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Constrained Word Association Tasks for Bilinguals:

Support for Parallel Processing

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Abstract

Investigators of processing models usually instruct participants to complete single and double-component tasks. Response time (RT) is measured and a comparison between these two types of tasks is conducted. Nonsignificant RT differences between single and double-component tasks support parallel processing models (PPM). Studies on bilinguals suggest that their languages are represented separately at the lexical level but, share a common representation at the semantic level. Also bilinguals' semantic networks are more complex; it seems that acquisition of a second language causes interference in the first language due to code-switching. Textbook information on memory revealed that the thought of a word is believed to activate the thought of related words. Investigations using word association tasks indicated large response variability, therefore many studies have utilized constrained word association tasks to address this problem. It seems that PPM have not been applied to study information processing in bilinguals.

Constrained Word Association Tasks for Bilinguals: Support for Parallel Processing

Two types of theoretical models implicitly provide some hypotheses about lexical organization and explain how words are accessed or recognized during reading and listening. These two classes are serial processing models (SPM) and parallel processing models (PPM). Exponents of SPM claim that lexical items searched for serially (one at a time) until the correct item is found (Gleason & Ratner, 1993). Those who favor PPM contend that perceptual input about a word can activate a lexical item either directly or in parallel, as multiple lexical entries. In essence, according to this model all possible candidates are simultaneously activated (Gleason & Ratner, 1993). It has been postulated that people process visual material in parallel, and recognition occurs simultaneously at three levels (Reed, 1992). These levels of processing are: (1) the feature level (consisting of characteristics such as a straight line in the letter F or the curved line in an S), (2) the letter level, (3) the word level. In the present review, evidence supporting both PPM and SPM is presented; however attention is focused on PPM.

Processing Models

Most studies investigating human mental lexical access have used tasks of visual recognition of features or letters. Such studies have examined short term memory in visual discrimination tasks (Magnussen, Greenlee & Thomas, 1996), and in letter recognition and matching tasks (Egeth & Dagenbach, 1991).

Magnussen, Greenlee and Thomas (1996) assessed visual short-term memory at the feature level. These researchers manipulated contrast and spatial frequency of graph-like displays. In this case, contrast can be interpreted as gradation in shades; they used both single-judgment and dual-judgment tasks. In the single-judgment task the reference and test stimuli differed along one of two dimensions, spatial frequency or contrast while in the dual-judgment task they could differ on either, both, or neither of the dimensions. Exposure time to visual stimuli was held constant for both types of judgment tasks. Participants were instructed to indicate whether a presentation of a graph-like stimulus matched the sample stimulus presented earlier. Magnussen et al. (1996), measured accuracy of judgment and found it not to be affected by the doubling in judgment tasks. Results indicated no significant differences in the accuracy between single-judgment and dual-judgment calls; there was no deterioration of performance due to the increase in processing load. These researchers concluded that participants appeared to be making two visual judgments simultaneously, indicating the possibility of two independent special purpose memory stores.

Egeth and Davenbach (1991) proposed a diagnostic for distinguishing between serial and parallel processing. They conducted a visual search investigation consisting of 3 separate studies wherein participants were instructed to reply yes or no to indicate whether the target letter was present at least once within each trial. Response time (RT) was measured. Letter combinations were randomly displayed to eliminate order of exposure expectations. Possible combinations included either one target letter and a distractor letter, two target

letters, or two distractor letters. In the first experiment, low feature similarity letters were used (0's and Xs) and were positioned side by side. In Experiment 2 and 3 high feature similarity letters were used (Ts and Ls) and were positioned one above the other. In experiment 2 the T's and L's were also presented at various angles. The variations in letter location and angle of display were manipulated to measure effect of presentation location on RT. No significant RT differences were found due to the degree of letter similarity. No significant effect of letter location on response time was found in experiment 1 and 3. Experiment 2 did, however, reflect an increase in RT, indicating that angle of letter display required more processing time. Degree of feature similarity did not affect RT, and no significant RT difference was found between target-present and target-absent trials. In this study, support for PPM was indicated by no significant difference in RT between judgment calls, while support for SPM was indicated by difference in RT.

Response Time and Response Accuracy

Cohen and Servan-Schreiber, (1992) attempted to investigate how a parallel distributed processing (PDP) framework can provide an alternative explanation to the known dichotomy between automatic and controlled processing. This article started with an overview of information processing principles then covered the basic aspects of automaticity followed by the stroop model. Cohen and Servan-Schreiber's study focused on the role of the following seven principles: sigmoidal activation function, gradual propagation of activation, intrinsic noise, incremental, difference-driven connection adjustment and control

by modulation, competition, and interactivity. Hence this study offers firm support for the use of RT and accuracy for future investigations of information processing.

Bilinguals

Evidence of a merged processing system for bilinguals' first and second language has been found. Chapnik Smith (1991) addressed the issue of language representation and processing by examining cross-language priming in bilinguals with word-fragment completion tasks. French-English bilinguals were given a task that required conceptual integration. Half of the participants were instructed to read sentences and make one word inferences. For example, the sentence "fish attacked swimmer " was suppose to elicit the inference of shark. The other half of the participants were given a list of randomly selected words and were told to memorize the list. They were given a word completion test either in English or in French. Some of the word fragments presented inferred words, while others presented actual words found within a sentence. They were given another word completion test 30 minutes later. Smith found within and between language priming effects only when tasks involved sentence processing. Sentence processing induced a significant translation priming effect while word lists did not. Smith (1991) concluded that the bilinguals' languages are represented separately at the lexical level but share a common representation at the semantic level.

Ransdell and Fischler (1987) compared native English-speaking bilinguals to English monolinguals on four verbal memory tasks: recognition, lexical

decision, object naming and free recall. These researchers questioned whether or not the acquisition of a second language would impede on word retrieval of their Native-English language (first language). Ransdell and Fischler (1987) found no difference in accuracy between the two groups and no significant RT difference in the object naming and free recall tasks, however bilingual participants did take longer to complete the recognition and lexical decision tasks. These findings were interpreted as representing possible cross-language switching effects. Ransdell and Fischler (1987) concluded that acquisition of a second language appears to cause interference in the first language learned; such interference could have been due to code-switching.

Semantic networks represent the mental organization of the lexicon, whereby words and concepts that share some meaning are related both hierarchically (i.e. fruit-apple) and laterally (orange-apple). There are two types of categories; these are referred to as clusters and concepts. Clusters are formed due to a tendency to remember similar or related items in groups, whereas concepts are described as multilevel classification systems based on common properties of items. Semantic networks consist of nodes representing concepts joined by a pathway that unites related concepts. When attempting to retrieve information via networks the thought of one word (i.e., activation of one node) can activate the thought of related words (Reed, 1992).

Word Association

Moran (1982) reviewed the possibility of a dual component cognitive dictionary consisting of common responses (responses known to occur more often within a social group), and personal responses. He set up a free word association study where participants were instructed to respond with both common and personal responses. Response variability for personal responses was greater than that of personal responses. He did, however, categorize the responses. Moran divided the responses into the following six categories: enactive (i.e., bread-eat, hit-ball), iconic (i.e., green-grass, lemon-sour), cofunctional (i.e., bread-butter, table-chairs), definition or synonym (i.e., joy-happiness) and contrast or opposite (i.e., large-small, short-tall). The sixth category comprised all words that did not conform to one of the other categories. The data indicated that more participants responded with either contrast words (i.e., antonyms) and definitions (i.e., synonym) than the other categories. These findings suggest that such word association categories might be useful to future investigations.

Block, Farnham, Hinrichs and Ghoneim (1989) applied free and constricted association tasks to collect word association norms. Constricted associations can be defined as associations where potential responses are restricted to a given category in relation to the cue word including opposite, category, example, another, and property. Participants were instructed to write the first appropriate one word response that came to mind. This study produced normed word associations consisting of word pair lists with different associative relationships but with similar associative strengths. This finding is important to

gain better insight on the brain organization. The material in this study is instructive since it outlines sound methodology for future investigation. More specifically, it highlights the advantages of using constricted word association tasks. When a mental search is constricted to one category or type of response, possible variations between subjects' responses are limited, thus simplifying the accuracy of assessment.

This review has revealed that investigators of processsing models usually instruct participants to complete single-component and double-component tasks. The RT is measured for these two types of tasks and compared to each other. Nonsignificant RT differences between the single and dual-component tasks reveals support for PPM. It was also discovered, through comparison studies, that bilinguals' memory storage is different from monolinguals' (Ransdell and Fischler, 1987), although research on bilingualism itself is limited. Since the thought of one word can activate related words, word association tasks are clearly a good method to further investigate memory.

Taken together, future investigations might seek evidence of parallel processing in lexical retrieval. The methodology applied to PPM investigations of visual discrimination and letter recognition tasks can be easily altered to accommodate word retrieval tasks. These tasks are known to potentially elicit great variability in responses between participants, but with the use of constrained word associations variability can be minimized.

It is with the unification of these findings that I hypothesize that bilinguals' RT will not differ between single-component and double-component

retrieval task completion. This nonsignificant difference in RT between single-component and double-component tasks will indicate that bilinguals can complete two retrieval tasks across two languages simultaneously. These results would therefore lend support for PPM.

Annotated Bibliography

Block, R., Farnham, S., Braverman, K., Hinrichs, J., & Ghoneim, M. (1989). Norms for free associations and five types of constrained associations. Psychological Reports, 64, 1065-6.

This study applied free and constricted association tasks to collect word association norms. Constricted associations can be defined as associations where potential responses are restricted to a given category in relation to the cue word including opposite, category, example, another, and property. This investigation is important for psychological research examining semantic memory. The material in this study will help set up methodology for the proposed study. Most specifically it highlights the use of constricted word association tasks.

Cohen, J., & Servan-Schreiber, D. (1992). A parallel distributed processing approach to automaticity. American Journal of Psychology, 105, 239-269.

Cohen and Servan-Schreiber attempted to investigate how a parallel distributed processing (PDP) framework can provide an alternative to the known dichotomy between automatic and controlled processing. The role of the following seven principles was examined: sigmoidal activation function , gradual propagation of activation, intrinsic noise, incremental, difference-driven connection adjustment and control by modulation, competition, and interactivity. This article starts with an overview of information processing principles then covers the basic aspects of automaticity followed by the stroop model. The authors also present attentional interactivity and competition. Simulations of

tasks are applied to demonstrate the effects of the stroop model and that of Erikson's response-competition. This study is included because of its solid argument for the use of RT as a measure.

Egeth, H., & Dagenbach, D. (1991). Parallel versus serial processing in visual search: Further evidence from subadditive effects of visual quality. Journal of Experimental Psychology: Human perception and performance, 17, 551-560.

These researchers proposed a diagnostic for distinguishing between serial and parallel processing in visual search based on testing for sub-additive effects of a visual quality manipulation. In a visual search task participants were instructed to look for a target letter amount distractor letters and elements. In visual-search experiments experimenters tended to determine whether processing under set conditions was parallel or serial by manipulating the task load. The logic of this methodology recognizes parallel processing by no significant response time increase against an increase in task load (subaditive effect). Serial processing would be indicated by an increase in response time with an increase in taskload (additive effect). The findings suggest that the proposed diagnostic is capable of detecting parallel processing when it occurs.

Gleason, J. B., & Ratner, N. B. (1993). Psycholinguistics Washington, DC: Holt, Rinehart and Winston.

This textbook covers the topic of psycholinguistics. The information regarding bilinguals' language systems were of interest for the suggested study.

Magnussen, S., Greenlee, M., & Thomas, J. (1996). Parallel processing in visual short-term memory. Journal of Experimental Psychology. Human Perception and Performance, 22, 202-12.

A delayed perceptual discrimination threshold was measured by a two interval forced-choice procedure (yes/no). Test and reference graph-like stimuli were presented at different points and time. Participants were subjected to a series of two single-judgement and one double-judgement tasks. In a single-judgement task the reference and test stimuli differed along one dimension, spatial frequency or contrast ,while they differed on both dimensions in a double judgement task. The authors failed to clearly define contrast and frequency. My assumptions are that contrast refers to variations in shades. This study measured accuracy of judgement and found it not to be affected by the doubling of taskload even though there was no increase in exposure time with the increase in taskload. It was concluded that results supported the argument for separate memory sustems for contrast and spatial frequency. This article was of value to my study because it supplied methodological information.

Moran, L. (1982). Design for a dual Component Cognitive Dictionary. Canadian Journal of Psychology, 36, 628-640.

This study was seeking support for a dual component cognitive dictionary existing within each individual. One of these two components is referred to as the personal component (their personal response) while the other is identified as the common component found within a social group (the most common answer). Subjects were instructed to verbally respond to each given word with the first

word that came to their mind. All subjects were tested individually. Each response was scored with the following preset criteria; enactive (the word pair was linked by an action e.g., bread-eat, hit-ball), iconic (the word pair was linked by ascribing a quality to the referent e. g., green-grass, lemon-sour), cofunctional (the word pair was combined as cofunctional physical referents e.g., bread-butter, table-chair), definition (the word pair was combined by the principles of synonymity e.g., joy-happiness or by superordination e.g., lemon-fruit), contrast (the word pair had opposite meanings e.g., large-small), and other (for word pairs that did not belong to any of these categories). The use of the word 'enactive' as shown here is as used by the researcher. The researchers found support for the enduring semantic sets hypothesis. They also identified definition and contrast categories as more likely to elicit most common responses. This phenomenon will help simplify scoring procedures and ensure potentially more completed responses while minimizing response time.

Ransdell, S. and Fischler, I. (1987). Memory in a Monolingual Mode: When are bilinguals at a disadvantage? Journal of Memory and Language, 26, 394-405.

This study takes a look into how a bilingual individual coordinates two languages that describe a single world. The question they asked was whether or not the acquisition of a second language would impede on word retrieval of their Native-English language (first language). They compared Native-English speaking bilinguals to English monolinguals on four verbal memory tasks and measured accuracy of response. The verbal memory tasks were episotic

recognition, lexical decision, object naming and free recall. Results revealed no significant difference in accuracy rating. Code-switching, the proposed cause for interference sugested by this experimenter is an interesting hypothesis.

Reed, S. K. (1992). Cognition: Theory and applications (3rd ed.). Belmont, CA: Wadsworth.

This textbook covers the topic of memory and cognition. Mental lexical organization specificities were of interest and of importance for my study because it explained memory organization and its structures.

Smith, M. C. (1991). On the recruitment of semantic information for word fragment completion: Evidence from bilingual priming. Journal of Experimental Psychology: Learning, memory and cognition, 17, 234-243.

This article addressed the issue of language representation and processing. Cross-language priming in bilinguals was examined with word-fragment completion tasks. These researchers found within and between language priming effects but only when tasks involved sentence processing. This article presented findings relevant to the effects of a second language on the native language.

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Constrained Word Association Tasks for Bilinguals:

Support for Parallel Processing

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Abstract

Can bilinguals complete word association tasks requiring processing across both languages simultaneously? Researchers have found evidence for parallel processing with visual feature discrimination and letter recognition tasks. The present study attempts to find support for parallel processing by exploring lexical retrieval tasks that require a search across bilinguals' two languages. Twenty-two bilingual university and college students and faculty received 75 trials on which they were given an English word and asked to either; 1) find an English word with an opposite meaning, 2) find a French word with the same meaning and, 3) find a French word with an opposite meaning. A significant difference in RT was found between these three tasks. Results failed to provide support for parallel processing.

Constrained Word Association Tasks for Bilinguals: Support for Parallel Processing

Several studies investigating parallel processing models (PPM) in human mental lexical access have used visual recognition tasks of features or letters (Cohen & Servan-Schreiber, 1992; Egeth & Dagenbach,1991). These studies measured response time (RT) and accuracy of response to identify the type of processing used. Such researchers suggest that significant differences in RT between simple and multiple tasks indicate the presence of serial processing (one task is completed at a time), whereas no significant differences in these measures indicate parallel processing (multiple tasks can be executed simultaneously). The present study sought supporting evidence for PPM at the word processing level. In contrast to previous investigations, the present study employed lexical retrieval tasks rather than visual recognition tasks. This study measured RT.

Some studies suggest that a bilingual speaker's languages are represented separately at the lexical level, but share a common representation at the semantic level (Smith, 1991). Comparisons between monolinguals and bilinguals indicated no significant differences in accuracy of response, but recognition and lexical decision tasks took longer to complete by the English-French bilinguals (Smith, 1991). Ransdell and Fischler (1987) concluded that acquisition of a second language appeared to cause interference in the first language due to code-switching. Information about the organization of semantic networks provided by Reed (1992) affords an alternative explanation for the interference hypothesis,

suggesting that bilinguals' semantic networks are more complex because they include links to both languages.

Free word association elicits large response variability (Block, Famham, Braverman, Hinrichs & Ghoneim, 1989). To reduce response variability, in the present study, constrained word associations were used. Constrained word associations can be defined as associations where potential responses are restricted to a given category in relation to the cue word including opposite, category, example, another, and property. Since past investigations have demonstrated participants' tendency to respond with definitions (i.e., synonyms) and contrasts (i.e., antonyms) (Moran, 1982), this study employed these categories. The limiting of potential responses simplified response accuracy assessment.

This study was designed to further investigate PPM at the word level of processing. Participants completed three types of retrieval tasks. The first task required a search for a word from the same language (English)—finding an English word with an opposite meaning (i.e., an antonym). The two other tasks required a search for a word across to the second language (French)—finding a French word with the same meaning (i.e., a translation) and finding a French word with an opposite meaning (i.e., a translation of an antonym). Participant RT was measured, since it was suggested that such a measure would render the most accurate assessment of single-component versus dual-component comparisons (Cohen & Servan-Schreiber, 1992). It is hypothesized that RT between the three

groups would not be significantly different, therefore, supporting PPM. These tasks can be represented in the following 2 X 2 design table 1.

Table 1

Representation of the 2 X 2 design Matrix

Meaning	Language	
	English	French
Same	Probe	French synonym
Opposite	English antonym	French antonym

In each trial, the participant received an English word or probe and had to perform the designated task.. The question was to determine whether bilinguals would have to find a French synonym or an English antonym before they could retrieve the French antonym for the probe, or could they retrieve the French antonym directly. Should they demonstrate the ability to directly retrieve the French antonym it would demonstrate that bilinguals can complete dual-component tasks within the same time frame required to complete a single-component task. These hypothesized results would lend some support for PPM.

Method

Participants

Twenty-two English and French bilingual University and College students and faculty members participated in this study. Some participants received credit while the others were rewarded for volunteering by having their name put into a draw for a lottery ticket.

Materials

The MEL-2 Professional program was used to design a DOS-based computer program that ran a demonstration and one of two test versions. It displayed procedural instructions, task assignments and selected words, and it recorded RT in milliseconds. A 15 second maximum RT allowance was included in the program to limit test time. Copies of the actual program, showing stimulus sequence, are in Appendix A. Pencil and paper were used by the experimenter to record participants' oral responses. A Sharp cassette recording device (model # RD-680-AV) was used as a backup system to record participants verbal responses. A questionnaire was formulated to collect history of language acquisition for each participant (see Appendix B).

Procedures

The participant received 75 test trials; on each, an English word was displayed, and the participant was instructed to: 1) find an English word with an opposite meaning, 2) find a French word with the same meaning, or 3) find a French word with an opposite meaning. Tasks were semi-randomized; no one task was presented more than three times consecutively. As soon as the participant had retrieved the required word, she pressed a response key and said the word aloud.

A sample test containing 18 trials was used to familiarize participants with the procedures. Once the sample test had been completed, the experimenter initiated the actual test. This test consisted of 75 trials. All participants were individually tested and received one of two test versions, which included the same

word list but in the reverse order. The experimenter informed the participants of the procedures, and indicated that the computer program would give them equal numbers of each of the three tasks. The participants were informed that pressing the spacebar activated the testing process and initiated the presentation of each subsequent word. Each trial proceeded as follows: pressing the spacebar elicited the task instruction, followed by a two second delay to allow for the reading of the task instruction which was then followed by a word. All words presented were in English in order to minimize the occurrence of code-switching. Participants were instructed to respond orally with an appropriate word while simultaneously pressing the spacebar. The spacebar press cued the program to record RT. The next spacebar press initiated the next trial and the process repeated itself until all 75 trials were completed. The experimenter sat in the background, recorded all responses in writing and assessed the accuracy of responses (correct or incorrect) on an answer sheet. A cassette player also recorded participants' responses as a back-up system in case of difficulty in understanding any responses.

Results

RT measures are commonly used in mental processing experiments and are accepted as a means of assessing the type of mental processing that is applied to complete specific tasks. Support for PPM is revealed when RT for a double-component task is not significantly different from RT required to complete a single-judgement task. In this study, evidence for PPM was expected, therefore, suggesting that bilinguals have the ability to process two or more tasks across

their two languages simultaneously. Unexpected results, on the other hand, would be reflected by a difference in RT between the double and the single tasks. These findings of difference might suggest that PPM are inadequate at explaining lexical retrieval of bilinguals. They might also point towards the alternative model known as the SPM, (involves completing one task at a time), meaning that bilinguals could very well be retrieving one component of the task at a time.

The Mean RT in milliseconds (with standard deviations in parentheses) for tasks 1, 2 and 3 were 2479 (826), 3213 (922), and 3793 (1254) (see Table 2). Participants took less time to find an Eglish word with an opposite meaning than they did to find a French word with the same meaning. Finding a French word with an opposite meaning required the most time.

Table 2

Mean Response Time and Standard Deviation (milliseconds)for Each Task

	Task		
RT	1	2	3
M	2479	3213	3793
SD	826	922	1254

The general linear model (GLM) of an analysis of variance (ANOVA) was executed to assess the significance of the observed differences. The analysis

revealed a significant difference in RT between the three tasks $F(2, 1342) = 49.78$ $p<0.001$, adjusted MSE = 3763775. The mean RT for the three types of tasks completed by each participants was used for the GLM. The use of mean RT was implemented due to uneven cells that resulted from the elimination of incorrect responses. Results revealed a significant difference in RT between the means $F(2,65) = 8.83$ $p<0.001$, MSE = 1079255. The language history questionnaires indicated diversity between participants. For example, 15 of the 22 participants learned English first, while 6 of them learned French first and finally 1 learned Portuguese first. Of these 22 participants 8 of them acquired their second language before the age of 4, while 11 of them did so at the elementary school level and the other 3 acquired their second language after the age of 13. Diversity was also found between participants' language of education; 6 participants completed elementary and secondary levels in English, 3 in French, and 13 did so in both English and French (the majority in this group was enrolled in French Emersion). Due to this variability in language history, GLM with mean RT was also executed to assess potential effects of such factors as the first language learned, the age of acquisition of the second language, and the language of education. Although these participant variables had an effect on the results, the effect was not large enough to indicate support for PPM.

Conclusion

The present results failed to find evidence of parallel processing in lexical retrieval. Perhaps the two components of the task must be done in sequence.

Alternatively perhaps replication of this experiment while controlling for participant variables, for example keeping them constant by recruiting a participant pool with the same participant variables as above mentioned could render results supporting PPM, at least for the first two tasks.

It is possible that the retrieval of words across two languages may be more complex than assumed. Task 2 of this experiment was assumed to require a single-component search, yet its response time was significantly greater than that of task 1. Another interesting area to further investigate is the actual process taken in order to retrieve words for task 3. Do bilinguals retrieve a tranlation and then find an antonym, or do they retrieve an antonym and then find a tranlation for that antonym? When that question was presented to several participants, a common reply was that it depended on which component was accessed first. An experiment could be done to assess this question. These commments tend to reflect an effect of the strength of the commections between words. Another possible explanation could include the role of practice and automaticity in word retrieval. Tasks that are handled serially at first can become parallel with extensive practice (Schneider & Shiffrin, 1977; Shiffrin & Schneider, 1977).

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Appendix A

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                        EXPERIMENT SPECIFICATION # 1   c:\mel2\ser1
AUTHOR Tom                    CREATION DATE 09-18-96 LAST UPDATE 03-03-98
FILES:   EXP ser1     DATA ser1      INSERT ser1      INCLUDE
BACKUP DISK VOLUME                   DEBUG normal        SPARE
ABSTRACT Version 1 of Reaction-time translation/ antonym experiment
75 trials, semi-random (but fixed) order (no more than three in a row)


NAMES OF: BLOCK INDEPENDENT VARS   1:          2:          3:          4:
 {to be logged for later analysis} 5:          6:          7:          8:
        BLOCK DEPENDENT VARIABLES  1:          2:          3:          4:
 {logs as ACcuracy,SElection, RT}  5:          6:          7:          8:
      TRIAL INDEPENDENT VARIABLES  1:stimulus  2:          3:          4:
 {to be logged for later analysis} 5:          6:          7:          8:
      TRIAL DEPENDENT VARIABLES    1:resp      2:          3:          4:
 {logs as ACcuracy,SElection, RT}  5:          6:          7:          8:
EVENT   TYPE   FORM ID       COMMENT              MISC. INSERT EXEMPLAR FIELD
  1   frame     1        instructions
  2   trial     1        run 75 trials
  3   frame     100      Good-bye
```

```
                        TRIALS SPECIFICATION   # 1   c:\mel2\ser1
COMMENT Run trials
TRIAL CATEGORY1              SEQUENCE fixed    NUMBER OF TRIALS 75
VALUES OF TRIAL INDEPENDENT VARS  1:{t1}     2:          3:          4:
TO BE LOGGED FOR LATER ANALYSIS   5:         6:          7:          8:
RERUN ERROR TRIALS no
EVENT   TYPE    FORM ID       COMMENT              MISC. INSERT EXEMPLAR FIELD
  1   frame     10       Subject starts trial
  2   frame     20       Instructions
  3   frame     50       Display word
```

```
                        FRAME SPECIFICATION    #   1 c:\mel2\ser1
COMMENT Instructions
FRAME INSERT          SEQUENCE none        START LINE 2        ERASE yes
FOREGROUND COLOR black     BACKGROUND cyan   CENTER no       DURATION response
DISPLAY TYPE normal
INPUT MODE key    LENGTH/PORT #             INDEX ANSWER no TERMINATE response
RESPONSE ' '                                ANSWER none
FEEDBACK none                               LOG DEPENDENT VARIABLE none
TEXT begins on next line and is continued on page 2
       In this experiment you will be shown English words, and asked
                 to respond by providing either:

              The ENGLISH word that is the OPPOSITE
              The FRENCH word that is the SAME
        or    The FRENCH word that is the OPPOSITE.

        You will start each trial by pressing the spacebar.

      Then you will be given your instructions for that trial.

        Two seconds later, the word will appear on the screen
```

As soon as you know the answer, indicate by pressing the spacebar, and tell the instructor your answer.

Then you will initiate the next trial by pressing the spacebar again. There will be 75 trials altogether.

Press spacebar to indicate you are ready to start.

```
                              FRAME SPECIFICATION    # 10  c:\mel2\ser1
COMMENT Calls upon subject to start trial
FRAME INSERT          SEQUENCE none        START LINE 15       ERASE yes
FOREGROUND COLOR hi_red    BACKGROUND black  CENTER yes      DURATION response
DISPLAY TYPE normal
INPUT MODE key    LENGTH/PORT #            INDEX ANSWER no TERMINATE response
RESPONSE ' '                               ANSWER none
FEEDBACK none                              LOG DEPENDENT VARIABLE none
TEXT begins on next line and is continued on page 2
Press the SPACEBAR to begin a trial
```

```
                              FRAME SPECIFICATION    # 20  c:\mel2\ser1
COMMENT Instructions for this trial
FRAME INSERT          SEQUENCE fixed       START LINE 11       ERASE yes
FOREGROUND COLOR yellow    BACKGROUND black  CENTER yes      DURATION 2000
DISPLAY TYPE normal
INPUT MODE key    LENGTH/PORT #            INDEX ANSWER no TERMINATE response
RESPONSE ' '                               ANSWER none
FEEDBACK none                              LOG DEPENDENT VARIABLE none
TEXT begins on next line and is continued on page 2
{t2}
```

```
                              FRAME SPECIFICATION    # 50  c:\mel2\ser1
COMMENT Present stimulus
FRAME INSERT          SEQUENCE fixed       START LINE 13       ERASE no
FOREGROUND COLOR hi_green  BACKGROUND black  CENTER yes      DURATION 15000
DISPLAY TYPE normal
INPUT MODE key    LENGTH/PORT #            INDEX ANSWER no TERMINATE response
RESPONSE ' '                               ANSWER ' '
FEEDBACK rt                                LOG DEPENDENT VARIABLE resp
TEXT begins on next line and is continued on page 2
{T3}
```

```
                              FRAME SPECIFICATION    # 100 c:\mel2\ser1
COMMENT Good-bye
FRAME INSERT          SEQUENCE none        START LINE 10       ERASE yes
FOREGROUND COLOR black     BACKGROUND grey   CENTER yes      DURATION 5000
DISPLAY TYPE normal
INPUT MODE none   LENGTH/PORT #            INDEX ANSWER no TERMINATE response
RESPONSE none                              ANSWER none
```

```
FEEDBACK none                                   LOG DEPENDENT VARIABLE none
TEXT begins on next line and is continued on page 2
The Experiment is over.

Thank you for your participation.
```

```
$ 1 stimulus
!slot 1:  stimulus condition; slot 2:  trial instruction; slot 3:  word
"3\What is the FRENCH word that is OPPOSITE of the following?:\HARD"
"3\What is the FRENCH word that is OPPOSITE of the following?:\LONG"
"1\What is the ENGLISH word that is OPPOSITE of the following?:\HAPPY"
"3\What is the FRENCH word that is OPPOSITE of the following?:\FIRST"
"2\What is the FRENCH word that is the SAME as the following?:\THICK"
"1\What is the ENGLISH word that is OPPOSITE of the following?:\WHITE"
"2\What is the FRENCH word that is the SAME as the following?:\TALL"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\QUICK"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\HIGH"
"2\What is the FRENCH word that is the SAME as the following?:\RICH"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\HEAVY"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\END"
"2\What is the FRENCH word that is the SAME as the following?:\DARK"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\RAISE"
"3\What is the FRENCH word that is the OPPOSITE of the followng?:\FLOOR"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\SMOOTH"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\PULL"
 \What is the FRENCH word that is the OPPOSITE of the followng?:\PRETTY"
 2\What is the FRENCH word that is the SAME as the following?:\GOOD"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\RUDE"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\FAT"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\WET"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\HEAVY"
"2\What is the FRENCH word that is the SAME as the following:?\FAST"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\SHORT"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\START"
"2\What is the FRENCH word that is the SAME as the following?:\BOY"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\MOTHER"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\BROTHER"
"2\What is the FRENCH word that is the SAME as the following?:\YOUNG"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\USED"
"2\What is the FRENCH word that is the SAME as the following?:\STRONG"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\TRUTH"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\LAUGH"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\NOISE"
"2\What is the FRENCH word that is the SAME as the following?:\ENTRANCE"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\IN"
"2\What is the FRENCH word that is the SAME as the following?:\STOP"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\ROUGH"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\TIDY"
"2\What is the FRENCH word that is the SAME as the following?:\SCARCE"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\FEW"
"2\What is the FRENCH word that is the SAME as the following?:\LOVE"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\SWEET"
 2\What is the FRENCH word that is the SAME as the following?:\LIVE"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\TRUE"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\DAY"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\FRIEND"
"2\What is the FRENCH word that is the SAME as the following?:\FULL"
```

```
\What is the ENGLISH word that is the OPPOSITE of the following?:\MEAN"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\LEFT"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\SICK"
"2\What is the FRENCH word that is the SAME as the following?:\WOMAN"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\THRIFT"
"2\What is the FRENCH word that is the SAME as the following?:\PRIDE"
"2\What is the FRENCH word that is the SAME as the following?:\LEAD"
"2\What is the FRENCH word that is the SAME as the following?:\RAW"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\SAVE"
"2\What is the FRENCH word that is the SAME as the following?:\OPEN"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\NEAR"
"2\What is the FRENCH word that is the SAME as the following?:\FORWARD"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\FRONT"
"2\What is the FRENCH word that is the SAME as the following?:\WINTER"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\RIGHT"
"2\What is the FRENCH word that is the SAME as the following?:\HOT"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\MELT"
"2\What is the FRENCH word that is the SAME as the following?:\LIFT"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\ON"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\CLEAN"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\TAKE"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\PAIN"
"2\What is the FRENCH word that is the SAME as the following?:\ASK"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\EARLY"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\AWAKE"
3\What is the FRENCH word that is the OPPOSITE of the following?:\PUSH"
```

```
                              DEFAULT SPECIFICATION  # 1   c:\mel2\ser1
Collect subject information for data logging yes
Path to Setup,Run,Makedat,Analyze \mel2
Does your screen flicker on displays (IBM CGA video adaptor) no
Independent variables Minimum 0      Maximum 31
Maximum value for dependent variable RT 32767 Maximum value for QANSWER 10
Insert Type:  Block  Trial/Question/Text  Frame     User     Subject   Misc
# of slots    5            5              5         10        5        5
# chars/slot  240          240            80        80        40       15
Length of tone for incorrect responses 500   Length of feedback display 1000
Generate as an INCLUDE file no              Run file name run.exe
Clear on feedback yes     At frame execution set CapsLock low and NumLock num
Time resolution 1         Run limit inserts no
Counter balance none      Balance category number 255
Graphics mode             Warn on duration not multiple of refresh time yes
Auto answer no            Subject init options #s
Overlay FORM with RUN yes  Max questions allowed per questionnaire 100
Minimum value for QANSWER 0
End report log  Wait type exclude  Sound device speaker
Response box: Model         Port         Init options
Random seed 0       Run-time retrace verification fatal  Time audit off
```

```
                          EXPERIMENT SPECIFICATION # 1   c:\mel2\ser2
AUTHOR Tom                CREATION DATE 09-18-96 LAST UPDATE 03-03-98
FILES:   EXP ser2     DATA ser2      INSERT ser2      INCLUDE
BACKUP DISK VOLUME                   DEBUG normal        SPARE
ABSTRACT Version 2 of Reaction-time translation/ antonym experiment
75 trials, semi-random order (but fixed) (no more than 3 in a row)


NAMES OF: BLOCK INDEPENDENT VARS   1:          2:          3:          4:
 {to be logged for later analysis} 5:          6:          7:          8:
         BLOCK DEPENDENT VARIABLES 1:          2:          3:          4:
 {logs as ACcuracy,SElection, RT}  5:          6:          7:          8:
       TRIAL INDEPENDENT VARIABLES 1:stimulus  2:          3:          4:
 {to be logged for later analysis} 5:          6:          7:          8:
       TRIAL DEPENDENT VARIABLES   1:resp      2:          3:          4:
 {logs as ACcuracy,SElection, RT}  5:          6:          7:          8:
EVENT   TYPE   FORM ID       COMMENT              MISC. INSERT EXEMPLAR FIELD
  1   frame    1        instructions
  2   trial    1        run 75 trials
  3   frame    100      Good-bye
```

```
                          TRIALS SPECIFICATION   # 1   c:\mel2\ser2
COMMENT Run trials
TRIAL CATEGORY1              SEQUENCE fixed    NUMBER OF TRIALS 75
VALUES OF TRIAL INDEPENDENT VARS  1:{t1}     2:          3:          4:
TO BE LOGGED FOR LATER ANALYSIS   5:         6:          7:          8:
RERUN ERROR TRIALS no
EVENT   TYPE   FORM ID       COMMENT              MISC. INSERT EXEMPLAR FIELD
  1   frame    10       Subject starts trial
  2   frame    20       Instructions
  3   frame    50       Display word
```

```
                          FRAME SPECIFICATION    #   1 c:\mel2\ser2
COMMENT Instructions
FRAME INSERT          SEQUENCE none        START LINE 2        ERASE yes
FOREGROUND COLOR black     BACKGROUND cyan   CENTER no       DURATION response
DISPLAY TYPE normal
INPUT MODE key    LENGTH/PORT #          INDEX ANSWER no TERMINATE response
RESPONSE ' '                             ANSWER none
FEEDBACK none                            LOG DEPENDENT VARIABLE none
TEXT begins on next line and is continued on page 2
       In this experiment you will be shown English words, and asked
                  to respond by providing either:

             The ENGLISH word that is the OPPOSITE
             The FRENCH word that is the SAME
       or    The FRENCH word that is the OPPOSITE.

         You will start each trial by pressing the spacebar.

       Then you will be given your instructions for that trial.

                                                    the word will appear on the screen
```

As soon as you know the answer, indicate by pressing the spacebar, and tell the instructor your answer.

Then you will initiate the next trial by pressing the spacebar again. There will be 75 trials altogether.

Press spacebar to indicate you are ready to start.

```
                              FRAME SPECIFICATION    # 10  c:\mel2\ser2
COMMENT Calls upon subject to start trial
FRAME INSERT          SEQUENCE none        START LINE 15       ERASE yes
FOREGROUND COLOR hi_red    BACKGROUND black  CENTER yes      DURATION response
DISPLAY TYPE normal
INPUT MODE key    LENGTH/PORT #           INDEX ANSWER no TERMINATE response
RESPONSE ' '                              ANSWER none
FEEDBACK none                             LOG DEPENDENT VARIABLE none
TEXT begins on next line and is continued on page 2
Press the SPACEBAR to begin a trial
```

```
                              FRAME SPECIFICATION    # 20  c:\mel2\ser2
COMMENT Instructions for this trial
FRAME INSERT          SEQUENCE fixed       START LINE 11       ERASE yes
FOREGROUND COLOR yellow    BACKGROUND black  CENTER yes      DURATION 2000
 ISPLAY TYPE normal
INPUT MODE key    LENGTH/PORT #           INDEX ANSWER no TERMINATE response
RESPONSE ' '                              ANSWER none
FEEDBACK none                             LOG DEPENDENT VARIABLE none
TEXT begins on next line and is continued on page 2
{t2}
```

```
                              FRAME SPECIFICATION    # 50  c:\mel2\ser2
COMMENT Present stimulus
FRAME INSERT          SEQUENCE fixed       START LINE 13       ERASE no
FOREGROUND COLOR hi_green  BACKGROUND black  CENTER yes      DURATION 15000
DISPLAY TYPE normal
INPUT MODE key    LENGTH/PORT #           INDEX ANSWER no TERMINATE response
RESPONSE ' '                              ANSWER ' '
FEEDBACK rt                               LOG DEPENDENT VARIABLE resp
TEXT begins on next line and is continued on page 2
{T3}
```

```
                              FRAME SPECIFICATION    # 100 c:\mel2\ser2
COMMENT Good-bye
FRAME INSERT          SEQUENCE none        START LINE 10       ERASE yes
FOREGROUND COLOR black     BACKGROUND grey   CENTER yes      DURATION 5000
DISPLAY TYPE normal
INPUT MODE none   LENGTH/PORT #           INDEX ANSWER no TERMINATE response
RESPONSE none                             ANSWER none
```

```
FEEDBACK none                                   LOG DEPENDENT VARIABLE none
TEXT begins on next line and is continued on page 2
The Experiment is over.

Thank you for your participation.
```

```
$ 1 stimulus
!slot 1:  stimulus condition; slot 2:  trial instruction; slot 3:  word
"3\What is the FRENCH word that is the OPPOSITE of the following?:\HARD"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\LONG"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\HAPPY"
"2\What is the FRENCH word that is the SAME as the following?:\FIRST"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\THICK"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\WHITE"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\TALL"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\QUICK"
"2\What is the FRENCH word that is the SAME as the following?:\HIGH"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\RICH"
"2\What is the FRENCH word that is the SAME as the following?:\HEAVY"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\END"
"2\What is the FRENCH word that is the SAME as the following?:\DARK"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\RAISE"
"2\What is the FRENCH word that is the SAME as the following?:\FLOOR"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\SMOOTH"
"2\What is the FRENCH word that is the SAME as the following?:\PULL"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\PRETTY"
"2\What is the FRENCH word that is the SAME as the following?:\GOOD"
"2\What is the FRENCH word that is the SAME as the following?:\RUDE"
"2\What is the FRENCH word that is the SAME as the following?:\FAT"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\WET"
"2\What is the FRENCH word that is the SAME as the following?:\HEAVY"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\FAST"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\SHORT"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\START"
"2\What is the FRENCH word that is the SAME as the following?:\BOY"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\MOTHER"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\BROTHER"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\YOUNG"
"2\What is the FRENCH word that is the SAME as the following?:\USED"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\STRONG"
"2\What is the FRENCH word that is the SAME as the following?:\TRUTH"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\LAUGH"
"2\What is the FRENCH word that is the SAME as the following?:\NOISE"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\ENTRANCE"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\IN"
"2\What is the FRENCH word that is the SAME as the following?:\STOP"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\ROUGH"
"2\What is the FRENCH word that is the SAME as the following?:\TIDY"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\SCARCE"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\FEW"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\LOVE"
"2\What is the FRENCH word that is the SAME as the following?:\SWEET"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\LIVE"
"2\What is the FRENCH word that is the SAME as the following?:\TRUE"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\DAY"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\FRIEND"
"2\What is the FRENCH word that is the SAME as the following?:\FULL"
```

```
"3\What is the FRENCH word that is the OPPOSITE of the following?:\MEAN"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\LEFT"
 2\What is the FRENCH word that is the SAME as the following?:\SICK"
 3\What is the FRENCH word that is the OPPOSITE of the following?:\WOMAN"
"2\What is the FRENCH word that is the SAME as the following?:\THRIFT"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\PRIDE"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\LEAD"
"2\What is the FRENCH word that is the SAME as the following?:\RAW"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\SAVE"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\OPEN"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\NEAR"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\FORWARD"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\FRONT"
"2\What is the FRENCH word that is the SAME as the following?:\WINTER"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\RIGHT"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\HOT"
"2\What is the FRENCH word that is the SAME as the following?:\MELT"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\LIFT"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\ON"
"2\What is the FRENCH word that is the SAME as the following?:\CLEAN"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\TAKE"
"2\What is the FRENCH word that is the SAME as the following?:\PAIN"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\ASK"
"1\What is the ENGLISH word that is the OPPOSITE of the following?:\EARLY"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\AWAKE"
"3\What is the FRENCH word that is the OPPOSITE of the following?:\PUSH"
```

```
                              DEFAULT SPECIFICATION  # 1   c:\mel2\ser2
Collect subject information for data logging yes
Path to Setup,Run,Makedat,Analyze \mel2
Does your screen flicker on displays (IBM CGA video adaptor) no
Independent variables Minimum 0      Maximum 31
Maximum value for dependent variable RT 32767 Maximum value for QANSWER 10
Insert Type:  Block  Trial/Question/Text  Frame     User     Subject   Misc
# of slots    5            5              5         10        5        5
# chars/slot  240          240             80        80        40       15
Length of tone for incorrect responses 500   Length of feedback display 1000
Generate as an INCLUDE file no             Run file name run.exe
Clear on feedback yes     At frame execution set CapsLock low and NumLock num
Time resolution 1         Run limit inserts no
Counter balance none      Balance category number 255
Graphics mode             Warn on duration not multiple of refresh time yes
Auto answer no            Subject init options #s
Overlay FORM with RUN yes  Max questions allowed per questionnaire 100
Minimum value for QANSWER 0
End report log  Wait type exclude  Sound device speaker
```

Appendix B

PARTICIPANT INFORMATION SHEET

Please fill out the following:

NAME:_____

PHONE #:_____ E-MAIL ADDRESS:_____

1st LANGUAGE LEARNED_____

SPEAK: (Circle One) YES NO

WRITE:(Circle One) YES NO

2nd LANGUAGE LEARNED_____

AGE OF ACQUISITION: (include specific age)

Pre-School	Elementary School	Secondary School
(less than 4)	(between 4 and 13)	(more than 13)
_____	_____	_____

SPEAK: (Circle One) YES NO

WRITE:(Circle One) YES NO

PREFERRED LANGUAGE _____

OTHER LANGUAGES IF ANY:_____

LANGUAGE SPOKEN AT HOME: FRENCH___ ENGLISH___OTHER___

This section will be filled by the experimenter

PASSED ORAL LANGUAGE FLUENCY TEST: YES NO

Education: Elementary French __ English __ Other __

Secondary French __ English __ Other __

Post-Secondary French __ English __ Other __

PARTICIPANT #:_____TEST VERSION_____