	Question language and Numbers	Question Language order
1	Text No.1 used for memory & No.3 for comprehension	E	Odds in E evens in F	E then F
2		E	Evens in E odds in F	E " F
3		F	Odds in F evens in E	F " E
4		F	Evens in F odds in E	F " E
5	Text No.3 used for memory & No.1 for comprehension	E	Odds in E evens in F	E then F
6		E	Evens in E odds in F	E - " F
7		F	Odds in F evens in E	F " E
8		F	Evens in F odds in E	F " E

Chart of the arrangement of the second experiment

This whole design was carried out twice to obtain a total of 16 subjects. To investigate the effect of switching, the experimental design was carried out once more, but the order of the question languages was reversed.

Results

The mean scores in the different conditions are shown in Table 4 below.

Text lang	Recall		Comprehension	
	F questions	E questions	F questions	E questions
F	6.87	6.75	9.62	9.68
E	6.62	6.56	8.93	9.75

Table 4. Means for no. of questions correctly answered according to the text and question language.

(Maximum no. of correct answers for both recall and comprehension was 10)

The means of recall and comprehension were calculated and are shown in Table 4. As the results show, the means are almost the same, and no difference was produced by text language or question language.

Considering the results of ANOVA (Table 5), neither between subjects factors nor within subjects factors were significant. In other words, language did not have any effect on students' ability to remember information in a second language. An additional control was examined by

switching the order of question languages. To be clear, this meant that half the subjects who read an English news bulletin then answered English questions followed by Farsi, while the other half received the questions in the opposite order. The effect of this was not significant.

The results of the analyses of covariance were also not significant. However, analysis of variance on comprehension showed a slight significance for 'Text language' and also 'Question language' and their interaction. The results are

shown in Table 7.

	55.45	12	1.76	-	-
question language	0.14	1	0.14	<1	n.s.
question language x text language	0.02	1	0.02	<1	n.s.
question language x switch	3.26	1	1.26	0.24	n.s.
question x text lang. x switch	0.14	1	0.14	<1	n.s.
question language x subjects within text language	54.2	12	1.35	-	-
Total	289.38	63	4.59		

Table 5. ANOVA results for recall, Experiment II (students)

Source	SS	df	Var. est.	F	Sig.
<u>Between Subjects</u>	232.9	31	7.51	-	-
text language	0.76	1	0.76	0.1	n.s.
switch	6.89	1	6.89	0.92	n.s.
text language x switch	17.02	1	17.02	2.29	n.s.
subjects within text language	203.23	28	7.43	-	-
<u>Within Subjects</u>	56.46	32	1.76	-	-
question language	0.14	1	0.14	<1	n.s.
question language x text language	0.02	1	0.02	<1	n.s.
question language x switch	1.26	1	1.26	0.64	n.s.
question x text lang. x switch	0.14	1	0.14	<1	n.s.
question language x subjects within text language	54.9	28	1.96	-	-
Total	289.36	63	4.59		

Table 5. ANOVA results for recall, Experiment II (students)

Source	df	ΣY^2	ΣX^2	ΣXY	Adjusted ΣY^2	df	Var. est.	F	Sig.
<u>Between subjects</u>	31	232.9	34	11.5	-	-	-	-	-
text language	1	0.76	1.56	0.45	0.64	1	0.64	0.08	n.s.
switch	1	6.89	0.24	-1.32	6.35	1	6.35	0.82	n.s.
text language x switch	1	17.02	0.57	3.73	15.22	1	15.22	1.98	n.s.
subjects within text language	28	208.23	31.63	5.99	207.10	27	7.67	-	-
<u>Within subjects</u>	32	56.46	-	-	-	-	1.76	-	-
question language	1	0.14	-	-	-	-	0.14	<1	n.s.
question language x text language	1	0.02	-	-	-	-	0.02	<1	n.s.
question language x switch	1	1.26	-	-	-	-	1.26	0.64	n.s.
question language x switch x text language	1	0.14	-	-	-	-	0.14	<1	n.s.
question language x subjects within text language	28	54.90	-	-	-	-	1.96	-	-
Total	63	289.36	-	-	-	-	4.59	-	-

Table 6. Covariance and ANOVA results, experiment II (students)

Source	SS	df	Var. est.	F	Sig.
<u>Between Subjects</u>	13	31	0.41	-	-
text language	1.56	1	1.51	4.10	p<0.1
subjects within	11.44	31	0.38	-	-
<u>Within Subjects</u>	21	32	0.65	-	-
question language	3.06	1	3.06	5.88	p<0.025
text language x question language	2.25	1	2.25	4.32	p<0.05
rest	15.69	30	0.52	-	-
Total	34	63	0.53		

Table 7. ANOVA results for comprehension (Experiment II)

Discussion

The results of this experiment do not confirm the hypothesis. In other words, there was no difference in recall between first and second languages.

Considering Table 4 on page 40 the means for the correct number of questions answered according to the text language are almost identical.

Although the results do not support the hypothesis, they are in accordance with the results and conclusions of research carried out earlier (Mägiste, 1979). According to this paper, even under optimal conditions, second language acquisition is a slow process. Usually development in comprehension happens earlier than production. To achieve a bilingual balance, it takes between 4 to 6 years, after which the second language will become the better one despite schooling in the first language. (This applies to individuals who are in the environment of their second language). The first situation is that ^{of} non-students who have not been in England long enough to become fluent in English and the second is that of students who have been here for a longer period and their fluency in English is almost similar to their fluency in Farsi.

In previous discussion on experiment I, evidence was cited that experience with verbal behaviour, like other behaviour, has a great effect in enabling an individual to have a better command of that behaviour. Remembering that all the participants of this group were students, taking different degree courses in a second language (English), obviously they have had the opportunity of using their second language much more than the adult group. Subjects in this group were more experienced in their second language compared to non-students.

In the present experiment, students were given a comprehension test with no time limit. It was decided that subjects would be dropped if they had a low comprehension (less than 50%). Two were dropped because they did not follow the instructions correctly and one because she could not read Farsi; no one was dropped for low comprehension. The difference in Farsi and English scores for comprehension is a weak significance, supporting their almost equal comprehension in two languages. So we could actually say that more experience with a second language enhances the recall, but what is left uninvestigated in this experiment is the question of what the results would be if the subjects had to do their comprehension and recall test within a time limit. It seems that they might have shown a difference in that case. Dornic (1979) reports: "Although research reported in recent years has not yielded unambiguous results, most of it indicates that comprehension speed, i.e., the decoding efficiency (and consequently, the speed of responding to verbal stimuli) in a bilingual's second language is generally slower than in his first language even after many years' use of the former. This is even true for high-frequency words where one would expect complete 'automaticity' of decoding. The semantic content of the words tends to be decoded more slowly, even at very elementary levels: the process of decoding words belonging to a secondary system simply required more time". If, by Dornic's account, speed is less in a second language, this would further inhibit the subjects in this experiment from comprehending if the time limit imposed should be less than needed for their comprehending ability. As the comprehension used here is mainly an implement for remembering and recall,

it had to be ensured that the comprehension of text was as constant as possible for all subjects, in order to bring out differences in recall. Dornic's research differed in that it solely concentrated on comparing differences in comprehension and speed.

Besides Dornic (1979) mentions several factors that can change the relation between a non-balanced bilingual's language systems. He generally includes these factors under one heading: stress. He believes that: "the apparently equal proficiency in a bilingual's two languages often rests on strategies and compensatory processes which he has learned to employ when using his subordinate language. If his pronunciation is good and his vocabulary reasonable, a mere simplification of his manner of expression may conceal his slower functioning in the weaker language, his poor degree of automaticity, and sometimes even his inferior knowledge of grammar and syntax. These shortcomings may well remain hidden until some stress is added. Information overload, environmental, emotional or social stresses, the necessity of rapid language switching, mental fatigue, and similar factors may unveil the latent dominance of one of his language systems". In other words, if we had set a time limit for the students as a stress factor, they might have shown a difference in recall.

The switching factor (order of question language) which was a between subjects variable did not show a difference and the result was insignificant. There are two points at issue here: 1. that the language of the question had no effect on the subjects, presumably because language has no

Experiment III

effect on these subjects anyhow; 2. the order of the language in the questions had no effect. This shows there was no loss of information while the first set of questions was being answered. Since there was no difference between languages in the effect of order, this suggests we do not need to include this variable in Experiment III.

Subjects

The subjects were 48 Iranian bilinguals: 16 were students studying in London, 16 were non-students aged between 15 and 20 residing in London and 16 were non-students residing in Tehran, Iran. Their ages were also between 15 and 60. All the non-students had learned English as a second language, partly in high school and partly by individual courses. Their comprehension was tested by one of the news bulletins. If it was lower than 50%, the subject was rejected from the experiment. All together, seven subjects were rejected either for low comprehension or misunderstanding of the instructions (4 subjects from the students and 3 subjects from adults in London). The subjects were volunteers.

Test Material and Procedure

The material used for this experiment was exactly the same as in experiment II.

Experiment III

The main object of this experiment is to compare the influence of environment on three groups of subjects: an older adult London group, an older adult Tehran group and a student London group. At first impression one may predict that the Tehran group will produce worse results in their second language. Also we would predict that students would be superior to older adults in London and Tehran. Students' superiority to the other two groups could be due to the necessity of using their second language and their familiarity with vocabulary and syntax in that language.

Subjects

The subjects were 48 Iranian bilinguals; 16 were students studying in London, 16 were non-students aged between 35 and 60 residing in London and 16 were non-students residing in Tehran, Iran. Their ages were also between 35 and 60. All the non-students had learned English as a second language, partly in high school and partly by individual courses. Their comprehension was tested by one of the news bulletins. If it was lower than 50%, the subject was rejected from the experiment. All together, seven subjects were rejected either for low comprehension or misunderstanding of the instructions (4 subjects from the students and 3 subjects from adults in London). The subjects were volunteers.

Test Material and Procedure

The material used for this experiment was exactly the same as in experiment II.

The procedure was also the same as experiment II, with the exception that the question language order was not varied, i.e., subjects first were given the questions in the language of the text they had read, followed by the other set of questions in the other language.

Results

Table 8 shows the mean scores in the different conditions.

Text lang	Recall		Comprehension	
	F questions	E questions	F questions	E questions
F	6.04	5.12	9.66	9.20
E	4.79	4.87	9.33	9.37

Table 8. Means for no. of questions correctly answered according to the text and question language. (Experiment III). (Maximum no. of correct answers for both recall and comprehension was 10).

Considering answers according to the text language, the best result is obtained when the text and the questions are both in the subjects' first language. The second best result is reading Farsi text with English questions. In the case of the English text, the better result is when both text language and question language are kept the same. So the worst result occurs when the subjects read in their second language and have the questions in their native language.

The results for ANOVA (Table 9) did not show a significant result for the main effect (text language). Among the within subjects factors, only question language x text language was

marginally significant ($F = 3.21$; d.f. 1,42; $p < 0.1$). Question language and its other interactions were all insignificant. The results of covariance did not differ from ANOVA. They are shown in Table 10).

Analysis of variance on comprehension scores, Table 11, shows that between subject variables were not significant and for within subject variables only the interactions of 'question x text language' ($F = 3.51$; d.f. 1,42; $p < 0.1$) and 'question x text language x group' ($F = 2.60$; d.f. 2,42; $p < 0.1$) were slightly significant.

Source	SS	df	Var. est.	F	Sig.
<u>Between subjects</u>	288.84	47	6.14	-	-
text language	13.50	1	13.50	2.40	n.s.
group	18.90	2	9.45	1.68	n.s.
group x text language	20.68	2	10.34	1.84	n.s.
subjects within group x text language	235.76	42	5.61	-	-
<u>Within subjects</u>	91.00	48	1.89	-	-
question language	4.13	1	4.13	2.19	n.s.
question language x group	0.18	2	0.09	0.05	n.s.
question language x text language	6.04	1	6.04	3.21	$p < 0.1$
question language x group x text language	1.66	2	0.83	0.44	n.s.
question language x subjects within groups x text language	78.99	42	1.88	-	-
Total	379.84	95	3.99		

Table 9. ANOVA Results for recall. Experiment III (students, non-students London and non-students Tehran).

Source	df	ΣY^2	ΣX^2	ΣXY	Adjusted		Var. est.	F	Sig.
					ΣY^2	df			
<u>Between subjects</u>	47	288.8	88.96	28.0	-	-	-	-	-
text language	1	13.5	1.04	2.0	12.51	-	12.51	2.22	n.s.
group	2	18.9	2.32	0.08	19.01	-	9.50	1.69	n.s.
group x text language	2	20.68	0.22	4.06	18.43	-	9.21	1.64	n.s.
subjects within groups x text language	42	235.76	85.38	21.86	230.17	41	5.61	-	-
<u>Within subjects</u>	48	91.0	-	-	-	-	1.89	-	-
question language	1	4.13	-	-	-	-	4.13	2.19	n.s.
question language x group	2	0.18	-	-	-	-	0.09	< 1	n.s.
question language x text language	1	6.06	-	-	-	-	6.06	3.21	p < 0.1
question language x group x text language	2	1.66	-	-	-	-	0.83	0.44	n.s.
question language x subjects within groups x text language	42	78.99	-	-	-	-	1.88	-	-
Total	95	379.89	-	-	-	-	3.99	-	-

Table 10. Covariance Results Experiment III (students, non-students London and non-students Tehran).
for recall

Source	SS	df	Var. est.	F	Sig.
<u>Between Subjects</u>	64.96	47	1.38	-	-
groups	2.33	2	1.16	0.79	n.s.
text language	0.16	1	0.16	0.10	n.s.
groups x text language	1.09	2	0.54	0.36	n.s.
subjects within groups	61.38	42	1.46	-	-
<u>Within Subjects</u>	24.02	48	0.50	-	-
question language	1.04	1	1.04	2.41	n.s.
question language x group	1.09	2	0.54	1.25	n.s.
question x text language	1.51	1	1.51	3.51	p < 0.1
question x text language x group	2.24	2	1.12	2.60	p < 0.1
Rest	18.14	42	0.43	-	-
Total	88.96	95	0.93	-	-

Table 11. ANOVA Results for Comprehension. (Experiment III)

Recall according to text language and question language			Comprehension according to text language and question language			
Group	Text Ques.	Farsi	English	Text Ques.	Farsi	English
Tehran	Farsi English	6.00 5.25	3.62 3.50	Farsi English	10 9.25	9.37 9.12
London	Farsi English	6.37 5.00	5.37 5.75	Farsi English	9.50 9.50	9.75 9.50
Students	Farsi English	5.75 5.12	5.37 5.37	Farsi English	9.50 8.87	8.87 9.50

Table 12. Means for no. of questions correctly answered according to text language and question language for each subgroup. (Maximum no. of correct answers for both recall and comprehension was 10).

Source	SS	df	Var. est.	F	Sig.
<u>Between Subjects</u>	119.22	15	7.94	-	-
text language	34.03	1	34.03	5.59	p < 0.05
subjects within groups x text language	85.19	14	6.08	-	-
<u>Within Subjects</u>	71.5	16	4.46	-	-
question language	1.53	1	1.53	0.30	n.s.
question language x text language	0.78	1	0.78	0.15	n.s.
question language x subjects within groups	69.19	14	4.94	-	-
Total	190.72	31	6.15	-	-

Table 13 ANOVA Results for recall. Experiment III
(Older Tehran subgroup only)

Source	df	ΣY^2	ΣX^2	ΣX^2	ΣX^2	Adjusted		Var. est.	F	Sig.
						ΣY^2	df			
<u>Between subjects</u> text language	15	119.22	24.69	35.88	-	-	15	-	-	-
	1	34.03	1.31	0.5	32.5	32.5	1	32.5	6.06	p < 0.05
subjects within groups x text language	14	85.19	23.38	35.38	69.74	69.74	13	5.36	-	-
<u>Within subjects</u> question language	16	71.5	-	-	-	-	-	4.46	-	-
	1	1.53	-	-	-	-	-	1.53	0.30	n.s.
question language x text language	1	0.78	-	-	-	-	-	0.78	0.15	n.s.
question language x subjects within groups	14	69.19	-	-	-	-	-	4.94	-	-
Total	31	190.72	-	-	-	-	-	6.15	-	-

Table 14. Covariance Results, for recall, Experiment III (Older Tehran subgroup only).

The results of each subgroup were looked at separately. According to Table 12, the Tehran group clearly obtained much worse scores in their English results for recall.

The subgroups were compared by planned comparisons, to discover whether they differed in the effect of text language. Two comparisons were carried out for the interaction of 'group x text'. In the first comparison, the student subgroup was compared with the two older subgroups (London and Tehran). The result was not significant ($F = 1.01$; d.f. 1,42). The second comparison was between the two non-student groups. The result of this comparison was also non-significant ($F = 2.67$; d.f. 1,42). For the interaction of 'question x group x text' the same two comparisons were carried out and again the results were not significant ($F = 0.12$; d.f. 2,42 for the first comparison and $F = 0.67$; d.f. 2,42 for the second comparison).

A separate analysis was performed on the Tehran recall data alone with the results shown in Tables 13 and 14. This supports the difference predicted above (p.49) but is of course only weak support, having been carried out after inspection of the data.

Discussion

The findings of the third experiment do not completely confirm the results of the first experiment. While the Tehran subgroup shows a difference in recall, the older adult London subgroup and students do not. The difference between the older London subgroup and the group tested in Experiment I which did show a significant effect of text language may be due to the design of the experiment, having the 'text language' in the present case as a between subject factor. Experiment I had 'text language' as a within subject factor, which would be more sensitive when relatively small numbers of subjects are employed. Though the difference between groups in the effect of text language was not significant, it was suggestive. According to Table 13 (separate analysis of Tehran group), 'text language' is significant.

It is possible that the non-student group in London are more experienced compared to the non-students in Tehran, and those who were tested in Experiment I. As was discussed earlier, the fact that subjects have more experience means more familiarity and this in itself increases speed and automaticity and as a result enables the subjects to rehearse the material and elaborate, rather than spending their time on basic processing and comprehension. It should be taken into consideration that the older adult subgroup in London were tested almost one and a half years later compared to adults in Experiment I, which would mean more experience for them. Another possible reason for this outcome may be due to the type

of material presented to the subjects. Since the news bulletins consist of facts, the comprehension factor is involved to a lesser extent compared with more complicated passages. The fact that comprehension for both Farsi and English was almost equal as shown by the results of analysis of variance on comprehension, may support this idea. The subjects, no matter which language they read the material in, will either remember the fact or they will not. This raises the question of what the results would be like if the subjects were presented with a different text, such as a literary text, a logical argument or a story similar to Bartlett's folk story, which make greater demand on processing capacity.

The interaction of text language with question language shows a slight significance. According to Table 8 when the text and questions are in the subject's first language, the performance is the best. In the case of English language, although the difference is small, still it is in the same direction, i.e., English text with English questions gives better results. This probably would mean that change of language has a negative effect on recall. A similar significant effect was obtained when ANOVA was carried out for comprehension. For the comprehension results (Table 11) the effect of question language x text language x group was probably due to the fact that the Tehran subgroup showed poor performance, for the combination of English text and English questions.

The results of the three experiments have raised two questions, the first question being the level of subject's fluency in a second language and its effect on recall and the second question being the effect of time limits for reading the text. The next experiment will consider the effect of these factors on Iranian bilinguals studying for a B.A. degree in English in Tehran.

It was expected that fluency in the second language should enhance recall whereas an imposed time limit should decrease recall in the same language.

Subjects

The subjects were 44 Iranian students in B.A. courses at two different universities in Tehran. They were all studying English language for their first degree. One of the universities chosen was only for women, so overall 50 of the subjects were female and 4 were male students. Their education up to the 12th grade (this being the stage when they receive their high school certificate) was carried out in their first language (Farsi), with English being studied as their second language for the last four years of their high school course. They were accepted for the language degree course on the basis of National Entrance Examinations for Universities. When this experiment was carried out the

Experiment IV

Aims

Results of the three previous experiments had different outcomes, with text language showing an effect in non-student groups (except the London sub-group in Experiment III) and no effect in the student groups. To investigate the matter in more detail it was decided that a fourth experiment should be conducted in an attempt to improve the control of the factors of fluency and reading time. The subjects were divided into high and low fluency groups, and a time limit for reading the text was imposed on half of them, while the other half had no such limit in time to read the text. It was expected that fluency in the second language should enhance recall whereas an imposed time limit should decrease recall in the same language.

Subjects

The subjects were 64 Iranian students in B.A. courses at two different universities in Tehran. They were all studying English language for their first degree. One of the universities chosen was only for women, so overall 58 of the subjects were female and 6 were male students. Their education up to the 12th grade (this being the stage when they receive their high school certificate) was carried out in their first language (Farsi), with English being studied as their second language for the last four years of their high school course. They were accepted for the language degree course on the basis of National Entrance Examinations for Universities. When this experiment was carried out the

minimum education they had received as a university student was almost nine months (one school year). To be sure that their English knowledge and ability was adequate to comprehend the text to be used, one of the lecturers read the texts and confirmed that they were within the students' scope.

Test Material

Texts Nos. 1 and 3 and their Farsi translations were used for the memory tests while Text No. 2 was used only in English to measure comprehension. (In Experiment 1 no significant differences between texts were found). There were 20 questions, half being in the same language as the text and half in the other language. All the questions of Text No.2 were in English, since it was intended to measure subjects' comprehension in their second language. Comprehension of their first language at this level of text difficulty was assumed to be equivalent for the groups assigned to the time limit or no time limit conditions and the groups yielding high and low fluency scores in English. This last assumption, as will emerge, appears to have been unjustified.

Procedure

The experimenter informed the subjects of the purpose of the experiment, to find out the ability to remember in two languages. This explanation was given in Farsi. To each questionnaire a separate sheet was attached asking for a self rating in the second language. They first had to

rate themselves on a scale which described their English fluency as: very good, good, above average, average, below average, poor and very little. The scale was scored from 7 to 1. (This measure was not in fact used in the experiment, for reasons discussed later.) Then each subject had to read Text No.2 in English for comprehension and answer 20 questions in English related to that text. It was mentioned that they could refer to the text if they did not remember any of the questions. They were then given either Text No.1 or 3 for their memory test. Order of presentation of the texts and assignment of texts and questions to languages were all counterbalanced. The chart shows the arrangement.

According to their comprehension score on Text No.2 the subjects were then divided into high and low fluency groups in their English language, with 32 subjects in each group. Half of these subjects had to read the texts on a time limit basis which was 5 minutes for Farsi texts and 10 minutes for English texts. The other half were free to read it at their own pace. Time limitation was estimated on the grounds of an earlier pilot study. 20 students were chosen at random and were asked to read the texts once carefully. Half read English texts and half Farsi texts. The reading time was taken by a stop watch as soon as they began to read the text. The watch was stopped as they finished. The maximum time obtained for Farsi and English was regarded as the time limit to be used in the 4th experiment. Thus the limit was a generous one, to ensure completion by all readers, even in the group given a time limit.

The instructions for the memory test were given orally and in Farsi. They were as follows: "Please read this text once carefully and try to remember as much as you can. Later you will be asked to answer questions related to this text. Please answer English questions in English and Farsi questions in Farsi and do keep them in the same order that you are given." When the readers finished the text it was taken from them and questions were handed out.

The chart on p.65 shows the assignment of Texts Nos. 1 and 3 and the related questions. This arrangement was repeated four times adding up to 64 subjects.

Results

Table 15 shows the mean scores for recall and comprehension according to text language, question language, fluency (high and low) and time (limited and not limited).

The results of ANOVA showed that the difference between the two fluency groups was significant ($F = 6.29$; d.f. 1,60; $p < 0.025$). The time limit factor and its interaction with fluency were not significant. The results for within subjects factors showed a significant effect for text language ($F = 37.40$; d.f. 1,60; $p < 0.001$), a marginally significant effect for question language ($F = 3.34$; d.f. 1,60; $p < 0.1$) and a significant interaction of text language by question language ($F = 35.91$; d.f. 1,60; $p < 0.001$). None of the other within subjects interactions was significant (see Table 16).

Subject No.	Text No.	Language of the text	Question language	Text No.	Language of the text	Question language
1	1	English	odds E, evens F	3	Farsi	odds F, evens E
2	1	E	odds E, evens F	3	F	evens F, odds E
3	1	E	evens E, odds F	3	F	odds F, evens E
4	1	E	evens E, odds F	3	F	evens F, odds E
5	3	E	odds E, evens F	1	F	odds F, evens E
6	3	E	odds E, evens F	1	F	evens F, odds E
7	3	E	evens E, odds F	1	F	odds F, evens E
8	3	E	evens E, odds F	1	F	evens F, odds E
9	1	F	odds F, evens E	3	E	odds E, evens F
10	1	F	odds F, evens E	3	E	evens E, odds F
11	1	F	evens F, odds E	3	E	odds E, evens F
12	1	F	evens F, odds E	3	E	evens E, odds F
13	3	F	odds F, evens E	1	E	odds E, evens F
14	3	F	odds F, evens E	1	E	evens E, odds F
15	3	F	evens F, odds E	1	E	odds E, evens F
16	3	F	evens F, odds E	1	E	evens E, odds F

Chart of the arrangement of each subject's texts and questions.

Source	Text lang.	Recall		Comprehension	
		F Ques.	E Ques.	F Ques.	E Ques.
Between Subjects	Low Fluency	F	5.40	4.15	-
		E	2.68	3.46	16.06
Time	High Fluency	F	6.84	5.00	-
		E	3.75	4.59	18.62
Subjects W.G.	Time Limit	F	5.96	4.65	-
		E	3.12	4.12	17.34
Within Subjects	No Time Limit	F	6.28	4.5	-
		E	3.31	3.93	17.34

Table 15. Experiment IV. Means for recall and comprehension according to text and question language for the fluency (high and low) and time (limited and not limited) conditions. (Maximum number of responses was 10 for recall and 20 for comprehension).

Table 16. ANOVA Results for Recall, Experiment IV.

Source	SS	df	var. est.	F	Signif.
<u>Between Subjects</u>	866.72	63	13.74	-	-
Fluency	79.88	1	79.88	6.29	p < 0.025
Time	0.1	1	0.1	< 1	n.s.
Fluency x Time	25.63	1	25.63	2.32	n.s.
Subjects w.g.	761.11	60	12.68	-	-
<u>Within Subjects</u>	907.25	192	4.72	-	-
Text Language	190.79	1	190.79	37.40	p < 0.001
Text Lang X Flu.	0.03	1	0.03	< 1	n.s.
Text Lang X Time	0.09	1	0.09	< 1	n.s.
T.L. X Flu X Time	1.41	1	1.41	0.27	n.s.
T.L. X Subjects	306.43	60	5.10	-	-
Question Language	8.63	1	8.63	3.34	p < 0.1
Que. Lang. X Flu.	1.13	1	1.13	0.43	n.s.
Que. Lang. X Time	2.84	1	2.84	1.10	n.s.
Q.L. X Flu. X Time	0.04	1	0.04	< 1	n.s.
Q.L. X Subjects	155.11	60	2.58	-	-
T.L. X Q.L.	89.06	1	89.06	35.91	p < 0.001
T.L. X Q.L. X Flu.	1.73	1	1.73	0.69	n.s.
T.L. X Q.L. X Time	0.05	1	0.05	< 1	n.s.
T.L. X Q.L. X Flu X Time	0.87	1	0.87	< 1	n.s.
T.L. X Q.L. X Subjs.	149.04	60	2.48	-	-
Total	1773.93	255	6.95		

Table 16. ANOVA Results for Recall. Experiment IV.

Discussion

The results of this experiment show that the effects of text language, question language and the interaction of these were all significant and these effects did not differ between groups of high and low fluency. Considering the previous experiments, text language had a significant effect in Experiment I, while in the second and third experiments (except for the Tehran sub-group in Experiment III), no effect for text language was found.

The similar outcomes in the first and fourth experiments are most probably because of the similarity of the linguistic background of the subjects used in these two experiments. In Experiment I, as discussed before, the subjects did not have enough practice with their English. They always spoke their native language at home and they had been in England for two or three years at the time of the experiment. To be reasonably fluent they needed to live here for a longer period. Subjects in Experiment IV also never used their second language except in the classroom and then only for the purpose of studying English as a university course. They always used their first language at home and never practised their second language in the outside environment.

The subjects in Experiment II, who were all students in London, made active use of their second language both in the classroom and in the outside environment and this was probably the reason for not showing a difference between the two languages. In the third experiment both adults and students were tested and no difference due to text language was found for the whole group. But when the sub-groups were taken

separately, adults in Tehran showed a difference due to text language, while students and adults in London did not. The London adults in this experiment were relatively more experienced and fluent in their English than the adults in the first experiment. They had been here for a longer period of time (approximately four years) and had more practice.

It seems that if we put the subjects of the four experiments in an order according to the degree of use they had made of their English at the time of the experiment, the students in London (Experiments II and III) would have made most use, followed by adults in London (Experiment III) and in last position would be the students (Experiment IV) and adults in Experiment I and Experiment III (Tehran sub-group). The last three groups all showed inferior recall in English. A simple comparison could be made between four experiments as shown in Table 17 below.

A close inspection of the table reveals that groups which show bigger differences between Farsi and English recall in favour of Farsi are the groups that also show greater comprehension differences in favour of Farsi (though in Experiment IV no measure of Farsi comprehension was taken the English comprehension scores are low in the context of the other experiments).

Question language also had an effect. Recall was better for Farsi questions than English questions. Also subjects could recall better when the languages of the text and the questions were the same. This pattern occurred in experiment III as well, though the effect was not large enough to be significant. Table 18 shows the average number of questions

Language Experiment	Comprehension		Recall		Maximum No. of Questions
	Farsi	English	Farsi	English	
I	18.00	17.34	6.37	5.28	comprehension: 20 recall: 10 questions and text in the same lang.
II	9.28	9.71	6.75	6.65	comprehension: 10 recall: 10 questions half in F and half in E
III (Tehran) sub-group	9.62	9.25	5.62	3.56	comprehension: 10 recall: 10
III (London) sub-group	9.50	9.62	5.68	5.56	questions half in F and half in E
III (student) sub-group	9.18	9.18	5.43	5.43	
IV	not mea- sured	17.34	10.70	7.64	comprehension: 20 recall: 20 questions half in F and half in E

Table 17. Means for comprehension and recall in two languages for four experiments.

Recall

Ques. Text	Farsi	English
Farsi	6.12	4.58
English	3.22	4.03

Table 18. Experiment IV. Means for correct recall according to text language and question language. (Maximum No. of correct answers was 10).

for correct recall in each case. It can be compared with the similar table for Experiment III (Table 8, page 50). It is not possible to compare the results with experiment I, since the subjects had to answer the questions in the same language as the text language, once in English and once in Farsi.

(In Experiments III and IV half the questions were in the same language as text and half in the other language.)

Fluency had a significant effect, but did not interact with the other variables, thus the superiority of the more fluent group occurred not only for English memory but for Farsi as well, i.e. high fluency group answered more questions correctly both in English and Farsi. This difference can be seen in Table 19 below.

	Recall	
	E. Text	F Text
Low Fluency Group	6.15	9.56
High Fluency Group	8.34	11.84

Table 19. Experiment IV. Means for correct recall according to fluency and text language. (Maximum No. of correct answers was 20)

This result can probably be interpreted as a difference in overall language and memory ability. It would be more appropriate to call it "individual language potential" rather than fluency. This conclusion was reinforced by a re-examination of Experiment I. It was found that English and Farsi comprehension were related over subjects ($r = 0.65$; $df = 30$; $p < 0.001$). Unfortunately this possibility was not considered

when designing Experiment IV, so Farsi comprehension was not measured since it was assumed that subjects' comprehension of their native language would be nearly perfect for the factual texts used. In this case it was expected that groups high and low in English fluency would show no difference in memory for Farsi text, but only for English text. This assumption seems to have been unjustified. However if there is a relation between comprehension in two languages, it means that it would have proved difficult to control fluency separately in the two languages by finding groups equal in Farsi comprehension and different in English comprehension or vice versa. Since comprehension in the two languages seems to be related (on the evidence of Experiment I) and memory performance is also related (in the present experiment), the findings further support the view that memory differences are closely related to comprehension, which differs both between languages and between groups of differing ability.

The time factor did not have any effect. The groups with a time limit performed as well as the groups with no time limit. The mean number of questions correctly answered was identical for English text for the two groups and almost the same for Farsi text (Table 20).

	Recall	
	E Text	F Text
Time limit group	7.25	10.62
No Time limit group	7.25	10.78

Table 20. Experiment IV. Means for correct recall according to time limit and no time limit for each text language. (Maximum No. of correct answers was 20).

This result may be due to the fact that the group with a time limit were given enough time to read the text to the end and there was not much time pressure as such. If the time limit was so short that slow readers were not able to read to the end of the text, then the results could not be relied upon as measures of recall. This problem will probably be present as long as subjects read the texts themselves. It may be overcome if the texts are recorded over two different lengths of time and used to test listening comprehension instead of reading comprehension, or the texts could be presented in short sections on a video screen to test the reading comprehension.

In future experiments of this nature the main point to be considered has to be the subjects' degree of bilingualism. Comprehension measurement is necessary, but the method used in these experiments needs to be improved upon as it was not sufficiently sensitive. Subjects showing worse comprehension do show worse recall, but using analysis of covariance to eliminate comprehension differences between languages did not remove recall differences. It is likely that comprehension tests used here measure both natural ability and years of learning. Within a group of similar subjects as in Experiment IV they measure the former, but with subjects of different backgrounds (Experiment III), both factors are measured. Thus comprehension scores in Experiment IV are likely to be related to recall in both languages, while in Experiment III they will be related also to differences between languages. To investigate only the effect of years of learning, subjects would have to be matched in natural ability. (The nearest example of this

would be Experiment I versus Experiment III, London sub-group). It is also likely that people equal in comprehension as measured here differ in other ways. It could be the extent to which people use their second language, and the extent to which the second language is available to them. In other words comprehension alone (as measured here) is not the most crucial factor, but mastery and fluency of the second language counts far more.

There are measurements called "degree of bilingualism" (Macnamara, 1967a) by which a bilingual's fluency can be measured. They could be used prior to the experiment. In fact in the fourth experiment one of these measurements called "self-rating" was used. Unfortunately this did not seem suitable for the particular subjects that were used, as the results of comprehension and self-rating did not correspond. Subjects with high comprehension rated themselves low and vice versa, so it was decided that comprehension scores would be used, because they were more objective. Other such measurements called "fluency tests" seem to yield better results for the purpose of measuring the degree of bilingualism. In such tests speed of response to verbal stimuli or speed of verbal production in two languages is measured. These measurements are: Ervin's (1961) picture naming test; Rao's (1964) simple instruction test; Lambert and his associates (1955, 1959) have taken reaction times in response to instruction to press keys; Scherer and Wertimer (1964) have used subject's judgement of statements to be true or false; and finally Johnson (1953) required subjects to say as many words as possible in one language and later in the other language in a limited time.

One of these methods should prove more sensitive as an indicator of fluency than the type of comprehension test used in the present experiments.

CHAPTER III: GENERAL DISCUSSION AND CONCLUSION

Correction on Page 11

Psychology Dept. of the University of Toronto

1987

Page 17
Paragraph 2

Experiment I and II (left)
Experiment I and III (right)

without higher
Experiment
2 subjects

GENERAL DISCUSSION

Overall, the results suggest that there is an advantage in recall for the first language in the groups which are not using their second language actively and the use of their first language has preference as in Experiments I and IV. Improvement in second language towards becoming a balanced bilingual helps this difference to disappear as was the case in Experiments II and III (with the exception of the Tehran subgroups.)

Considering Experiments I and ~~II~~^{III} in which we had different outcomes two points have to be mentioned: (a) that the design of the two experiments were different, (b) that the subjects in Experiment I were less fluent. The subjects of Experiment III being tested one and a half years later, had the opportunity to use and practice their second language compared to the subjects in Experiment I. Due to the differences mentioned, it would be unwise to expect similar results from both.

Also subjects were looked at individually in Experiment I and III. It was noticed that eight subjects out of sixteen (50% of the London subgroups in Experiment III) have received higher education in their second language. This could be responsible for the non-significance of the effect of text language, i.e., for these people there was no difference between their two languages, while in Experiment I eight out of thirty-two subjects (25%) had higher education in their second language. The difference in design of the two experiments made the comparison of the means of the subjects with and without higher education in their second language impossible (in Experiment III due to random assignment of the text language, 2 subjects

out of the 8 who had received higher education had read Farsi text and 6 English text). Therefore it is important to note that in Experiment I the mean result of recall for individuals without higher education in their second language was responsible for the difference in recall of the two languages as summarised in the table below:

	Recall	
	F text	E text
Individuals with higher education in a second language	6.62	6.62
Individuals without higher education in a second language	6.29	4.83

mean No. of recalls out of 10

Originally the comprehension measurement was meant to deal with the extent of second language knowledge, but later it was realised that it does not deal with this problem adequately. Over the four experiments it was found that although comprehension did not differ greatly for reading the English text some groups showed an effect for text language and others did not. A possible way of overcoming this problem could be the measurement of comprehension and recall by the same set of questions to ensure that subjects have not missed out any information in the text. By this method first they read the text and answered the questions while the text is presented as comprehension. On the same day they would be tested for their short-term memory by a subset of exactly the same questions and later for their long-term memory by answering another subset of the same questions.

The results of the present experiments indicate that progress in the second language helps the individual reach almost the same level of capacity in remembering as in the first language. However, it does not reveal whether, given an equal length of time for carrying out the same task (reading and recalling) in each language, the subjects will lag in their second language; the speed with which the bilinguals will carry out the task in their second language may be less. Therefore the speed factor is very important, especially when the practical implication is considered, such as when bilingual students are supposed to prove their equal capability in a situation with a time limit, such as examination.

In the present experiments the news bulletin was chosen because it was thought that the great majority of the subjects would be interested in it (because of the political situation in Iran). At the same time they would be familiar with the type of information they would be receiving. This could guarantee that the subjects' comprehension of the material would be adequate. It is necessary to mention that in a pilot study, four different texts were prepared from an 'O' level geography text book; the test was carried out with six subjects, but the texts proved to be too hard to comprehend, so it was decided that the text should be changed.

Possible future investigations may include the measurement of degree of bilingualism coupled with speed measurement, and second by testing memory for material which has already been questioned by comprehension tests so that attention can be controlled.

Conclusion

This research was started with the hope of explaining one original informal observation, which was that it seemed that adult Iranians were not able to retain simple names, facts and figures connected with their daily life or work. The idea was that bilinguals are not able to remember in their second language as efficiently as in their first. In the first experiment this original impression was justified by finding that there was a noticeable difference in remembering the information between the two languages, in the favour of the first language. However, this was not confirmed when the design and the type of subjects were changed to Iranian students in London. This was an unexpected outcome, because the comprehension factor did not explain the original result since all the scores were adjusted to differences in comprehension. Therefore the only explanation for the difference in Experiments I and II lies in the category of subjects used. We find the criterion to be fluency rather than comprehension. This can only be because the students are in a more advanced state of fluency in their second language, which enables them to achieve a nearly equal capability to that in their first language. However, the non-students in Experiment I, in spite of their good comprehension, are not yet at this stage. According to the results of Experiment III they can also achieve the status of the students if they become as fluent, i.e., no evidence has been found for permanent disability in remembering for non-students. To increase their fluency, the non-students would benefit from the advice that they should improve their language within the environment of that particular language. This advice is based on the results of Experiments

III and IV in which the worst performance was by the Tehran groups who are far removed from the English language environment and do not have the advantage of experiencing the usage of language in that environment. (Eds.) 'The Psychology of

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The Chancellor of the Exchequer has announced cuts amounting to six hundred million pounds in an effort to stabilize Britain's economy in the coming years. This is expected to affect teachers, doctors, civil servants and pensioners. In an angry debate in the Commons last night, the Opposition expressed outrage and disgust at these proposals and called on the Chancellor to resign. The motion, however, was carried by a majority of six.

APPENDIX

The Human Rights Organisation, Amnesty International, says that it has sent a message to the South African Police Minister, urging him to halt the use of torture and detention without trial of political prisoners in Namibia. The movement has called for an independent judicial enquiry into reports of torture in Namibian prisons for a review of the cases of all political prisoners. It said that police and troops had sweeping powers of arrest and there was no protection for those seized.

Foreign ministers of NATO countries are beginning a two-day meeting in Brussels later today. It is expected that the main topic will be East-West relations following the death of Mr. Brezhnev.

In Leeds, a 32-year-old man, John Smith, has been found guilty of the murder of a high court judge at his home near Preston last year. He was sentenced to life imprisonment with a recommendation that he serve a minimum of 25 years. It was a revenge killing, the court was told, the victim, judge William Davis, had once sentenced Smith to a short period of imprisonment. As he was led from the court, Smith shouted

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at the judge, I'll cut your throat when I get out. Smith waited 13 years to do what he intended.

It is going to cost you more to run the family car. The price of petrol is to go up by 2 pence a gallon from September 1st.

The Westbury Pageant, celebrating the bi-centenary of the birth of our famous local artist, Francis Hall, will be opened by the Mayor at 2.30 p.m. in the Sports Ground. There will be archery contests, fencing displays. Admission 50 pence, 10 pence for children.

This is Radio West, and the time is 28 minutes past nine. Now over to Simon for the traffic news:-

Well, it is not a very good picture, I'm afraid. There are road works on the A99 just outside Westbury and this is causing considerable delay. There's a burst gas pipe in Westbury High Street and traffic is building up there. And we've just had news of an accident at the junction of St. Mary's Road and Brook Street. It seems to be a pretty serious one. Traffic is being diverted to Cook's Road. There is a heavy tail-back and the police say that any one who can avoid this route would be well advised to do so.

PLEASE ANSWER THE FOLLOWING QUESTIONS

- 1 - How much is the government cutting back?
- 2 - What is the reason for the cut backs?
- 3 - With a majority of how many votes was the proposals of the cut backs carried on?
- 4 - What did the message of Amnesty International ask?
- 5 - How long will the meeting of the ministers of the mentioned countries last?
- 6 - What was the sentence for the murderer?
- 7 - According to the News, how much will the price of petrol go up?
- 8 - How much was the admission for adults?
- 9 - Where are the road works going on?
- 10- Where did the gas pipe burst?

PLEASE ANSWER THE FOLLOWING QUESTIONS

- 1 - Who announced the cut backs?
- 2 - Who will be affected by the cut backs of the government?
- 3 - To whom was the message of Amnesty International sent?
- 4 - Ministers of which countries are having a meeting?
- 5 - Where did the murder of the high court judge take place?
- 6 - How long did the murderer wait to do what he intended?
- 7 - Where did the Pageant celebration take place?
- 8 - What was the celebration for?
- 9 - What was the time, announced on the Radio?
- 10 - To which road were the cars diverted, after the accident?

طبق اخبار رسیده وزیر خزانهداری اعلام کرده که طی سال آینده جهت ثبات اقتصاد بریتانیا در نظر است که حدود ششصد میلیون پوند از برنامه‌های متفاوت حذف شود. اثر چنین برنامه روی معلمین و اطباء و کارمندان دولت و بازنشستگان خواهد بود. شب گذشته طی بحثی در مجلس نمایندگان، حزب مخالف نفرت و خشم خود را نسبت باین پیشنهاد ابراز داشت و تقاضای برکناری وزیر خزانه داری را خواستار شد. با وجود این، لایحه مزبور با اکثریت شش رأی تصویب شد.

سازمان حقوق بشر یا عفو بین‌المللی به نخست‌وزیر آفریقای جنوبی پیغامی فرستاده است. در این پیغام مصرّاً خواسته شده که به بازداشت‌های بدون محاکمه و شکنجه‌زندانان سیاسی در "نامیبیا" پایان داده شود. ضمناً این سازمان در خواست کرده که یک دادگاه قضائی مستقل برای رسیدگی به گزارش‌های شکنجه در زندانهای "نامیبیا" برای بررسی مجدد وضع تمام زندانان سیاسی تشکیل شود. گفته شده که پلیس و سربازان در بازداشت چنین افراد قدرتی بی‌اندازه دارند و هیچ‌گونه حمایتی برای آنها که بازداشت شدند وجود ندارد.

وزرای خارجه، کشورهای عضو "ناتو" جلسه دو روزه خود را امروز در بروکسل شروع میکنند. انتظار میرود که موضوع اصلی این مذاکرات روابط بین شرق و غرب بعد از مرگ "برژنف" باشد.

در شهر "لیدز" مرد سی و دو ساله‌ای بنام "جان اسمیت" بععلت کشتن يك قاضی دادگاه که سال پیش اتفاق افتاد محکوم شناخته شد. این قتل در نزدیکی منزل قاضی در "پرستون" صورت گرفته بود. این شخص به حبس ابد محکوم شد. و در دادگاه گفته شد که این يك قتل انتقام جویانه بوده است. قربانی آقای "ویلیام دیویس" قاتل را يك بار به مدت کوتاهی زندان محکوم کرده بود. در آن وقت اسمیت "در حالیکه از جای محکومین بطرف خارج هدایت میشد فریاد زده بود که وقتی آزاد شوم ترا از بین میبرم و بالاخره بعد از سیزده سال فکر خود را به مرحله اجرا در آوردم.

بهای بنزین قرار است از اول سپتامبر د و پنس در هر گالن افزایش یابد . در نتیجه دارندگان اتومبیل هزینه بیشتری را متحمل خواهند شد .

در " وست بری " برای یادبود دویستمین سالروز تولد نقاش مشهور محلی بنام " فرانسیس مال " رژه و نمایش مخصوصی ترتیب داده شده است . این مراسم توسط شهردار در زمین ورزش گشایش خواهد یافت . علاوه بر نمایش زندگی این نقاش ، مسابقات تیراندازی و شمشیر باوی نیز وجود دارد . ورودی برای بزرگسالان پنجاه پنس و برای خرد سالان ده پنس است .

اینجا رادیو " وست " ساعت ۲۸ دقیقه از نه گذشته است . حال " سیمون "

شمارا در جریان ترافیک قرار میدهند :

متأسفانه وضع ترافیک چندان خوب نیست . در مسیر " ۶۶ " درست خارج " وست بری " کارهای تعمیراتی در دست اجرا است و همین سبب تأخیر قابل توجهی میشود . بعلاوه در خیابان اصلی " وست بری " لوله گاز ترکیده و کم کم ترافیک این خیابان سنگین میشود . ضمناً همین حالا بما خبر دادند که در تقاطع " سنت مری رود " و " بروک استریت " در وست بری تصادفی شده و بنظر میرسد که تصادف شدیدی است . بعلاوه این تصادف ترافیک بطرف " کوکس رود " هدایت میشوند و تمام اتومبیل ها پشت سر هم ردیف شده اند . پلیس از همه درخواست میکند که تا میتوانند از این مسیر استفاده نکنند .

لطفاً به سئوالات زیر پاسخ دهید :

۱- میزان حذف برنامه های دولت چقدر است ؟

۲- حذف برنامه های دولتی به چه منظور است ؟

۳- لایحه مزبور با اکثریت چند رای به تصویب رسید ؟

۴- در پیغام سازمان عفوبین الطل چه خواسته شده ؟

۵- جلسه وزرای خارجه برای چه مدت ادامه دارد ؟

۶- حکم دادگاه در مورد مجرم چه بود ؟

۷- طبق خبر بهای بنزین چه مقدار افزایش یافته ؟

۸- ورودی برای بزرگسالان چه قدر است ؟

۹- کارهای تعمیراتی در کدام مسیر در جریان بود ؟

۱۰- لوله گاز در کجا ترکیده بود ؟

لطفاً به سئوالات زیر پاسخ دهید :

- ۱- کدام وزیر حذف برنامه‌های دولت را اعلام کرد ؟
- ۲- اثر مستقیم حذف برنامه‌ها روی کدام طبقه خواهد بود ؟
- ۳- پیغام سازمان عفو بین‌الملل به چه کسی بود ؟
- ۴- وزرای خارجه کدام کشورها جلسه خواهند داشت ؟
- ۵- کشتن قاضی در کجا اتفاق افتاد ؟
- ۶- قاتل چند سال بعد به فکر خود جامعه عمل پوشانید ؟
- ۷- مراسم رژه و نمایش در کجا گشایش یافت ؟
- ۸- مراسم رژه برای چه منظوری ترتیب داده شده بود ؟
- ۹- طبق گفته گوینده رادیو ، ساعت چند بود ؟
- ۱۰- بعد از تعارف ، اتوبوسها با طرف کدام خیابان هدایت شدند ؟

More cut backs have been proposed by British Leyland. Workers at the Company's bus and truck division will be told tomorrow of a major reorganization plan which will mean the loss of several thousand jobs. Worst hit will be the plant at Leyland in Lancashire where 1500 workers could be made redundant. This plant makes the Road Train model, the heavy trucks of Leyland range. It employs 8000 people, that's close on half the total labour force in British Leyland's truck business, so the redundancies here are likely to be substantial.

The Americans say Pakistan has refused to accept delivery of F 16 warplanes because they are not fitted with advanced electronic equipment, carried in similar aircraft used by the U.S. airforce. The first six planes were due to be delivered to Pakistan this week. Pentagon officials say discussions are being held to try to deal with the problem. The F 16 aircrafts are part of a six year military and economic deal worth more than 3000 million dollars.

Another Ulster Defence Regiment man is shot in the north. It happened in County Tyrone. The dead man was a part-time UDR member. Police say that the man was shot as he was making deliveries from a building contractors to a house in Olympic Drive. The gunman held up the owners of the house and lay in wait until the victim arrived in his lorry. The latest shooting came as Royal Ulster Constabulary headquarters in Belfast issued a statement about the worsening security situation. The statement says that Provisional Irish

Republican Army campaign of murdering leading citizens and members of the security forces is an attempt to provoke the Protestant community to extreme action. The statement said that the IRA had planned a massive bombing campaign, but action by security forces had so far prevented it. Meanwhile three more victims of the latest outbreak of violence were buried today. At the funeral of Mr. Harvey, the Parish priest Reverend Christopher Knight, said that Mr. Harvey was an innocent victim of a random sectarian assassination. Mr. Harvey was a member of Clanron Football Club. Several top officials were among the mourners.

The nationwide search for Robert Peters and David Summers, the two eleven-year old schoolboys who have been missing from their London homes for six weeks has ended. The boys were found in a youth hostel in the West of the country. They were posing as French schoolboys visiting Britain, but their identity was discovered when a party of genuine French boys arrived.

PLEASE ANSWER THE FOLLOWING QUESTIONS

- 1 - Where will the cut backs take place?
- 2 - Which plant is the worst hit because of the cut backs?
- 3 - What type of plane has Pakistan refused to accept?
- 4 - What was the reason for refusing the planes?
- 5 - To which Regiment did the man who was shot belong to?
- 6 - In which street did the gunman lie in wait?
- 7 - How many were buried following the latest out breaks?
- 8 - In which city did the missing boys live?
- 9 - As whom were the boys posing?
- 10 - How much was the military and economic deal with Pakistan worth?

PLEASE ANSWER THE FOLLOWING QUESTIONS

- 1 - In which division will workers be told about the plan?
- 2 - How many people will be made redundant?
- 3 - Which country announced that Pakistan has refused to accept the planes?
- 4 - How many planes were due to be delivered that week?
- 5 - In which county was the person shot dead?
- 6 - Which group is believed to be responsible for the shooting?
- 7 - For how long were the two boys missing?
- 8 - Where were the boys found?
- 9 - When was the boys' true identity revealed?
- 10 - To which club did Mr. Harvey belong?

گزارش رسیده حاکی از آنست که کارخانه لیلاند در صدد اجرای برنامه های مصرفه جوئی است . کارکنان این شرکت در قسمت اتومبوس سازی و کامیون سازی فردا از يك طرح تغییر تشکیلات با خبر خواهند شد و معنای آن در واقع بیکاری تعداد زیادی از کارگران است . بدترین وضع را کارخانه لیلاند در لانک شایر دارد که ۱۵۰۰ نفر در آنجا بسر کنار خواهند شد . این کارخانه کامیونهای از نوع مدل ترنی را ارائه میدهد که سنگین ترین نوع کامیون در کارخانه لیلاند است . تعداد کل کارگران این محل ۸۰۰۰ نفر است . این تعداد نزدیک به نصف کارگران قسمت کامیون سازی کارخانه لیلاند است در نتیجه رقم بیکاری ذکر شده بسیار مهم و قابل توجه است .

آمریکا اظهار داشته است که پاکستان از پذیرش هواپیماهای جنگی اف ۱۶ خود داری کرده است . پاکستان علت آنرا مجهز نبودن این هواپیماها به وسایل الکترونیکی پیشرفته توجیه کرده است . از قرار معلوم هواپیماهای مشابه آن که توسط نیروی هوایی آمریکا استفاده میشود دارای چنین تجهیزاتی میباشند . شش هواپیمای اول قرار بود که این هفته تحویل داده شود . مقامات رسمی پنتاگون میگویند که مذاکراتی در دست انجام است که این مسئله بصورتی حل شود . فروش این هواپیماها قسمتی از يك معامله نظامی و اقتصادی شش ساله است که بالغ بر بیش از ۳۰۰۰ میلیون دلار است .

يك فرد دیگر از هنگ دفاعی آلستر به ضرب گلوله در ایرلند جان خود را از دست داده است . این حادثه در استان "ترون" اتفاق افتاده است . شخص متوفی عضونیمه وقت این هنگ بوده است . پلیس گزارش میدهد که این شخص زمانی هدف گلوله قرار گرفت که از يك شرکت ساختمانی به يك خانه در خیابان المپیک وسایلی را تحویل میداد شخص مسلح افراد خانه را تا رسیدن قربانی با وانت خود ، در منزل حبس کرده بود . تیر اندازی اخیر زمانی اتفاق افتاد که شهرانی آلستر در بلغاست گزارش وخیم شدن اوضاع امنیتی را اعلان داشت . طبق این گزارش کشتار رهبران جامعه و اعضای نیروهای امنیتی توسط جمهوری خواهان ایرلند شمالی کوششی است جهت برانگیختن جامعه پروتستان برای مقابله . علاوه بر این گفته شد که جمهوری خواهان ایرلند شمالی در صدد بمب گذاریهای زیادی هستند ، ولی عطیات نیروهای امنیتی تا بحال مانع آن بوده . در حال حاضر سه قربانی اغتشاشات اخیر امروز بخاک سپرده شدند . در مراسم تدفین آقای "هاروی" ، کشیش محل آقای "کریستوفر نایت" اظهار داشت که آقای "هاروی" قربانی ترورهای اتفاقی تبعیض گروهی است . آقای "هاروی" عضو کلوب فوتبال "کلان ران" بود . چند تن از مقامات بلند مرتبه شهر جز "تشیع کنندگان" بودند .

جستجو برای یافتن دو پسر بچه یازده ساله بنامهای "رابرت پیترز" و "دیوید سامرز" که بعد از شش هفته از منزل خود در لندن نا پدید شده بودند در سراسر کشور متوقف شد . این دو پسر بچه را در ناحیه غرب کشور در خانه جوانان پیدا کردند . آنها خود را بجای دو پسر بچه فرانسوی که مشغول باز دید از انگلیس هستند جا زده بودند . هویت اصلی آنان زمانی آشکار شد که یک گروه فرانسوی واقعی به همان محل آمدند .

لطفاً به سئوالات زیر پاسخ دهید :

- ۱- چه کارخانه‌ای در صدر اجرای برنامه‌های صرفه جویی است ؟
- ۲- بدترین وضع را کدام کارخانه دارد ؟
- ۳- پاکستان از پذیرش چه نوع هواپیماهایی خودداری کرده است ؟
- ۴- علت عدم پذیرش هواپیماها چه بوده است ؟
- ۵- شخصی که در ایرلند کشته شده وابسته به کدام هنگ بوده ؟
- ۶- شخص مسلح در کدام خیابان منتظر رسیدن قربانی بود ؟
- ۷- اغتشاشات اخیر ایرلند چند کشته داشته ؟
- ۸- بچه‌ها در کدام شهر زندگی میکردند ؟
- ۹- دو پسر گمشده خود را بجای چه کسی معرفی کردند ؟
- ۱۰- ارزش معاطه نظامی - اقتصادی پاکستان در حدود چه میزانی است ؟

لطفاً به سئوالات زیر پاسخ دهید :

- ۱- کارکنان چه قسمتی از طرح برنامه صرفه جویی مطلع خواهند شد ؟
- ۲- در نظر است چند نفر از کاربران شوند ؟
- ۳- عدم پذیرش هواپیماها توسط پاکستان ، از طرف کدام کشور اظهار شده ؟
- ۴- چند هواپیما قرار بوده این هفته تحویل داده شود ؟
- ۵- در کدام استان ایرلند حادثه اتفاق افتاده ؟
- ۶- طبق گزارش شهربانی بلفاست چه گروهی مسئول حوادث است ؟
- ۷- دو پسر بچه گمشده چه مدت بود که از منزل خود ناپدید شدند ؟
- ۸- بچه ها در کجا پیدا شدند ؟
- ۹- هویت واقعی بچهها چه موقع آشکار شد ؟
- ۱۰- آقای هاروی عضو چه کلمبی بوده ؟

British Aerospace succeeded tonight in breaking into the immensely competitive American market with a deal that rivals the selling of the Harrier Jump Jet to the U.S. Marine Corps. In a Trans-Atlantic phone call the American Defence Secretary, William Spencer, told his British opposite number, Tom Brook, that Hawk beat its German/French rival, the Alpha, and several American products. The order is for up to 300 of the planes; the deal is worth half a billion pounds with considerable scope for more sales later. Eventually the Americans may buy thousands more of them. It is very difficult to sell military equipment to the Americans as other Western countries have often complained over the years. Official NATO policy is that there should be a two-way traffic, sales from Europe to the United States, not just from the America to Europe. Even so, it's never been easy to practice and this deal took a year. The Hawk, the chosen aircraft of the Red Arrows, is a highly successful aeroplane. It first went into service with the Royal Air Force in 1976 and is powered by a single Rolls Royce engine. The U.S. Navy Secretary was invited to fly it himself and he liked it.

Tony Doglass has failed to get into Labour's Shadow Cabinet although he got 66 votes, which was more than expected in view of Michael Gibbson's advice to Labour Members of Parliament not to support him. Five new members were elected to the enlarged Shadow Cabinet; Peter Johnson, David King, Raymond White, Jonathan Edwards and Brian Scott.

Roman Catholic bishops in the United States today called for America to end its aid to El-Salvador. El-Salvador is 80% catholic. It is ruled by a right wing group backed by America to the tune of £75,000,000 a year. America says it's to stop left wing guerrillas backed by Cuban arms and Soviet money taking over the country. In the resulting civil war, thirty thousand people have died in the last two years and the number grows daily.

The President elect of Mexico Mr. Miguel-de-la-Madrid who is to be sworn in later today has announced his cabinet. He is keeping on a number of ministers from the previous administration including the finance minister, Mr. Silva Hetsog who conducted the recent negotiations with the International Monetary Fund over Mexico's massive foreign debts. Among the newcomers are the foreign, defence and interior ministers.

Helicopters and rescue ships have been searching for four crewmen of a Belgian trawler which has gone down off the Cornish coast. The body of one crewman has already been found, so has the trawler's empty life boat. The search will be resumed tomorrow.

PLEASE ANSWER THE FOLLOWING QUESTIONS

- 1 - In which market have British Aerospace had success?
- 2 - Who was the American Secretary of Defence?
- 3 - How long did it take for the Anglo-American deal to be completed?
- 4 - What did the Roman Catholic bishops call for?
- 5 - Which army backs the left-wing guerrillas in El-Salvador?
- 6 - In which year were the Hawks used for the first time?
- 7 - What does official NATO policy stress?
- 8 - Which country's President elect is Miguel-de-la-Madrid?
- 9 - How many people were in the lost trawler?
- 10- How many votes did Tony Doglass get?

PLEASE ANSWER THE FOLLOWING QUESTIONS

- 1 - What did British Aerospace sell to the U.S. before the present deal?
- 2 - How much was the deal between Britain and America worth?
- 3 - Name two of the elected members of the Labour Party cabinet?
- 4 - What percent of the people in El-Salvador are Catholic?
- 5 - How many people have been killed in El-Salvador?
- 6 - What is the type of engine used in Hawks?
- 7 - How many new members were added to the Labour Party cabinet?
- 8 - Who remained at his post in Mr. Miguel-de-la-Madrid's cabinet?
- 9 - what did the rescue team find?
- 10- Where was the trawler lost?

صنعت هواپیما سازی انگلیس موفقیت بزرگی در بازار رقابتی آمریکا بدست آورده است. این موفقیت مشابه و در ردیف فروش جت های "هیریر" به نیروی دریایی ایالات متحده است. در يك مصاحبه، تلفنی از راه دور وزیر دفاع آمریکا "ویلیام اسپنسر" به همتای انگلیسی خود "تام بروک" باین مطلب اشاره کرد که جت های "هاوک" بر رقیب آلمانی - فرانسوی خود یعنی جت های "آلفا" و چندین محصول آمریکائی دیگر غالب شده است. تعداد سیصد تا از این هواپیماها که تقریباً ارزش نیم بلیون پوند را دارند سفارش داده شده و احتمالاً فروش آن در آینده نیز ادامه خواهد داشت. در نتیجه آمریکا ممکن است تعداد زیادی از این جتها را خریداری کند. همانطوریکه دیگر کشورهای غربی غالباً اظهار میدارند فروش وسائل جنگی به آمریکا بسیار مشکل است. روش قراردادی "ناتو" تأکید بر فروش دو جانبه دارد، یعنی هم فروش آن از طرف کشورهای اروپائی به آمریکا و هم برعکس، نه فقط از آمریکا به کشورهای اروپائی. با وجود چنین قراردادی انجام این معاطله در عمل آسان نبوده و حدود یکسال طول کشیده است. "هاوک" تحت نام مخصوص "پیکان سرخ" يك هواپیمای بسیار موفق است. قدرت آن بوسیله يك موتور "رولز رویس" تئین میشود و اولین بار در سال ۱۹۷۶ در نیروی هوایی سلطنتی انگلیس مورد استفاده قرار گرفت. مشاور نیروی دریائی آمریکا شخصاً برای پرواز با آن دعوت شد و هواپیما بسیار مورد توجه او واقع شد. آقای "تونی داگلاس" با اینکه ۶۶ رأی بدست آورده است موفق نشد که در کابینه حزب کارگر قرار گیرد. علیرغم توصیه های "مایکل گیسون" مبنی بر عدم حمایت از او، این تعداد رأی بیش از حدی بود که انتظار میرفت. پنج عضو جدید به کابینه حزب کارگر اضافه شدند. این افراد عبارتند از: "پیتر جانسون"، دیوید کیتنگ، ریچوند وایت، جان اتان ادوارد و براین اسکات".

اسقفهای کاتولیک رم در ایالات متحده خواستار قطع کمک های آمریکا به السالوادور شدند. ۸۰ درصد مردم السالوادور کاتولیک هستند. این کشور بوسیله يك حزب حاکم دست راستی که از طرف آمریکا حمایت میگردد اداره میشود و سالیانه بالغ بر ۷۵ میلیون پوند برای آمریکا هزینه دارد. آمریکا اظهار میدارد که این عمل برای جلوگیری از غلبه

چریکهای دست چپی است که بوسیله نیروهای کوبائی و کمک های مادی شوروی حمایت میشوند . در نتیجه جنگ داخلی سی هزار نفر طی دو سال گذشته کشته شدند و هر روز به تعداد آن اضافه میشود .

رئیس جمهور منتخب مکزیکو آقای " میگوئل - دولا - مادرید " که قرار است امروز بعنوان رئیس جمهور جدید قسم یاد کند ، کابینه خود را معرفی کرده است . او چند تن وزرای سابق ، منجمه وزیر دارائی را در پست خود ابقا کرده است . وزیر دارائی آقای " سیلوا هتسوگ " مذاکرات اخیر با مقامات صندوق بین المللی پول را در مورد بدهی های عظیم مکزیکو بر عهده داشت . در بین وزرای جدید میتوان از وزیر دفاع ، وزیر امور خارجه ، و وزیر کشور نام برد .

هلی کوپتر و کشتی های کمکی در جستجوی چهار سر نشین يك کشتی ماهیگیری بلژیکی هستند که در ساحل " کورنیش " غرق شده است . در حال حاضر کشتی بدون سر نشین ، بعلاوه جسد یکی از سر نشینان پیدا شده است . جستجو برای بقیه افراد مجدداً فردا شروع خواهد شد .

لطفاً به سئوالات زیر پاسخ دهید :

- ۱- هواپیماسازی انگلستان در کدام بازار موفقیت بدست آورد هاست ؟
- ۲- وزیر دفاع آمریکا که بود ؟
- ۳- چه مدت طول کشید که این معامله به مرحله عمل برسد ؟
- ۴- اسقفهای کاتولیک خواستار چه هستند ؟
- ۵- دست چینی ها در سالواد و توسط چه نیروهائی کمک میشوند ؟
- ۶- هواپیماهای "هاوک" اولین بار در چه سالی در نیروی هوائی انگلیس مورد استفاد قرار گرفت ؟
- ۷- قرارداد ناتو در مورد چه مسئله ای تأکید میکند ؟
- ۸- " میگوئل- د-ولا- مادرید رئیس منتخب کجاست ؟
- ۹- کشتی ماهیگیری چند سر نشین داشت ؟
- ۱۰- آقای تونی د اگلاس چند رای بدست آورد ؟

لطفاً به سئوالات زیر پاسخ دهید :

- ۱- قبل از معامله اخیر، صنعت هواپیماسازی انگلیس به آمریکا چه فروخته بود ؟
- ۲- ارزش معامله بین آمریکا و انگلیس چقدر بوده (برحسب پوند) ؟
- ۳- دو تن از اعضای حزب کارگر را که جهت کابینه انتخاب شدند نام ببرید .
- ۴- کاتولیک ها چند درصد مردم السالوادور را تشکیل می دهند ؟
- ۵- در جنگ داخلی السالوادور چند نفر کشته شدند ؟
- ۶- موتور هواپیماهای " هاوک " از چه نوعی است ؟
- ۷- چند نفر به کابینه حزب کارگر اضافه شدند ؟
- ۸- در کابینه آقای " میگوئل-د-ولا-مادرید " کدام وزیر در پست خود ابقا شد ؟
- ۹- تیم کمکی موفق به پیدا کردن چه شدند ؟
- ۱۰- کشتی در سواحل کجا گم شده بود ؟

Police in London are searching for three prisoners who escaped after they stabbed a prison officer and a passer-by in Kennington. More than 100 police were brought in to search the area. The prison officer was stabbed in the heart with a flick-knife; he is in intensive care; his condition is described as stable. Police say the men are very dangerous and the public should not approach them. They escaped from a bus on the way from the Old Bailey to Brixton. The passer-by was stabbed when they tried, unsuccessfully, to steal his car. He's said to be "satisfactory" in hospital.

In Dublin, hundreds of students marched through the city centre to protest at the raising of the school entry age. The march was organized by the Union of Students and its President Mr. Collin said the raising of the school entry age would mean unemployment for teachers. He said that no pre-school education was available and the waiting list for kindergarten places is two years.

The President of U.S. said tonight that he was disappointed by the Soviet reaction to his peace plan; a White House spokesman said it was clearly a very quick analysis by the Russians and there were some misinterpretations of what the President had said.

President Mubarak of Egypt who began a State visit to India yesterday, is having talks with the Prime Minister Mrs. Gandhi. The two leaders are discussing the non-aligned summit meeting which is to be held in Delhi next March and

the Middle East situation. Speaking in a banquet in Delhi yesterday Mr. Mubarak called for the immediate withdrawal of Israeli troops from Lebanon and accused Israel of open violation of Lebanon's independence and territorial integrity. The Egyptian President said that he believed there was now a golden opportunity for the new move for peace but this was impossible to achieve in the shadow of military occupation. In his welcoming speech, the Indian President Mr. Zail Singh said the rights of the Palestinian people must be fully realized.

The United States defence department has formally notified Congress of plans to sell 34 tanks to Lebanon. The sale is part of President Reagan's aid programme designed to strengthen the Lebanon army to enable it to assume full responsibility for the country's security.

Mrs. Laura Thompson of Eastbourne has been awarded first prize in the West Country Amateur Drama Competition for her performance as Desdemona in the famous play "Othello". A car was stolen about 9 p.m. last night from the Paramount cinema car-park. It is a green mini, registration number: ARK 7892. Anyone seeing this car is asked to telephone the police: 153 6666. Do not approach the driver.

PLEASE ANSWER THE FOLLOWING QUESTIONS

- 1 - How many prisoners had escaped?
- 2 - How did the prisoners escape?
- 3 - When did the prisoners escape?
- 4 - Who organized the student's march?
- 5 - What has the president of U.S. put forward?
- 6 - Where will the non-aligned summit meeting take place?
- 7 - What is the name of the President of India?
- 8 - To which country will the tanks be sold?
- 9 - What is the reason for selling the tanks?
- 10 - Give the registration number of the stolen car.

PLEASE ANSWER THE FOLLOWING QUESTIONS

- 1 - How many policeman were searching for the prisoners?
- 2 - How was the prison officer attacked?
- 3 - In which city did the students march?
- 4 - What did the White House spokesman say about the Russian reaction?
- 5 - Name the two leaders who had a discussion together?
- 6 - What did the President of Egypt ask for, in his speech?
- 7 - What did the President of India refer to, in his talks?
- 8 - The defence ministry of which country announced the sale of the tanks?
- 9 - Whose part did Mrs. Laura Thompson perform?
- 10 - From where was the car stolen?

پلیس لندن در جستجوی سه زندانی فراری است، آنها توانستند با ضربت زدن به مامور زندان و یک عابر پیاده در "کنینگتون" فرار کنند. بیش از صد نفر پلیس برای جستجوی محل گمارده شدند. مامور زندان توسط یک چاقوی ضامن دار مورد حمله قرار گرفته است و در قسمت مراقبت های مداوم بیمارستان تحت نظر است و وضع عمومی او خوب گزارش شده است. پلیس میگوید که این سه نفر بسیار خطرناکند و مردم باید از نزدیک شدن با آنها خودداری کنند. آنها زمانیکه از دادگاه به "بریک استون" منتقل میشدند از اتوبوس فرار کردند. عابر زمانی مورد حمله قرار گرفت که زندانیان فراری میخواستند اتوبوس او را بزدند. حال این عابر نیز از بیمارستان رضایت بخش گزارش شده است.

در اولین صدها دانشجو در اعتراض به افزایش سن ورود به مدرسه در مرکز شهر دست به راهپیمایی زدند. این راه پیمایی توسط اتحادیه دانشجویان ترتیب داده شده بود و رئیس انجمن اظهار داشت که افزایش سن ورود به مدرسه در واقع بمعنای بیکاری برای معلمین است. او اضافه کرد که برای سالهای قبل از مدرسه هیچ تعلیماتی در نظر گرفته نشده و لیست انتظار برای جای خالی در کودکان دو سال است.

رئیس جمهور آمریکا اظهار داشت که از عکس العمل شوروی برای طرح صلحی که ارائه کرده بسیار مایوس شده. یک سخنگوی کاخ سفید گفت، که بطور روشن این یک تحلیل بسیار سریع از طرف شوروی بوده است و در آنچه که پرزیدنت گفته سو تفاهاتی پیش آمده است.

پرزیدنت حسنی مبارک رئیس جمهور مصر مسافرت رسمی خود را به هندوستان آغاز کرده است. و در حال حاضر مشغول مذاکرات نخست وزیر هند خانم گاندی است. مذاکرات رهبران دو کشور درباره اوضاع خاورمیانه و جلسه کشورهای غیر متعهد است که قرار است در ماه مارچ در دهلی تشکیل شود. پرزیدنت مبارک دیروز در یک مهمانی ضمن صحبت های خود خواستار ترك نیروهای اسرائیل از خاک لبنان شد و این کشور را متهم به خشونت آشکار بر علیه حاکمیت و تمامیت ارضی لبنان نمود. رئیس جمهور مصر اظهار داشت که با اعتقاد او فرصت بسیار درخشانی برای صلح بوجود آمده است ولی حصول این امر با اشغال نظامی غیر ممکن است. رئیس جمهور هند آقای "زایل سینک" نیز در سخن رانی متقابل خود اشاره کرد که حقوق مردم فلسطین باید تماماً مورد توجه قرار گیرد.

وزارت دفاع ایالات متحده رسماً کنگره را از طرح فروش ۳۴ تانک به لبنان مطلع کرده است. فروش این تانکها قسمتی از برنامه کهنی پرزیدنت ریگان برای تقویت ارتش لبنان جهت پذیرش مسئولیت کامل برای امنیت این کشور میباشد.

خانم لورا تامسون "اهل ایستبورن" جایزه اول مسابقات آماتوری درامای غرب کشور را بدست آورده است . او در نمایش اطلو نقش دزد مونا را بازی کرده است .
شب گذشته حوالی ساعت ۹ از محل پارکینگ سینما پارامونت اتوبیلی دزدیده شد
مشخصات آن عبارت است از مینی سبزرنگ و شماره پلاک آن : آ.ا. کی. ۷۸۹۲۰ -
میباشد . از کسانی که چنین اتوبیلی را دیده اند خواهش میکنیم به پلیس شماره تلفن
۱۵۳-۶۶۶۶۱ تلفن کنند . لطفاً از نزدیک شدن به راننده خودداری کنید .

لطفاً به سئوالات زیر پاسخ دهید :

۱- چند نفر از زندانیان فرار کردند ؟

۲- زندانیان چگونه فرار کردند ؟

۳- زندانیان چه موقع فرار کردند ؟

۴- راه پیمائی توسط کی ترتیب داده شده بود ؟

۵- رئیس جمهور آمریکا چه طرحی را ارائه کرده ؟

۶- جلسه کشورهای غیر متعهد کجا تشکیل خواهد شد ؟

۷- رئیس جمهور هند چه کسی بود ؟

۸- تانک ها به کدام کشور فروخته خواهد شد ؟

۹- فروش تانکها برای چه منظوری است ؟

۱۰- شماره پلاک ماشین ربوده شده چه بود ؟

لطفاً بمسئالات زیر پاسخ دهید

- ۱- چند نفر پلیس در جستجوی زندانیان فراری هستند ؟
- ۲- مأمور زندان چگونه مورد حمله قرار گرفته بود ؟
- ۳- دانشجویان در کدام شهر راهپیمایی کردند ؟
- ۴- سخنگوی کاخ سفید در مورد عکس العمل شوروی چه گفت ؟
- ۵- رهبران دو کشوری که باهم مذاکره کردند که بودند ؟
- ۶- رئیس جمهور مصر ضمن صحبتهای خود خواستار چه چیز شد ؟
- ۷- رئیس جمهور هند در سخنرانی خود به چه مطلبی اشاره کرد ؟
- ۸- وزارت دفاع کدام کشور به فروش تانکها اشاره کرد ؟
- ۹- خانم لورا تامسون نقش چه کسی را بازی کرد ؟
- ۱۰- اتوبوس از کجا زردیده شد ؟

- 1 - How much of the ...
- 2 - Who ...
- 3 - With a ...
- 4 - To what ...
- 5 - How long ...
- 6 - Where ...
- 7 - According to ...
- 8 - Where ...
- 9 - Where ...
- 10 - What ...

QUESTIONS FOR EXPERIMENT II AND III

PLEASE ANSWER THE FOLLOWING QUESTION

- 1 - How much is the government cutting back ?
- 2 - Who announced the cut back ?
- 3 - With a majority of how many votes was the proposals of the cut backs carried on ?
- 4 - To whom was the message of Amnesty International sent ?
- 5 - How long will the meeting of the ministers of the mentioned countries last ?
- 6 - where did the murder of the high court judge take place ?
- 7 - According to the news, how much will the price of petrol go up ?
- 8 - Where did the pageant celebration take place ?
- 9 - Where are the road works going on ?
- 10- What was the time , announced on the Radio ?

PLEASE ANSWER THE FOLLOWING QUESTION

- 1 - What is the reason for the cut backs ?
- 2 - Who will be affected by the cut backs of the government ?
- 3 - What did the message of Amnesty International ask ?
- 4 - Ministers of which countries are having a meeting ?
- 5 - What was the sentence for the murderer ?
- 6 - How long did the murderer wait to do what he intended?
- 7 - How much was the admission for adults ?
- 8 - What was the celebration for ?
- 9 - Where did the gas pipe burst ?
- 10 - To which road were the cars diverted , after the accident?

لطفاً به سئوالات زیر پاسخ دهید

- ۱ - میزان حذف برنامه های دولت چقدر است ؟
- ۲ - کدام وزیر حذف برنامه های دولت را اعلام کرد ؟
- ۳ - لایحه مزبور با اکثریت چند رأی به تصویب رسید ؟
- ۴ - پیغام سازمان عفو بین الملل به چه کسی بود ؟
- ۵ - جلسه وزرای خارجه برای چه مدت ادامه دارد ؟
- ۶ - کشتن قاضی در کجا اتفاق افتاد ؟
- ۷ - طبق خبر بهای بنزین چه مقدار افزایش یافته ؟
- ۸ - مراسم رژه و نعایش در کجا گشایش یافت ؟
- ۹ - کارهای تعمیراتی در کدام مسیر در جریان بود ؟
- ۱۰ - طبق گفته گوینده رادیو ، ساعت چند بود ؟

لطفاً به سئوالات زیر پاسخ دهید

- ۱ - حذف برنامه های دولتی به چه منظور است ؟
- ۲ - اثر مستقیم حذف برنامه های متفاوت روی کدام طبقه خواهد بود ؟
- ۳ - در پیغام عفو بین الملل چه خواسته شده ؟
- ۴ - وزرای خارجه کدام کشورها جلسه خواهند داشت ؟
- ۵ - حکم دادگاه در مورد مجرم چه بود ؟
- ۶ - قاتل چند سال بعد به فکر جامعه عمل پوشانید ؟
- ۷ - ورودی برای بزرگسالان چه قدر است ؟
- ۸ - مراسم رژه برای چه منظوری ترتیب داده شده بود ؟
- ۹ - لوله گاز در کجا ترکیده بود ؟
- ۱۰ - بعد از تصادف ، اتوبوس ها بطرف کدام خیابان هدایت شدند ؟

PLEASE ANSWER THE FOLLOWING QUESTIONS

- 1_ In which market have British Aerospace had success ?

- 2 - What did British Aerospace sell to the U.S. before the present deal ?

- 3 - How long did it take for the Anglo-American deal to be completed ?

- 4 - Name two of the elected members of the Labour Party - cabinet .

- 5 - Which army backs the left-wing guerrillas in El-Salvador ?

- 6 - How many people have been killed in El-Salvador ?

- 7 - What does official NATO policy stress ?

- 8 - How many new members were added to the Labour Party cabinet?

- 9 - How many people were in the lost trawler ?

- 10- What did the rescue team find ?

PLEASE ANSWER THE FOLLOWING QUESTION

- 1 - Who was the American Secretary of defence ?
- 2 - How much was the deal between Britain and American worth?
- 3 - What did the Roman Catholic bishops call for ?
- 4 - What percent of the people in El-Salvador are Catholic ?
- 5 - In which year were Hawks used for the first time ?
- 6 - What is the type of engine used in Hawks ?
- 7 - Which country's President elect is Miguel-de-la-Madrid?
- 8 - Who remained at his post in Mr. Miguel-de-la-Madrid's cabinet ?
- 9 - How many votes did Tony Doglass get ?
- 10- Where was the trawler lost ?

لطفاً به سئوالات زیر پاسخ دهید

۱ - هواپیماسازی انگلستان در کدام بازار موفقیت بدست آورده است ؟

۲ - قبل از معامله اخیر صنعت هواپیماسازی انگلیس به آمریکا چه فروخته بود ؟

۳ - چه مدت طول کشیده که این معامله به مرحله عمل برسد ؟

۴ - دوتن از اعضای حزب کارگر را که جهت کابینه انتخاب شدند نام ببرید .

۵ - دست جیبی ها در السالوادور توسط چه نیروهائی کمک میشوند ؟

۶ - در جنگ داخلی السالوادور چند نفر کشته شدند ؟

۷ - قرارداد ناتو در مورد چه مسئله ای تأکید میکند ؟

۸ - چند نفر به کابینه حزب کارگر اضافه شدند ؟

۹ - کشتی ماهیگیری چند سرنشین داشت ؟

۱۰ - تیم کمکی موفق به پیدا کردن چه شدند ؟

لطفاً به سئوالات زیر پاسخ دهید

۱ - وزیر دفاع آمریکا که بود ؟

۲ - ارزش معامله بین آمریکا و انگلیس چقدر بوده (برحسب پوند) ؟

۳ - اسقفهای کاتولیک خواستار چه هستند ؟

۴ - کاتولیکها چند درصد مردم السالوادور را تشکیل میدهند ؟

۵ - هواپیماهای "هاوک" اولین بار در چه سالی در نیروی هوایی انگلیس مورد استفاده قرار گرفت ؟

۶ - موتورهای هواپیماهای "هاوک" از چه نوعی است ؟

۷ - میگوئل-دو-لا-مادرید رئیس جمهور منتخب کجاست ؟

۸ - در کابینه آقای میگوئل-دو-لا-مادرید کدام وزیر در پست خود باقی ماند ؟

۹ - آقای تسونی داگلاس چند رای بدست آورد ؟

۱۰ - کشتی در سواحل کجا گم شده بود ؟

RAW DATA: EXPERIMENT I

Non-Students, London

S _S	STR		LTR		Com.		S _S	STR		LTR		Com.	
	F	E	F	E	F	E		F	E	F	E	F	E
S1	8	4	4	4	20	16	S17	6	5	4	4	20	18
S2	6	8	3	5	17	15	S18	6	0	4	0	17	16
S3	8	2	1	1	17	16	S19	7	7	3	3	19	18
S4	5	5	1	3	19	19	S20	6	8	5	4	19	19
S5	10	9	5	7	20	20	S21	3	2	0	1	16	15
S6	1	1	1	1	20	18	S22	6	5	1	1	12	11
S7	8	8	7	7	20	19	S23	9	7	7	5	20	20
S8	6	1	5	3	18	16	S24	8	8	6	6	20	20
S9	8	6	4	1	18	17	S25	5	2	0	0	20	16
S10	9	8	7	6	18	19	S26	3	8	6	5	18	19
S11	4	6	7	3	14	16	S27	3	4	3	4	19	19
S12	7	6	8	8	18	16	S28	9	6	4	4	19	19
S13	6	7	5	3	17	20	S29	7	4	4	2	18	19
S14	4	5	3	1	16	19	S30	8	9	8	7	15	13
S15	6	0	2	0	18	16	S31	10	8	7	7	20	19
S16	4	2	1	0	16	18	S32	8	8	3	5	18	16

S = Subjects

STR = Short Term Recall

F = Farsi (Persian)

LTR = Long Term Recall

E = English

Com. = Comprehension

Max. Recall score for STR and LTR is 10

Max. score for comprehension is 20

RAW DATA: EXPERIMENT II

Students, London

Text	S _s	Recall		Comp.		S _s	Recall		Comp.	
		F	E	F	E		F	E	F	E
E	S1	7	8	7	10	S17	3	6	9	10
	S2	10	8	10	9	S18	4	1	8	10
F	S3	9	8	10	10	S19	5	4	10	10
	S4	6	9	10	9	S20	10	6	10	10
E	S5	7	9	9	10	S21	10	7	8	10
	S6	6	6	9	10	S22	8	8	10	9
F	S7	3	5	9	10	S23	8	8	10	10
	S8	5	4	9	10	S24	7	5	10	10
E	S9	10	7	10	10	S25	3	4	9	10
	S10	8	9	9	10	S26	7	8	10	10
F	S11	8	9	9	10	S27	8	7	9	9
	S12	9	8	10	10	S28	5	8	10	9
E	S13	4	7	9	9	S29	7	7	7	10
	S14	7	6	9	10	S30	5	4	10	9
F	S15	9	9	8	9	S31	7	9	10	10
	S16	3	2	10	9	S32	8	7	10	10

RAW DATA: EXPERIMENT III

Students and Non-Students (London and Tehran)

Text	Recall			Comp.			Recall			Comp.			
	S _s	F	E	F	E	S _s	F	E	F	E	S _s	F	E
E	S1	1	4	8	10	S17	7	6	10	9	S33	5	6
	S2	7	5	9	10	S18	2	4	10	10	S34	1	4
F	S3	6	7	10	10	S19	5	5	10	10	S35	5	3
	S4	4	1	10	10	S20	7	4	10	9	S36	4	5
E	S5	7	5	9	10	S21	3	5	10	10	S37	4	3
	S6	8	7	10	8	S22	7	3	10	9	S38	2	0
F	S7	5	4	7	6	S23	4	3	10	10	S39	8	6
	S8	9	5	9	8	S24	7	4	10	10	S40	3	4
E	S9	3	4	9	10	S25	7	5	10	10	S41	4	3
	S10	7	5	8	8	S26	5	7	10	9	S42	4	1
F	S11	7	8	10	8	S27	5	3	7	8	S43	9	6
	S12	6	4	10	10	S28	7	6	10	10	S44	6	6
E	S13	4	5	9	10	S29	6	9	9	10	S45	6	8
	S14	6	8	9	10	S30	6	7	9	9	S46	3	3
F	S15	3	5	10	10	S31	8	7	10	10	S47	6	4
	S16	6	7	10	9	S32	8	8	9	9	S48	7	8

RAW DATA: EXPERIMENT IV

University Students, Tehran

Time Limit Group, Low Comprehension

Recall

Ss	Farsi Text		English Text		English Comprehension
	F. Ques.	E. Ques.	F. Ques.	E. Ques.	
1	5	5	0	3	17
2	7	3	2	2	17
3	9	8	4	4	16
4	1	6	1	5	17
5	2	1	2	1	17
6	6	7	2	3	17
7	2	5	4	4	17
8	2	1	0	1	14
9	3	2	2	3	14
10	5	1	1	2	17
11	9	5	6	5	17
12	8	4	5	4	17
13	7	6	1	4	15
14	3	1	0	2	16
15	4	6	2	3	15
16	6	4	4	4	14

Max. Recall score is 10

Max. Comprehension score is 20

Contd/

RAW DATA: EXPERIMENT IV

University Students, Tehran

Time Limit Group, High Comprehension

Recall

Ss	Farsi Text		English Text		English Comprehension
	F. Ques.	E. Ques.	F. Ques.	E. Ques.	
1	8	7	2	2	20
2	9	2	0	1	18
3	6	5	3	0	19
4	10	7	6	6	19
5	4	3	1	4	18
6	10	6	2	4	18
7	9	8	3	8	18
8	9	10	4	5	18
9	3	2	7	5	19
10	10	7	7	9	18
11	6	4	1	2	19
12	3	0	3	5	19
13	3	5	6	8	18
14	8	8	6	7	19
15	8	4	9	10	20
16	6	6	4	6	18

Contd/

RAW DATA: EXPERIMENT IV

University Students, Tehran

No Time Limit Group, Low Comprehension
Recall

Ss	Farsi Text		English Text		English Comprehension
	F. Ques.	E. Ques.	F. Ques.	E. Ques.	
1	7	4	1	3	16
2	9	2	1	2	15
3	3	0	0	3	17
4	8	3	1	2	14
5	9	8	5	6	17
6	6	2	3	3	17
7	5	2	7	4	14
8	6	5	3	1	14
9	5	4	3	3	17
10	5	2	6	5	17
11	1	4	1	1	15
12	4	1	0	2	16
13	4	7	3	3	17
14	5	8	6	7	17
15	10	8	4	9	17
16	7	8	6	7	17

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RAW DATA: EXPERIMENT IV

University Students, Tehran

No Time Limit Group, High Comprehension
Recall

Ss	Farsi Text		English Text		English Comprehension
	F. Ques.	E. Ques.	F. Ques.	E. Ques.	
1	5	4	6	1	18
2	8	3	6	6	18
3	6	8	1	1	19
4	6	2	3	2	19
5	8	8	5	2	18
6	6	5	6	6	18
7	5	5	4	6	20
8	9	5	2	6	18
9	3	2	2	1	19
10	7	5	1	1	18
11	7	3	3	3	18
12	10	7	9	10	19
13	5	3	2	1	18
14	6	5	1	5	19
15	9	7	4	7	20
16	7	4	1	7	19