User's Manual for

Micro-LADS

Mary Sweig Wilson, Ph.D.
Bernard J. Fox, M.S.

Laureate
Learning
Systems, Inc.

110 East Spring Street • Winooski, VT 05404 • (802) 655-4755

This manual and the accompanying software are copyrighted. All rights are reserved by Laureate Learning Systems, Inc.

The program is intended for use only by the original purchaser and only on the computer system specified. Lawful users of this program are hereby licensed only to read the program from its medium into the memory of a computer solely for the purpose of executing the program. Copying, duplicating, selling, or otherwise distributing this product is not permitted. Each Micro-LADS disk has been registered to assist us in the prosecution of offenders.

No part of this manual may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, microfilming, recording, or otherwise without prior written consent from Laureate Learning Systems, Inc.

Laureate Learning Systems, Inc. makes no warranties, either express or implied with respect to this manual or with respect to the software described in this manual, its quality, performance, MERCHANTABILITY, or FITNESS FOR ANY PARTICULAR PURPOSE. Laureate Learning Systems, Inc. software is sold or licensed AS IS.

IT IS ILLEGAL TO MAKE UNAUTHORIZED COPIES OF THIS SOFTWARE.

This software was produced through the efforts of many people: special educators, designers, artists, programmers, and other dedicated workers.

The costs of developing this and other software programs are recovered through software sales. The unauthorized duplication of personal computer software raises the cost to all legitimate users.

This software is protected under federal copyright law. It is illegal to make or distribute copies of this software. Duplication of this software is a federal crime. Penalties include fines of as much as $50,000 and jail terms of up to five years.

Laureate Learning Systems, Inc.,
as a member of the Software Publishers Association (SPA), supports the industry's efforts to fight the illegal copying of personal computer software.

Report copyright violations to:
SPA, 1730 M Street, NW, Suite 700
Washington, DC 20036
(202) 452-1600

Copyright © 1984-1992 Laureate Learning Systems, Inc. All rights reserved.

Laureate Learning Systems, Inc.
110 East Spring St.
Winooski, VT 05404
(802) 655-4755

Printed in U.S.A.
Rev. 6.94
ISBN # 1-924884-26-6

Apple II and Apple IIGS are registered trademarks of Apple Computer, Inc.
TouchWindow is a trademark of Edmark Corp.
Echo II, Echo +, Echo IIb, Echo IIC, and Cricket are registered trademarks of Echo Speech Corp.

TABLE OF CONTENTS

Preface

The *Microcomputer Language Assessment and Development System* (*Micro-LADS*) provides tutorial training as well as testing on a broad range of grammatical constructions. *Micro-LADS* uses colorful graphic stimuli, exciting animation, speech and/or text to train syntactic comprehension.

A wide range of children can benefit from using *Micro-LADS*. Children who have reached the cognitive age of two but have not yet begun inducing the grammatical rules covered in the programs can benefit regardless of primary disability or classification. For youngsters with mental retardation, *Micro-LADS* can provide the patient, yet encouraging support needed to acquire the constructions. Preschoolers with language-learning disabilities will enjoy the excitement of learning with *Micro-LADS*. Children with autism can also profit from instruction which is machine rather than human delivered.

The Single Switch mode makes the program accessible to youngsters with severe/profound physical disabilities. By adding text onto the screen and then eventually removing the auditory prompting and instruction, you can use *Micro-LADS* to help Specific Learning Disabled (SLD) children through the early reading acquisition stages. *Micro-LADS* can provide invaluable training for children with hearing impairments. Since the text used in the program is large, many children with visual impairments can use the program as well. Clinicians will find the program useful in working with patients with aphasia and closed head trauma. You can also use *Micro-LADS* with children learning English as Second Language (ESL).

This manual covers the technical and instructional aspects of using *Micro-LADS*. It familiarizes you with the system and provides a step-by-step tutorial. A rationale for the approach and training techniques

used in *Micro-LADS* are included along with suggestions for instructional applications. Reference appendices provide listings of all the stimulus sentences, the construction menus from all seven diskettes and vocabulary summaries.

Many people contributed to the development of *Micro-LADS*. We would like to thank them all. We especially want to recognize the contributions of Ann Peery, the senior programmer for this project, and Phil Peery for graphics and animation. Finally, we want to thank all the clinicians and clients who have helped us develop and test the program from prototype to final product.

Chapter 1
GETTING STARTED

Micro-LADS is a seven diskette series of programs that trains over 46 fundamental syntactic constructions. Colorful illustrations and the options of speech, text, and/or animated characters provide a multisensory environment and a proven approach to syntax remediation. *Micro-LADS* consists of this manual, seven diskettes, the Registration Card, and an Apple IIGS Troubleshooting Guide.

Fill Out Your Registration Card!
Take a moment to fill out the Product Registration card. This allows you to take advantage of our replacement policy. We will replace a damaged diskette free of charge within one year of purchase. By registering, you also enable us to keep you informed of updates and other important information.

To run *Micro-LADS* you need the following equipment:

- Apple II microcomputer (64K minimum)
- One 5 1/4" Disk Drive
- Monitor (color preferred)
- Printer (optional)
- Echo Speech Corp. speech synthesizer (Echo II, Echo +, Echo IIb, Echo IIc, or Cricket)

■ Setting Up

We will assume that your computer system is set up according to the manufacturer's recommendations. If you need to install the speech synthesizer, please refer to the manual which accompanies it.

■ Starting Micro-LADS

To start the program, you must insert a diskette into your disk drive. For the purposes of the tutorial in Chapter 2, we will be using Diskette 1. However, you may use any of the 7 *Micro-LADS* diskettes.

1. Check to see that the small door on the disk drive is up. If you have two disk drives, use Drive 1.

2. Remove the diskette from its jacket by grasping it with your thumb on the label side. Don't touch any portion of the recording surface which is exposed through the holes in the protective black jacket.

3. Hold the diskette level with the label side up and gently insert it all the way into the drive.

4. Now gently close the disk drive door. If the door doesn't close easily, lift it up and try reinserting the diskette. If you force the door closed on a diskette that is not properly placed, you can permanently damage it.

5. If the computer is off, turn it on. You should refer to the Apple II Reference Manual for proper starting instructions when the computer is already turned on. The disk drive will start whirring and the "In Use" light will be lit. After a few seconds, *Micro-LADS* Title Page will appear on your screen.

■ If Micro-LADS Doesn't Start Up

Have a problem? Here's what to do.

1. Check to see that the disk drive door is closed.

2. If it is and nothing is happening, check the power. Be sure all your cables are connected. Turn your equipment off if you are correcting cable connections.

3. If you are using an Apple IIGS, please refer to the Apple IIGS Troubleshooting Guide which accompanied this product.

4. Still not working? You may want to refer to your equipment manuals for more information or look for assistance. You can give us a call at (800) 562-6801 and we'll do our best to help you.

When you have the Title Page on the screen, go on to Chapter Two, The Tutorial.

Chapter 2
THE TUTORIAL

This chapter provides an overview of the Microcomputer Language Assessment and Development System (Micro-LADS) and guides you through a hands-on tutorial.

■ Overview

Each of the seven Micro-LADS diskettes tests and trains auditory and/or reading comprehension of different grammatical constructions. There are seven diskettes covering the grammatical constructions shown in the following table.

Diskette 1. Plurals and Noun-Verb Agreement
Noun Plurals (Regular Nouns)
Noun-Verb Agreement (Has/Have)
Noun-Verb Agreement (Regular Verbs)

Diskette 2. Verb Forms
Present Progressive
Simple Present
Future (Modal Will)
Regular Past (-ed)

Diskette 3. Prepositions

In	Behind
On	Next To
Under	In Front Of

Diskette 4. Pronouns

Subjective	Objective	Possessive
He	Him	His
She	Her	Her
They	Them	Their

Diskette 5. Negatives
Negative Determiner "No" (Has No)
Negative Transformation (Is Not)
Negative Transformation (Are Not)
Negative Transformation (Does Not Have)

Diskette 6. Deictic Expressions, Passive, and Wh- Questions
Deictic Expressions
This, These/That, Those, Here/There
Passive
Present Passive
Wh-Questions
Who/What

Diskette 7. Prepositions II

Between	Behind
In Front Of	Beside
Above	Below
On	

Table 1. Constructions covered in Micro-LADS

Normally developing children acquire listening comprehension of these constructions between the ages of 2 and 5. The ability to read these constructions develops by third grade. When using Micro-LADS, speech alone can first be paired with the graphic stimuli. As auditory comprehension develops, text can be added to the screen. Finally, when the child has mastered the constructions aurally, the speech component can be turned off and Micro-LADS can function as a reading comprehension program.

Each construction is presented in a set of either two or three (depending on which of the 7 diskettes you are using) pictures on the screen. Each picture in the set illustrates a grammatical construction. There are at least ten picture sets available for each construction.

Two major response modes are available - Direct Select and Single Switch. In the Direct Select mode, you can use the keyboard, game controller or Touch

Window to indicate a choice. In the Single Switch mode, the user indicates a choice when the scanning bar is under the desired picture. You can input a response by depressing the <SPACE BAR>, a game controller button or an individualized single switch plugged into the game I/O port. The instructor specifies the Scan Speed desired. In either mode, the instructor can set the length of time the program waits for a response before moving on to the next stimulus. Stimuli can be presented with large size text alone, speech alone, or with both text and speech. The animated reinforcement characters can be turned on or off.

There are three levels of instruction used in training. The first level uses instruction and a visual cue to the correct response. On the second level, the visual cue is faded and on the third level instruction is faded. Instructors can choose to train on any one level or set the program to branch among the levels. You also set the criterion the student needs to meet to move up to the next level and/or to end the lesson. Animated characters at the top of the screen indicate what level a child is on. A response counter in the upper right hand corner indicates how many more correct answers a child needs to complete the current level. These elements provide an attending incentive.

Responses are followed by Knowledge of the Correct Response (KCR). In KCR, the learner is always made aware of the correct answer either through reinforcement following a correct response or information feedback following an incorrect response. Following the first error response, a cue marks the correct picture and reprompting is provided. If a second error is made, the correct response is isolated on the screen and instructional feedback is provided.

Incorrect answers are subtracted from the number of correct answers on the response counter. If working on more than one level, a child is dropped back a level after making a specified number of errors. If the child reaches criteria at the highest level of training (and

the animation is on), a final animated sequence signals successful completion of the lesson. At the end of the program, a Lesson Summary reports student performance and can be printed out for record-keeping.

■ Hands-on Tutorial

By now you have your computer powered up. Chapter 1 left you with the Title Page on the screen. If you haven't gone through Chapter 1 yet, please take the time to do that now. For the purposes of this tutorial, we are using Diskette 1, but you may use any of the seven *Micro-LADS* diskettes.

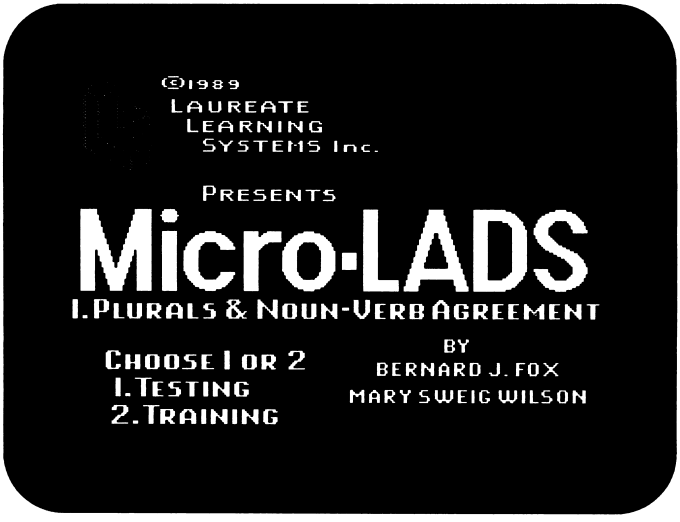


Figure 1. Title Page

As you can see from the Title Page, you can choose "1.Testing," which can be used for pre and post training measurement or "2.Training." For this tutorial, please press <2> and we will go through the menus. If you loaded Diskette 1, the menu shown in Figure 2 will be presented.

■ Selecting a Construction

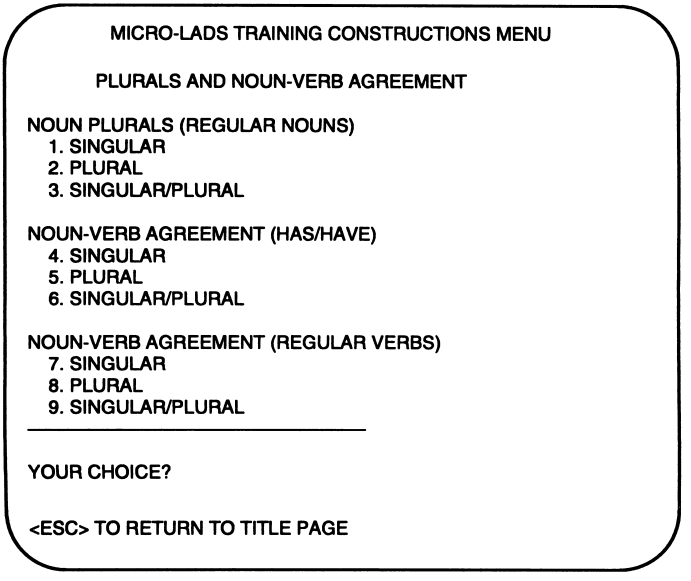


Figure 2. The Constructions Menu

On Diskette 1, 6 grammatical constructions are covered: Singular and Plural Nouns, Singular and Plural Noun-Verb Agreement with Has/Have, and Singular and Plural Noun-Verb Agreement (Regular Verbs). You can choose to have each of the three picture sets presented in three different ways. You can choose to instruct on singular forms, plural forms, or both singular and plural forms combined. All the Micro-LADS diskettes offer similar choices. Construction Menus for all seven diskettes can be found in Appendix B. Micro-LADS uses hundreds of stimulus sentences. In Appendix C, you will find a complete listing of them for all of the diskettes.

To make a choice from the Constructions Menu, you enter the number which corresponds to the construction presentation you want. You need not press <RETURN> as the program is designed to move on after a number has been entered. For menus which provide more than 9 options, you may note a slight delay before the program displays the next menu.

This delay is intended to provide enough time for you to enter two digits, like the number 10 or 12.

If you want to change from Training to Testing, you can press <ESC> to return to the Title Page. However, at this time please choose one of the constructions and you will move on to the Parameters Menu. For the purpose of this tutorial, we will be training Noun-Verb Agreement Singular/Plural on Diskette 1. If you are using Diskette 1, press <9> now. If you are using another Micro-LADS diskette, choose the number of the construction you wish to train.

■ The Parameters Menu

The Parameters Menu (Figure 3) allows you to specify how the lesson will be presented. Number 1 shows the construction you have chosen to be trained. The remaining parameters are set to default values appropriate for a fairly broad range of learners. To customize the lesson to the specific needs of a student, you can change Parameters 2 through 0.

```
1 TO RUN, 2-0 TO CHANGE PARAMETERS

1. RUN ..... (NOUN+VERB: SINGULAR/PLURAL)
2. VOICE &/OR TEXT ..... (BOTH ON)
3. INTERFACE ..... (Direct Select/KB)
4. SCAN SPEED ..... (—)
5. RESPONSE TIME ..... (5)
6. # CORRECT TO ADVANCE ..... (3)
7. TRAINING LEVEL TO END ..... (3)
8. CRITERION TO END LESSON ..... (9/10)
9. ANIMATION ..... (ON)
0. DISCOURSE REVIEW ..... (ON)

YOUR CHOICE?

<?> FOR DESCRIPTION OF PARAMETERS
<ESC> TO RETURN TO CONSTRUCTIONS MENU
```

Figure 3. The Parameters Menu

We will now go through these parameters in detail. If you would like an on-screen explanation of any of the parameters, press <?> and the number of the parameter you want described.

1. RUN...
Parameter 1 is used to start the program. The construction you have chosen is indicated. If you change your mind, you can press <ESC> to return to the Constructions Menu and choose a different construction. If you press <1> at this time the program will run at the default values we have set. If you want to change any lesson parameters, you must do so before pressing <1>.

2. VOICE &/OR TEXT...
If you have an Echo Speech Synthesizer plugged in, Option 2 will indicate that both voice and text are on. If you would like the voice on but no text to appear, press <2> for (VOICE ONLY). If you would like the text to appear without speech, press <2> again for (TEXT ONLY). To set both voice and text on, press <2> a third time to return to the original setting (BOTH ON). With non-readers you may want the text off whereas for early readers you might want both the voice and text on. To use Micro-LADS to improve reading skills, you may want to turn off the voice and only use text.

If you do not have an Echo Speech Synthesizer plugged in, the Option 2 setting will default to (TEXT ONLY) and cannot be changed.

3. INTERFACE...
Micro-LADS offers two major interface modes, Direct Select and Single Switch.

With the Direct Select mode, you have several options:

• **Direct Select/KB (Keyboard)**
Direct Select/KB (Keyboard) is the default interface. Using the keyboard as an interface, you use the left and right arrow keys to move the indicator bar to the picture. Once the bar is under the picture of choice, press the <SPACE BAR> or controller button to record that choice.

• **Direct Select/GC (Game Controller)**
If you have a game controller plugged into the game paddle I/O port, press <3> and the interface mode will change to Direct Select/GC (Game Controller). This option will not appear on the menu unless you have a game controller connected to the computer.
The game controller can be used to move the indicator bar. To select the picture of your choice, press the game controller button. If you have more than one game controller plugged in, the program will detect which one you will be using. It will not be sensitive to input from other controllers. You can use game paddles, joysticks, track balls, or any other controller plugged into the game port.

• **Direct Select/ TW (TouchWindow)**
If you have a TouchWindow plugged in, press <3> again and the interface mode will change to Direct Select/TW (TouchWindow). This option will not appear on the menu unless you have a TouchWindow connected to the computer.

The TouchWindow can be mounted on your monitor with velcro. Using the TouchWindow, you simply touch the screen to enter a response. If you choose this option the program requires that you calibrate the screen. Two points are presented in succession for you to touch. This input provides information on the location of the touch screen in relation to the monitor screen.

In the Single Switch mode, an indicator bar scans from one picture to the next. You indicate your choice by pressing the <SPACE BAR> when the indicator bar is under the picture you want. In this mode, the program will also accept input from a single switch plugged into the game I/O. Many commercially available single switches are appropriately wired to plug directly into the Apple's game paddle port. If you plan to build your own single switch, Appendix A gives a circuit diagram that will help you connect the switch to the computer. If you are not familiar with this type of work, please leave it to the experts.

Press <3> to select the interface of your choice.

4. SCAN SPEED...
Option 4 is only operational if the interface mode chosen is Single Switch. Scan Speed is the amount of time the indicator bar remains under one picture before moving. You can set the Scan Speed from 1 (fast) to 10 (slow). The default setting is 3, which means the bar will remain under a picture for about one second before moving on to the next picture.

5. RESPONSE TIME...
Option 5 lets you set the amount of time the program will wait for the child to respond before it moves on to the next stimulus presentation. You can choose among values ranging from 1 (short) to 10 (long) or 0 to have the program wait indefinitely. In the Single Switch mode, basically what you are setting is the number of times each picture will be scanned before the program provides KCR and goes on to the next stimulus presentation. Since you are setting the number of times each picture will be scanned both before and after cuing, Response Time in the Single Switch mode is related to Scan Speed. The slower the Scan Speed, the longer it will take to scan the pictures the specified number of times. To change the Response Time, press <5> and you will be asked to enter a number from 0 to 10.

6. # CORRECT TO ADVANCE...
Option 6, in combination with Options 7 and 8, allows you to determine whether you want the student to work continuously on one level or branch among the levels. If you want the student to branch among the levels, Option 6 is used to set the number of responses the child has to answer correctly before moving up to the next level. If you want the student to work on only one level, set Option 6 to 0 and the program will automatically begin at the Training Level to End (see Option 7).

To change this parameter, press <6> and you will be asked to enter a number from 0 to 10. We have set the default parameter to 3. This means that after 3 correct responses, the child will move up a level. While the correct responses do not have to be consecutive, wrong answers do cancel out correct responses. Thus, when an error is made, one answer is subtracted from the total number of correct answers to that point.

7. TRAINING LEVEL TO END...
With Option 7, you choose the highest training level you want the student to complete before the lesson ends. If you want the student to work on only one level, choose that level and set Option 6 to 0. If you want the student to branch among the levels, set this option to 2 or 3 and the program will begin at Level 1 and move up to Levels 2 and/or 3 after the student has attained the # Correct to Advance (1-10) that you specified with Option 6.

If branching, the program is set to drop back a level if the student makes so many errors that s/he will not meet Criterion to End Lesson (see Option 8). In addition, if the Training Level to End is set at 3 and the student makes 3 errors on Level 2, the program is set to drop back to Level 1.

Press <7> and you will be asked to enter a level to end (1-3).

8. CRITERION TO END LESSON...
This option allows you to set criterion for the Training Level to End that you have chosen in Option 7. Criterion can be set between 5 and 10. We have set the default value to 9 or 90% correct. The program is designed to drop back to the previous level if the child has made so many errors that s/he will not reach criterion in that set presentation. With criteria set at 9 a child will be dropped back to the previous level if 2 errors are made in the set presentation. This assures that a child will not face continued failure in training.

If a student meets criterion, the program continues until the entire set of stimulus has been presented and then displays the Lesson Summary. If a student is only working on one level and does not meet criterion, the program will continue until all 10 stimulus items have been presented and then present 10 more stimulus items.

9. ANIMATION...
Option 9 enables you to turn the animated characters on and off. While the animated creatures provide stimulating reinforcement for younger children, you may decide that it is more appropriate to turn the animation off when using Micro-LADS with older students or adults. Press <9> to turn the animation off or on again.

When the animation is turned on, different characters provide reinforcement and entertainment on each of the seven diskettes. Our silly, bouncy, green Blob featured in our *First Words* program sets a racing theme for the first diskette. The Blob introduces each of the new characters on the remaining six diskettes. The Verb Forms diskette features Robo. The Prepositions diskette has a little dancing clown, Coco. On the Pronouns diskette, Biggo is the star. On the Negatives diskette, three little Spectos mark levels while the Monster Blob provides reinforcement. Spotto is the character created for Diskette 6. And on the final diskette, Rocko provides the fun.

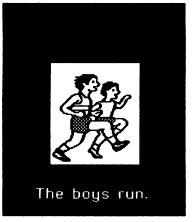
0. DISCOURSE REVIEW...
Option 0 allows you to decide whether you would like the construction reviewed in a discourse context before training begins. The Discourse Review enables the student to hear the correct syntactical structures in a natural conversation format before being asked to choose responses. Press <0> to turn the Discourse Review off or on again.

■ Running a Lesson

Before running the program, check the parameter values you have set. If you would like to change any of the parameters, please do so now. To use our default settings, refer to Figure 2 and set your parameters accordingly. For the purpose of this tutorial, please set # Correct to Advance to 2 so we quickly go through level changes. Set Training Level to End at 3. You can set Criterion to End Lesson to any value from 5 to 10. (Remember, though, that you will have to get that number correct in a Level 3 set of 10 stimuli to finish the program.) Make sure Animation and Discourse Review are On. Now, press <1> to run the program.

The program will load in and wait. When prompted, press the <SPACE BAR>, game controller button, or individualized switch to start the program. The program will begin by introducing the constructions in a discourse context. Following is the Discourse Review for the constructions we have chosen: Noun-Verb Agreement with both singular and plural subjects.

What does the boy do?
The boy runs.
When there is only one, we say "runs."



What do the boys do?
The boys run.
When there is more than one, we say "run."

The same pictures are used for the Discourse Review each time. However, when you are training or testing, pictures within each set are randomly presented. A transcript of the Discourse Reviews can be found in Appendix D.

After the Discourse Review is completed, a single stimulus picture will be presented and you will be told what it is. It may or may not be one of the stimuli used in the discourse review since the stimuli are randomly presented. Following instruction, two or three (depending on which Micro-LADS diskette you are using) grammatically contrasting pictures will be presented and you will be asked to choose the correct one. Note the animated orange cue marker over the correct answer.

Please choose the correct answer. Note the response counter in the right hand corner. It tracks responses (chosen on the first try) and shows how many more correct answers you need to move up to the next level. Notice that your correct answer was added to the response counter. Make another correct choice. Since we have set the # Correct to Advance to 2, the character will not only reinforce you, but you will also move up to Level 2. On Diskette 1, this is indicated when the Blob places the checkered flag in the left hand corner of the screen. Each of the other 6 diskettes has its own distinct character who signals level changes using different objects.

On Level 2, instruction is included but the cue is removed. Make an error this time. The correct picture will flash and the cue marker will appear above it. This prompts the child to the correct response. We have termed this Cuing of the Correct Response (CCR). Make another error and you will be provided with corrective feedback in the form of KCR. On Level 2, we have set the program so that if you make three errors, you will drop back to Level 1. This would be indicated by the character's removal of the level marker in the left hand corner.

Give two correct responses this time so we can move up to Level 3. You will note that on this level the only instructional technique used is feedback. At this time, you may want to experiment with the program to see what happens when you give correct and incorrect responses. If you make so many incorrect responses that you will not meet the Criterion to End which you set, you will move down to Level 2. If you meet the Criterion to End that you set, you will see the final animated routine.

To end the program, you must either meet the Criterion to End you set for the Training Level to End or press <CONTROL>-C. Either of these conditions will exit the program to the Lesson Summary.

■ The Lesson Summary

Below is the first page of a sample Lesson Summary from Diskette 1.

```
MICRO-LADS:
      PLURALS AND NOUN-VERB AGREEMENT
LESSON SUMMARY

NOUN-VERB AGREEMENT (REGULAR VERBS)
   9. SINGULAR/PLURAL

VOICE &/OR TEXT ---------- (BOTH ON)
INTERFACE ---------- (DIRECT SELECT/KB)
SCAN SPEED ---------- (—)
RESPONSE TIME ---------- (5)
# CORRECT TO ADVANCE ---------- (2)
TRAINING LEVEL TO END ---------- (3)
CRITERION TO END LESSON ---------- (9/10)
ANIMATION ---------- (ON)
DISCOURSE REVIEW ---------- (ON)

                  SINGULAR      PLURAL
LEVEL I             0/0          2/2
LEVEL II            1/2          1/1
LEVEL III           4/5          5/5

      PRESS <SPACE BAR> TO CONTINUE
```

Figure 4. The Lesson Summary

In this example, you can see that we were using the Plurals and Noun-Verb Agreement Diskette and that we trained Noun-Verb Agreement (Regular Verbs) Singular/Plural which was Option 9 on the Training Constructions Menu. The parameter values we set are also shown. We kept the default values for most of the parameters. We set # Correct to Advance to 2 and you made you own criterion choice. Below the review of parameters, you see a response summary for the three levels. The number correct is displayed along with the total number of presentations (correct/number presented). If you press the <SPACE BAR> at this time you will see the second page of the Lesson Summary.

FINAL LEVEL
CONSTRUCTION SCORES

	CORRECT/PRESENTATIONS SINGULAR	PLURAL
BOY/RUNS		Y
GIRL/DRINKS		Y
BOY CLIMBS	Y	
BOY/PAINTS	Y	
PLANE/FLIES		Y
BOAT/SAILS	N	
GIRL/DANCES	Y	
BOY/CLIMBS TREE		Y
DUCK/SWIMS	Y	
GIRL/SITS ON COUCH		Y
TOTALS	4/5	5/5

DO YOU WANT A PRINTOUT? Y/N

Figure 5. The Lesson Summary

On this page, complete stimulus data is shown for the final level (Training Level to End) that you set. This detailed account of responses is only displayed if you met criterion or if you exited after reaching the Training Level to End. If you exited the program before reaching the Training Level to End, no scores will be reported here. Correct responses are indicated with a Y and incorrect responses with an N. Total correct responses out of the number of presentations is shown at the bottom.

■ Lesson Summary Printout

At the end of the Lesson Summary, you are asked "Do you want a Printout? Y/N."

If you don't have a printer:
If you do not have a printer and you would like a record of the student's Lesson Summary, you must hand copy the data from the screen. When you are finished, type <N> and the program will return you to the Title Page. If you type <Y>, the program may hang while it searches for a non-existent printer.

If you have a printer:
If you have a printer, make sure it is plugged into Slot 1 in the case of the Apple II+, IIe and IIGS or the printer port on the IIc or IIGS. Type <Y> to get a printout.

The program asked you for a name, the date and a comment. You can actually enter up to 7 lines of any information to be included on the printout. You might want to include remarks about attending behavior, suggestions for the next day, or a special note of praise. This information will appear at the top of your printout.

After typing in the identifying information, press <RETURN> to start printing.

When the printout is complete, you will be asked if you want another printout. You can print out as many copies of the report as you want, entering up to 7 lines of information each time. When you have made all the copies you want, type <N> to return to the Title Page.

Chapter 3
BACKGROUND, RATIONALE, AND INSTRUCTIONAL USE

Over the past two decades, language intervention programs have increasingly been based on normal developmental sequences and proven instructional strategies. The *Microcomputer Language Assessment and Development System (Micro-LADS)* is based on linguistic theory, developmental psycholinguistic research, and instructional technology. *Micro-LADS* was designed for integration into a total language intervention program. Using the computer to provide receptive tutorial instruction frees professionals to provide services that demand human instruction such as interactive expressive treatment, advocacy and consultation.

Only recently has there been intensive study of assessment and intervention procedures for ameliorating language disorders in children. In the fifties, experts in communication disorders spoke of "speech delays" (Van Riper, 1954). This was consistent with the linguistic descriptions of language that were popular at that time. The American structuralists described language acquisition as what was to be learned- phonology, morphology, and finally syntax. In other words, children learned sounds, then learned to string them together into words and finally produced sentences. The process by which this occurred was explained by American behaviorists (Skinner, 1957; Staats & Staats 1963). Parents were assumed to teach their children language using principles of operant conditioning.

In the late fifties, the publication of Noam Chomsky's *Syntactic Structures* (1957) sparked a revolution in linguistic theory and subsequently in the fields of psycholinguistics and communication disorders. Chomsky (1957, 1965) proposed that syntax was central to explaining language. In *Aspects of the Theory of Syntax*, Chomsky (1965) further proposed

that children come to the language acquisition task with innate universals concerning the nature of human languages. The revolution in linguistics and Chomsky's postulation of a uniquely human language acquisition system sparked interest in child language development.

One of the first psycholinguistic books published after *Aspects* focused on language acquisition and the debate between behaviorists and transformational grammarian trained psycholinguists. *The Genesis of Language* (Smith & Miller, 1966) begins with a classic chapter by McNeill in which he argues for the existence of the innate mechanism Chomsky postulated. McNeill renamed it the Language Acquisition Device (LAD). This is the term that has become accepted. We wanted to incorporate this acronym into *Micro-LADS* to signal our belief in the unique properties of the human brain regardless of handicapping condition.

For a period in the late sixties and early seventies generative semantics emerged to challenge the tenets of Chomsky's (1965) Standard Theory Generative Grammar. Generative semanticists (Fillmore 1968; Lakoff 1971; McCawley 1968) proposed that semantic relations, not syntactic relations, formed the critical underlying or deep structure bases of sentences. Thus, standard theory and extended standard theory viewed the semantic component as interpretive while the generative semanticists viewed it as forming the base of sentences. The generative semantic theoretical challenge was soon overcome although the impact it had on related fields such as language intervention is still evident. In the field of linguistics itself, however, by 1980 Newmeyer was able to make the following statement: "Today many of these hypotheses have no public adherents at all, and the term 'generative semantics' itself evokes nostalgia rather than partisan fervor" (Newmeyer 1980 p. 133).

While linguists argued over the form of the language, psycholinguists carried on their own battles over how language was acquired. The debates between behav-

iorists and Chomsky followers were soon joined by the adherents of Piaget. He, like Chomsky, believed in uniquely human cognitive capacities or universals. Unlike Chomsky, however, he rejected the notion of unique linguistic universals or a LAD[1]. By the mid-seventies there seemed little doubt in scholars' minds that the child brings much to the language acquisition task. In no way can the human brain be viewed as a Tabula Rasa when it comes to language learning. While the form of the particular language is determined by the child's linguistic environment, the processes utilized in inducing linguistic structures are largely influenced by genetics. By this time there were no theorists left to argue for a strictly behavioral view of language learning although applications within education based on this premise existed (and still do today).

A burgeoning interest in child language research followed quickly upon the theoretical psycholinguistic debates on language acquisition. Classical books (Bloom 1970, 1973; Brown 1973; Menyuk 1969, 1971) as well as numerous studies published in the sixties and seventies helped us to understand normal developmental sequences. This assisted us in the design of language intervention progressions which have a solid research foundation.

While behaviorism was struck a fatal blow in explaining the processes primarily responsible for normal language acquisition, principles of behavioral analysis are important in the instructional design of language intervention programs. For a child to grasp a concept, be it semantic or syntactic, attention to the task is crucial. Failure and boredom will both result in non-attention. Behavior analysis has taught us errorless

---

1. Readers with a particular interest in the theoretical differences between Chomsky and Piaget might enjoy reading *Language and Learning* (Piattelli-Palmarini 1980) which records the 1975 debate between these two great thinkers.

learning principles which entail cuing and small steps (Holland & Skinner 1969). Ferster & Skinner's classic *Schedules of Reinforcement* (1957) enlightened us on when to reinforce to maintain attending behavior. The behavioral principles utilized in video games helped us to understand the motivational principles in keeping kids working (Malone 1980).

Micro-LADS is based on generative grammar and normal developmental progressions. It utilizes proven instructional techniques derived from the analysis of behavior and experimental research.

Normal functional use of language requires linguistic rule knowledge. While the ultimate goal of language intervention is the most normalized use of language in speaking and listening, language-disordered children still need programming to acquire the linguistic code of the language. In responding to an article by Muma (1975) which stressed the pragmatic aspects of communication, Shewan wrote:

> "Most children who come to a clinic with language problems, however, demonstrate difficulties with the linguistic system itself... Consequently language intervention must be concerned with linguistic competence and performance... Accordingly, language-disordered children must develop some language before therapy can be directed to effective communication. The initial focus of language training with these children would be on language understanding and formulation." (1975 p.311)

More recent research tends to support Shewan's position. Studies have begun to accumulate which suggest that when language impaired children are linguistically matched with normally developing peers, they may not be as pragmatically deficit as was once believed.

Fey and Leonard (1984) reported on the pragmatic abilities of Specific Language Impaired (SLI) children.

They found that their SLI children were as assertive as the matched normally developing samples. The SLI children did not evidence pragmatic impairment insofar as initiating conversations. In fact, the SLI children's ability to adapt their speech based on the age of the partner was at times greater than that of the normally developing younger children. As in previous studies, the main characteristic of the SLI group was deficient expressive syntax, not deficit pragmatic abilities.

Interestingly, the mastery of syntax seems to be the most difficult of tasks for the language- impaired child. A number of researchers have spoken about the problematic nature of syntax mastery in language-impaired children (Lee 1966; Leonard 1972; Menyuk 1964). Language- impaired children may use constructions over which they do not have mastery. Consistent good use of structures separates language-impaired children from their normally developing peers. In one study (Wilson 1979), thirteen normal and thirteen language-impaired children were matched for expressive *Northwestern Syntax Screening Test* (NSST, Lee 1969) scores. Their expressive language abilities were subsequently assessed via elicited imitation and spontaneous elicitation procedures. Results indicated that only the spontaneous score based upon consistent use of structures (mastery) differentiated the two groups.

A critical component of any language intervention program should be receptive instruction. While less is known about comprehension development than expressive development, authorities agree that in any general sense receptive abilities precede and exceed expressive performance. That is not to say that in certain cases one cannot find a rule that appears in production before it is fully comprehended. The specific relationship between comprehension and production has not been delineated.

The normally developing child begins combining words between eighteen and twenty-four months of

age. Although some infant language screening checklists indicate that children at this age have relatively small lexicons, a review of the literature reveals this is not the case. When the child begins combining words, s/he has a rich lexicon. In 1975, Levasseur collected language samples from sixteen children over a six-hour time period. These normally developing children were starting to combine morphemes. The mean expressive vocabulary size for the group was 134 words with a median of 112. In summarizing four other studies reporting vocabulary size in relation to the emergence of two-word utterances, Levasseur obtained a mean of 140 words. This would suggest that by the time two word utterances emerge the child has an expressive lexicon of fifty or more words. As receptive vocabulary level exceeds expressive, one can assume the child understands a much larger number of words.

Micro-LADS uses an extensive vocabulary (Appendix D) to introduce the various grammatical constructions. This is important not only for the induction of the syntactic rules across semantic contexts, but also for vocabulary acquisition. As the child begins acquiring syntactic structures, vocabulary growth accelerates.

Before children's Mean Length of Utterance (MLU) reaches 2.0, they begin to acquire rules embodied in adult grammar. Although children's early syntactic utterances have been characterized as combinations of uninflected content words such as nouns, verbs and adjectives, a careful review of the literature reveals early evidence of grammatical markers. Brown (1973) noted that when MLU is below 2.0, the majority of the child's combinations are of the content-content word form (i.e. roll ball, big dog, Mommy shoe). An examination of his data, however, reveals that even in this earliest stage some articles, inflections, prepositions, and other functors can be found (p. 80).

In analyzing spontaneous language samples 100 utterances in length, Wilson and Wishkin (1977) found that all sixteen of their normally developing

subjects used two or more grammatical morphemes. These subjects were all in Brown's Stage I. Their MLUs ranged from 1.07 to 1.57. Among the grammatical morphemes noted were the prepositions "in" and "on." In a more recent longitudinal study of a single subject, Engle and Wilson (1979) reported that for their subject, grammatical morphemes were used frequently at an early stage of development. Multi-morpheme utterances of the form content plus content word were not used as frequently as previously reported for other subjects in the beginning period of word combinations. A second study of another child's language development during the early stages of multi-morpheme utterances yielded similar results (Spaulding 1980).

Some of the grammatical constructions covered in *Micro-LADS* begin emerging early in the two word utterance stage ("in", "on", and noun plurals). This would suggest that receptive exposure to these constructions could be introduced when the language-impaired child's expressive lexicon is approaching fifty words even if s/he has not begun combining words. Since the language impaired child characteristically has difficulty inducing grammatical rules, an early emphasis on these grammatical constructions is warranted. The evidence from studies of normally developing children suggests that even the earliest period of multi-morpheme utterances is not devoid of grammatical morphemes.

According to Brown (1973), the main period of base rule development occurs during Stage II (MLU 2.0-2.49). He describes this stage of grammatical development as one in which constructions increasingly reflect mastery of the base component rules. Just as some grammatical morphemes which develop and are mastered in Stage II were present during Stage I, some transformations which develop more fully at later stages are noted in children's utterances during Stage II. Each period of language development contains evidence of utterance forms which will characterize the succeeding stage.

The normally developing child takes a considerable period of time to master the syntactic rules of the language. While most of the base rules covered in *Micro-LADS* are mastered by the time a child is five, there are some restrictions and exceptions to general rules that are learned well past five (Chomsky 1970). In fact, some people never learn all the exceptional and irregular forms in the grammar.

■ Clinical Background

The content and instructional techniques employed in *Micro-LADS* are based not only on the theories and research discussed, but also on more than 20 years of clinical practice. In 1969 a small experimental language group was formed at the University of Vermont. Children were scheduled for language treatment two times a week for both group and individual sessions. While more frequent scheduling would have been desirable, the geographic dispersion of the group made it impossible. Language lessons were constructed each week to focus on various constructions with which the children were having difficulty. The children in the original group could all be classified as SLI. Subsequent groups included children falling into other primary diagnostic categories (i.e. mental retardation, hearing impaired, emotionally disturbed).

By 1971, the lessons had been incorporated into a progression which was then tested on different populations (Vanhoenaker 1971; Strickler 1971). The results of these studies demonstrated the viability of this approach to language intervention. These lesson plans and progressions were subsequently used to develop the *Wilson Initial Syntax Program* (1972). Today, when people accept the uniqueness of our human cognitive abilities, the approach seems conservative. In 1972, however, approaching language intervention from a syntactic prospective was less accepted. The *WISP* is a totally receptive program, yet studies have shown that expressive performance as well as receptive performance improved after comprehension training (Holloway 1972; Wilson 1977; Kendziorski 1978).

These findings of a receptive program effecting expressive increases are consistent with those of other researchers. Studies have shown that modeling or receptive procedures are in fact more effective than imitation procedures in language intervention (Zimmerman & Pike 1972; Harris & Hassemer 1972; Zimmerman & Rosenthal 1974; Courtright & Courtright 1976; 1979). Similarly, receptive training has been found to be effective in second language learning (Winitz & Reeds 1975; Ruder, Hermann & Schiefelbusch 1977). While comprehension training should remain an important component in any language intervention program, most children will also need programming specifically geared to production.

Continued research using the receptive combined with expressive approach to language intervention led to the publication of the *Wilson Expanded Syntax Program* (1976a). The *WESP* consists of 999 picture cards depicting various syntactic functions within a sentence format. The instructor's manual lists suggested receptive and expressive progressions. *Syntax Remediation: A Generative Grammar Approach to Language Development* (Wilson 1977) explicates the theoretical and research basis for the *WISP*, the *WESP*, and in this case, *Micro-LADS*.

As part of this development of clinical intervention strategies, two assessment instruments were also designed. Both grew out of the treatment approach rather than the other way around (Wilson & Charron 1978). Both receptive and expressive assessment procedures were developed. The *Prescriptive Analysis of Language Disorders-Expressive Syntax Assessment and Receptive Syntax Assessment (PALD-ESA & PALD-RSA)* were designed to yield information as to which constructions needed to be programmed in treatment. The *PALD-ESA* (Wilson 1981) analyzes imitative and spontaneous ability on thirty-five syntactic constructions using one echoic and three spontaneous productions for each concept. The test yields three scores: an Imitation Score, a Spontaneous Elicitation Score and most importantly a Mastery

Score where Mastery is defined as having correctly responded to all three spontaneous elicitations. Normative data are provided for children 2;0 to 4;11. The *PALD-ESA* is available through Laureate. The *PALD-RSA* (Wilson 1976) measures syntax comprehension using five exemplars for each rule. Two scores are derived, a total score and a mastery score, where mastery is defined as four out of five correct responses for each construction tested. The *PALD* mastery scores are critical as it is the consistent good use of constructions that differentiates SLI children from their normally developing peers. This is also true for language impaired youngsters with mental retardation.

■ Microcomputer Development Background

The original plan for developing a microcomputer based receptive syntax training program was formulated in 1979. In the spring of 1980 a prototype receptive syntax test was developed. The program consisted of 10 sets of three lexically similar, grammatically contrasting pictures for testing comprehension of "in," "on," and "under." The program was used that summer to conduct a study (Fox 1980) designed to investigate whether children preferred live or computer administered testing procedures. Five normally developing children and 10 language impaired children were tested using the software. The children were asked to choose either a live or computer administered test procedure following exposure to both methods. Only one of the 15 children chose live over computer testing after exposure to both. Further, there was no difference between the live and computer administered scores.

We were not surprised that the children preferred microcomputer over live administered testing. The individualized testing situation is one that is basically uncomfortable for both parties. Skilled testers are aware of this and use strategies to alleviate testing anxiety. The testing environment can best be characterized as a "failure" environment. In assessment, we do not choose tests which include only items we think

the child will pass... administering such a test would be a waste of time from a diagnostic point of view. Rather, we choose tests which will identify where the child fails. Both examiner and child feel uncomfortable when items are missed yet this is the nature of the task. With computer administered testing, all the expectations of the human dyad are removed. The child has not failed to fulfill the computer's expectations... it has none. One need not feel s/he is looking "dumb" to a computer.

While we realized microcomputer administered receptive language testing was a viable option for the future, we were even more interested in pursuing the use of the microcomputer for instruction. We were especially interested in evaluating the effectiveness of instructional feedback techniques. Computer Aided Instruction (CAI) studies using mainframe computers and adult subjects had demonstrated that Knowledge of the Correct Response (KCR) was an effective instructional technique (Gilman 1969; Anderson, Kulhavy & Andre 1971; Tait, Hartley, & Anderson 1973). In KCR, the learner is always given the correct answer either through reinforcement or information feedback when incorrect. We decided to examine this procedure in a speech/graphics program. In addition to KCR, we added a variant, Cuing of the Correct Response (CCR). In CCR, a correct answer is reinforced, but following an error or no response the learner is given a cue to the correct response. The learner is then given a second opportunity to respond.

The prototype software was designed to train "in" and "on" using ten sets of pictures. An accompanying microcomputer administered test assessed "in," "on," and "under" using fifteen picture sets. A single subject, multi-baseline, multi-element design was used to assess the effectiveness of the training software as well as compare the two feedback techniques (Wilson & Fox 1980; Wilson & Fox 1983). The subject was a three year old language impaired girl. We used the 45 item (15 sets of In/On/Under pictures) preposition test to assess comprehension of these three prepositions.

Only two days of baseline testing were necessary as scores were similar on both days.

Three training segments were administered. First "in" was trained, then "on," and finally the two were contrasted. Following each training segment, the 45 item test was administered. The courseware was effective in training the comprehension of "in" and "on." Test scores for the remaining preposition "under" which was not trained stayed at chance level. There were no differences in the effectiveness of the two feedback methods. Based on this study, we incorporated both feedback methods into the *Micro-LADS* package.

When we first started our work we thought we would systematically evaluate the various instructional components that could be incorporated into courseware. In our first study of treatment software, we started with the investigation of consequent events. We found that feedback alone, while effective in training did not provide the supportive teaching environment and motivation we envisioned in courseware. Using feedback alone meant that the learner had to "guess" to receive instruction. Until our subject had mastered the concept, the software was essentially a test with feedback. We realized at that time that courseware needed to be more than "effective" in research studies. Courseware had to be fun!

Micro-LADS utilizes antecedent events as well as feedback. In designing *Micro-LADS*, we wanted to incorporate antecedent events that had proven to be clinically supportive. We have included both instruction and cuing to the correct response. To ensure that the learner is motivated to continue, we have provided varied animated reinforcement routines. The cumulative counter on the right hand side of the screen will provide an incentive for those who comprehend its significance yet is unobtrusive enough that lower level learners will not be discouraged.

The *Microcomputer Language Assessment and Development System* has a long developmental history. It is based on accepted linguistic, psycholinguistic and instructional theories and practice.

■ Program Suggestions

The *Microcomputer Language Assessment and Development System* can be used with language-impaired children who are in the multi-morpheme stage regardless of etiology. *Micro-LADS* can also be used with children learning English as a Second Language (ESL). As a tutor, it can provide structured intervention according to your specifications. The combination of constructions, content delivery form, and parameters affords over a million unique presentation formats per module.

You can set *Micro-LADS* to train on any one of the three levels or to branch among them. You determine what level a student should begin and end on and how many correct answers s/he needs to advance to the next level or meet criterion. For the child with mental retardation who needs many presentations before inducing a structure, you might set the program to train only on Level 1. On this level, both instruction and cuing are provided. Alternatively, you might want to set the program to branch up to Level 2, but only after 8-10 correct responses are given. In contrast, a child learning English as a Second Language might prefer the challenge of branching among the three levels and advancing after getting only one answer correct. In this case, the program will automatically drop back from Level 2 to Level 1 when 3 errors are made and drop back from Level 3 to Level 2 when criterion will not be met. This assures the child will not be "stuck" in a failure loop even if the instructor has chosen the branching option.

The grammatical constructions covered in the seven *Micro-LADS* modules are arranged by category on each disk. The order is not developmental. Most speech-language clinicians prefer to follow developmental progressions in administering treatment.

Despite extensive research, however, no definitive progression exists.

The *Prescriptive Analysis of Language Disorders* provides normative data for both receptive and expressive abilities for most of the constructions covered in *Micro-LADS*. Normative data were collected using children between 2;0 and 4;11(Bernadin, 1977: Charron, 1978).

Based on these data, other normal progressions, and clinical experience, we suggest that the progression given in Table 2 is a reasonable one to follow when covering the grammatical constructions in *Micro-LADS*. The progression is developmental in order with one exception: we have grouped constructions by rule. For example, in clinical practice we have found it useful to train "they" along with "he" and "she." Similarly, work with modal "will" can be included with the other verb forms. This suggested progression can be modified to best meet the needs of the children you serve.

In grammatical instruction, the goal is full induction or mastery of the rules. *Micro-LADS* can assist you in reaching this goal both receptively and expressively. If a child has not demonstrated mastery of construction both receptively and expressively, programming of that construction using *Micro-LADS* is recommended. Even if a child appears to have the construction receptively, if he or she does not have full command over it expressively, then continued receptive programming is warranted. This is consistent not only with our own findings but also with those studies that show improved expressive performance using receptive training alone (Courtright & Courtright, 1976; 1979).

Construction	Disk Number
Negative Determiner (Has No)	5
Noun Plurals (Regular Nouns)	1
In/On	3
Noun-Verb Agreement (Has/Have)	1
He/She/They	4
Under	3
Him/Her/Them	4
Present Progressive (V+ing)	2
Past Tense	2
Future (Modal Will*)	2
Simple Present	2
Noun-Verb Agreement (Regular Verbs)	1
Negative Transformation (Is Not)	5
Negative Transformation (Are Not)	5
Negative Transformation (Does Not Have)	5
Who/What	6
Behind/Next To/In Front Of	3
Between/Behind/In Front Of	7
Here/There	6
This/That & These/Those	6
Above/Below/On	7
Beside/Above/In Front Of	7
Present Passive	6

*While the PALD-RSA data indicate later mastery of this concept, we have found that grouping it with the other verb forms is an effective training strategy.

Table 2. Suggested Progression for Training

Using materials such as those contained in the *WESP* (Wilson, 1976) will enable the instructor to extend the instructional content contained in the modules. These print media materials can be used in expressive groups where children make use of the constructions they are mastering in pragmatic contexts. Full use of the linguistic code for communication should be dealt with in human instructional settings. Induction of the linguistic code, however, can be facilitated by Computer Aided Instruction. Group session plans might consist of a variety of intraverbal requests and target responses expected from each child. These can be interspersed with less structured opportunities for

communication among the participants around a theme or project for the session. Further suggestions for both individual and group training sessions are given in *Syntax Remediation: A Generative Grammar Approach to Language Development* (Wilson, 1977).

Micro-LADS targets constructions critical to the induction of English grammar. It is appropriate for use with a wide range of language-impaired youngsters as well as with children learning English as a Second Language. You can start preschoolers on the early developing constructions with the text off. As they progress you can add the text component. Finally, when your students can rely on text alone, you can turn off the voice component.

Hearing-impaired children will benefit from having the text paired with the picture stimuli from the beginning. With the Scanning (Single Switch) interface mode, *Micro-LADS* is accessible to children with severe motor impairments. In our experience, children who are cognitively functioning below 3 to 3 ½ years of age find the Direct Select mode easier to use. The TouchWindow provides an excellent interface for these children.

We have provided a number of appendices to assist you in developing individualized treatment plans. In Appendix B, you will find construction menu listings of all seven modules. As you can see, in all cases you can target the constructions in isolation before mixing instruction and response requests. A Stimulus Index is provided in Appendix C. When the text component is turned on, these stimuli are presented under the pictures. When the voice is on, they are spoken. All constructions covered in *Micro-LADS* can introduced in a discourse context by using the Discourse Review option. Appendix D gives the discourse introductions for the constructions. These contexts can be incorporated into expressive treatment sessions. Appendix E contains an alphabetical listing of the vocabulary items used in the stimulus phrases.

The testing level available for all modules allows you to document achievements. Goals for treatment can be incorporated into the child's Individual Education Plan (IEP). The Lesson/Test Summary printouts allow you to share the child's successes with parents and teachers (and provide you with progress documentation).

Children in language intervention programs can now benefit from microcomputer technology. We hope *Micro-LADS* will extend your effectiveness and assist you in improving children's language skills.

References

Anderson, R., Kulhavy, R., & Andre, T. (1971). Feedback procedures in programmed instruction. *Journal of Educational Psychology*, 62, 148-156.

Bernardin, L. (1977). *The establishment of norms for children aged 2;6 to 4;11 on the experimental version of the prescriptive analysis of language disorders-receptive syntax assessment.* Unpublished master's thesis, University of Vermont, Burlington.

Bloom, L. (1970). *Language development: Form and function in emerging grammars.* Cambridge, MA: MIT Press.

Bloom, L. (1973). *One word at a time.* The Hague: Mouton.

Charron, M. (1978). *The establishment of norms for the prescriptive analysis of language disorders-expressive syntax assessment.* Unpublished master's thesis, University of Vermont, Burlington.

Chomsky, C. (1969). *Acquisition of syntax in children from 5-10.* Cambridge, MA: MIT Press.

Chomsky, N. (1957). *Syntactic structures.* The Hague: Mouton.

Chomsky, N. (1965). *Aspects of the theory of syntax.* Cambridge, MA: MIT Press.

Courtright, J., & Courtright, I. (1979). Imitative modeling as a language intervention strategy: The effects of two mediating variables. *Journal of Speech and Hearing Research*, 22, 389-402.

Engle, C., & Wilson, M. (1979). *Grammatical morphemes: Stage I phenomenon?* Paper presented at American Speech, Language, and Hearing Research, 27, 413-423.

Fey, M., & Leonard L. (1984). Partner age as a variable in the conversational performance of specifically language-impaired and normal-language children. *Journal of Speech and Hearing Research*, 27, 413-423.

Ferster, C., & Skinner, B. (1957). *Schedules of reinforcement*. New York: Appleton-Century-Crofts.

Fodor, J., Bever, T., & Garrett, M. (1974). *The psychology of language*. New York: McGraw-Hill.

Fox, B. (1980). *A study comparing live and computer administered receptive syntax items testing the prepositions in, on, and under*. Unpublished master's thesis, University of Vermont, Burlington.

Gilman, A. (1969). Comparison of several feedback methods for correcting errors by computer-assisted instruction. *Journal of Educational Psychology*, 60, 503-508.

Holloway, B. (1972). *A study of two methods of presentation of the Wilson Initial Syntax Program*. Unpublished master's thesis, University of Vermont, Burlington.

Kendziorski, S. (1978). *The differential effectiveness of the Wilson Initial Syntax Program with two groups of syntactically deficient children*. Unpublished master's thesis, University of Vermont, Burlington.

Harris, M. & Hassemer, W. (1972). Some factors affecting the complexity of children's sentences: The effects of modeling, age, sex, and bilingualism. *Journal of Experimental Child Psychology*, 13, 447-455.

Lakoff, G. (1971). On generative semantics. In D. Steinberg & L. Jakobovits (Eds.), *Semantics*. Cambridge, MA: University Press.

Lee, L. (1969). Developmental sentence types. A method for comparing normal and deviant syntactic development. *Journal of Speech and Hearing Disorders*, 31, 311-330.

Leonard, L. (1972). What is deviant language? *Journal of Speech and Hearing Disorders*, 38, 174-183.

Levasseur, M. (1975). *A study of children's vocabulary size when word combinations first appear*. Unpublished master's thesis, University of Vermont, Burlington.

Malone, T. (1980, August). What makes things fun to learn? A study of intrinsically motivating computer games. *Cognitive and Instructional Science Series*, Xerox Palo Alto Research Center.

McNeill, D. (1966). Developmental psycholinguistics, In F. Smith & G. Miller (Eds.), *The genesis of language*. Cambridge, MA: MIT Press.

Menyuk, P. (1964). Comparison of grammar of children with functionally deviant and normal speech. *Journal of Speech and Hearing Research*, 7, 107-121.

Menyuk, P. (1969). *Sentences children use*. Cambridge, MA: MIT Press.

Menyuk, P. (1971). *The acquisition and development of language*. Cambridge, MA: MIT Press.

Morehead, D. & Ingram, D. (1973). The development of base syntax in normal and linguistically deviant children. *Journal of Speech and Hearing Research*, 16, 330-352.

Muma, J. (1975). The communication game: Dump and play. *Journal of Speech and Hearing Disorders*, 40, 296-309.

Newmeyer, F. (1980). *Linguistic theory in America: The first quarter-century of transformational generative grammar*. New York: Academic Press.

Piatelli-Palmarini, M. (1980). *Language and learning: The debate between Jean Piaget and Noam Chomsky*. Cambridge, MA: Harvard University Press.

Ruder, K., Hermann, K., & Schiefelbusch, R. (1971). The effect of verbal imitation and comprehension training on verbal production. *Journal of Psycholinguistic Research*, 6, 59-72.

Shewan, C. (1975). The language-disordered child in relation to Muma's "Communication game: Dump and Play." *Journal of Speech and Hearing Disorders*, 40, 310-314.

Skinner, B. (1975). *Verbal behavior*. New York: Appleton-Century-Crofts.

Smith, F., & Miller, G. (1966). *The genesis of language*. Cambridge, MA: MIT Press.

Spaulding, K. (1980). *Multimorpheme structures in emerging grammar: A single subject study.* Unpublished master's thesis, University of Vermont, Burlington.

Staats, A. & Staats, C. (1963). *Complex human behavior.* New York: Holt, Rinehart & Winston.

Sticker, M. (1971). *A study of short-term language programs for mentally retarded children.* Unpublished master's thesis, University of Vermont, Burlington.

Tait, K., Hartley, J., & Anderson, R. (1973). Feedback procedures in computer assisted arithmetic instruction. *British Journal of Educational Psychology*, 43, 161-171.

Vanhoenaker, C. (1971). *A study of short-term language program for preschool children from low income families.* Unpublished master's thesis, University of Vermont, Burlington.

Van Riper, C. (1954). *Speech correction: Principles and methods* (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Wilson, M. (1972). *The Wilson initial syntax program.* Cambridge, MA: Educators Publishers Service.

Wilson, M. (1976a). *The Wilson expanded syntax program.* Cambridge, MA: Educators Publishing Service.

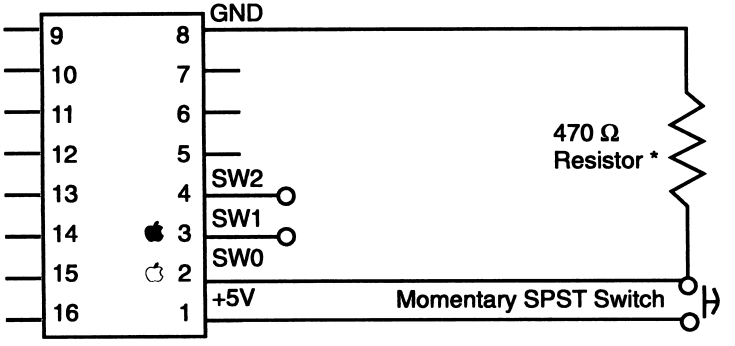
Wilson, M. (1976b). *Prescriptive analysis of language disorders-receptive syntax program.* Unpublished manuscript, University of Vermont, Burlington.

Wilson, M. (1977). *Syntax remediation: A generative grammar approach to language development.*

Appendix A
CIRCUIT DIAGRAMS

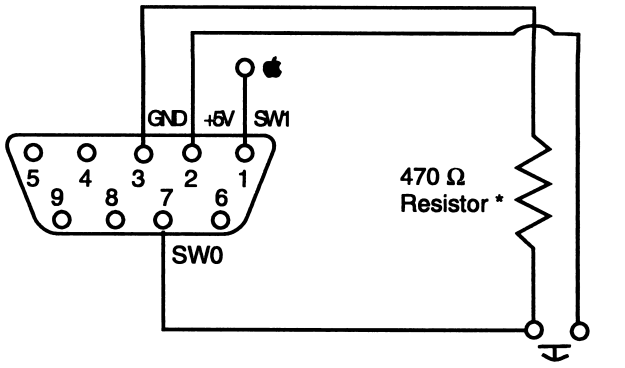
Single switch circuitry for Apple II+, IIe, IIc, and IIGS.

Apple II+, IIe, and IIGS Internal 16-pin DIP socket labelled "Game I/O" on the main circuit board.



Apple IIe, IIc, and IIGS — External D-type miniature connector on the back of the computer, labelled with a small paddle icon.

Note: The Apple IIe and IIGS both have the internal and external connectors — use the external connector if possible. The solid apple key is sometimes referred to as the option key.



Momentary SPST Switch

If SW0 is unavailable or used for something else, you may use the other switches, SW1 or SW2. The software automatically determines which switch is used. With the Apple IIc, connect the switch to pin 1 instead of pin 7 on the external D-type connector. With the Apple II+, connect the switch to pin 3 or 4 instead of pin 2 on the internal GAME I/O socket. With the Apple IIe or IIGS, you can use either of the above connection configurations.

* The resistor ensures that the SW0 line is low when the switch is off and high when the switch is on. The resistor should be 470 and 1/4 or 1/2 watt (any tolerance level is fine).

Appendix B
CONSTRUCTION MENUS

Diskette 1
Plurals and Noun-Verb Agreement

MICRO-LADS TRAINING CONSTRUCTIONS MENU

PLURALS AND NOUN-VERB AGREEMENT

NOUN PLURALS (REGULAR NOUNS)
1. SINGULAR
2. PLURAL
3. SINGULAR / PLURAL

NOUN-VERB AGREEMENT (HAS/HAVE)
4. SINGULAR
5. PLURAL
6. SINGULAR / PLURAL

NOUN-VERB AGREEMENT (REGULAR VERBS)
7. SINGULAR
8. PLURAL
9. SINGULAR / PLURAL

— — — — — — — — — — — — — — — — — —

YOUR CHOICE?

<ESC> TO RETURN TO TITLE PAGE

Diskette 2
Verbs Forms

MICRO-LADS TRAINING CONSTRUCTIONS MENU

VERB FORMS

SET A (PEOPLE)
1. PRESENT PROGRESSIVE
2. FUTURE
3. PAST
4. PRESENT PROGRESSIVE / FUTURE / PAST

SET B (ANIMALS & THINGS)
5. PRESENT PROGRESSIVE
6. FUTURE
7. PAST
8. PRESENT PROGRESSIVE / FUTURE / PAST

SET C (PEOPLE)
9. PRESENT PROGRESSIVE
10. FUTURE
11. PAST
12. PRESENT PROGRESSIVE / FUTURE / PAST

— — — — — — — — — — — — — — — — — — — —

<SPACE> TO CHANGE PRESENT TENSE FORM

— — — — — — — — — — — — — — — — — — — —

YOUR CHOICE?

<ESC> TO RETURN TO TITLE PAGE

Diskette 2
Verbs Forms

MICRO-LADS TRAINING CONSTRUCTIONS MENU

VERB FORMS

SET A (PEOPLE)
1. SIMPLE PRESENT
2. FUTURE
3. PAST
4. SIMPLE PRESENT / FUTURE / PAST

SET B (ANIMALS & THINGS)
5. SIMPLE PRESENT
6. FUTURE
7. PAST
8. SIMPLE PRESENT / FUTURE / PAST

SET C (PEOPLE)
9. SIMPLE PRESENT
10. FUTURE
11. PAST
12. SIMPLE PRESENT / FUTURE / PAST

— — — — — — — — — — — — — — — — — — — —

<SPACE> TO CHANGE PRESENT TENSE FORM

— — — — — — — — — — — — — — — — — — — —

YOUR CHOICE?

<ESC> TO RETURN TO TITLE PAGE

Diskette 3
Prepositions

MICRO-LADS TRAINING CONSTRUCTIONS MENU

PREPOSITIONS

IN / ON / UNDER (PEOPLE)

1. IN
2. ON
3. UNDER
4. IN / ON / UNDER

IN / ON / UNDER (ANIMALS & THINGS)

5. IN
6. ON
7. UNDER
8. IN / ON / UNDER

BEHIND / NEXT TO / IN FRONT OF

9. BEHIND
10. NEXT TO
11. IN FRONT OF
12. BEHIND / NEXT TO / IN FRONT OF

— — — — — — — — — — — — — — — — — — —

YOUR CHOICE?

<ESC> TO RETURN TO TITLE PAGE

Diskette 4
Pronouns

MICRO-LADS TRAINING CONSTRUCTIONS MENU

PRONOUNS

SUBJECTIVE
1. HE
2. SHE
3. THEY
4. HE / SHE / THEY

OBJECTIVE
5. HIM
6. HER
7. THEM
8. HIM / HER / THEM

POSSESSIVE
9. HIS
10. HER
11. THEIR
12. HIS / HER / THEIR

— — — — — — — — — — — — — — — — — —

YOUR CHOICE?

<ESC> TO RETURN TO TITLE PAGE

Diskette 5
Negatives

MICRO-LADS TRAINING CONSTRUCTIONS MENU

NEGATIVES

DETERMINER NO (HAS NO)
1. HAS
2. HAS NO
3. HAS / HAS NO

NEGATION (IS NOT)
4. IS
5. IS NOT
6. IS / IS NOT

NEGATION (ARE NOT)
7. ARE
8. ARE NOT
9. ARE / ARE NOT

NEGATION (DOES NOT HAVE)
10. HAS
11. DOES NOT HAVE
12. HAS / DOES NOT HAVE

— — — — — — — — — — — — — — — — — — —

YOUR CHOICE?

<ESC> TO RETURN TO TITLE PAGE

Diskette 6
Deictic Expressions, Passive, & WH-Questions

MICRO-LADS TRAINING CONSTRUCTIONS MENU

DEICTIC EXPRESSIONS, PASSIVE,
AND WH-QUESTIONS

DEICTIC EXPRESSIONS
1. THIS, THESE
2. THAT, THOSE
3. THIS, THESE / THAT, THOSE

DEICTIC EXPRESSIONS
4. HERE
5. THERE
6. HERE / THERE

PASSIVE
7. PRESENT PASSIVE

WH-QUESTIONS
8. WHO
9. WHAT
10. WHO / WHAT

— — — — — — — — — — — — — — — — — — — —

YOUR CHOICE?

<ESC> TO RETURN TO TITLE PAGE

Diskette 7
Prepositions II

MICRO-LADS TRAINING CONSTRUCTIONS MENU

PREPOSITIONS II

BETWEEN / BEHIND / IN FRONT OF
1. BETWEEN
2. BEHIND
3. IN FRONT OF
4. BETWEEN / BEHIND / IN FRONT OF

ABOVE / BELOW / ON
5. ABOVE
6. BELOW
7. ON
8. ABOVE / BELOW / ON

BESIDE / ABOVE / IN FRONT OF
9. BESIDE
10. ABOVE
11. IN FRONT OF
12. BESIDE / ABOVE / IN FRONT OF

— — — — — — — — — — — — — — — — — — —

YOUR CHOICE?

<ESC> TO RETURN TO TITLE PAGE

Appendix C
STIMULUS INDEX

Diskette 1- PLURALS AND NOUN-VERB AGREEMENT

A. Noun Plurals (Regular Nouns)

Singular	Plurals
the horse	the horses
the balloon	the balloons
the butterfly	the butterflies
the ice cream cone	the ice cream cones
the glass	the glasses
the rabbit	the rabbits
the cloud	the clouds
the cake	the cakes
the bird	the birds
the pig	the pigs

B. Noun-Verb Agreement (Has/Have)

Singular	Plural
The tree has leaves.	The trees have leaves.
The balloon has a string.	The balloons have strings.
The cake has candles.	The cakes have candles.
The pig has a hat.	The pigs have hats.
The rabbit has a carrot.	The rabbits have carrots.
The apple has worms.	The apples have worms.
The boy has a bat.	The boys have bats.
The cat has a tail.	The cats have tails.
The horse has spots.	The horses have spots.
The plane has wings.	The planes have wings.

C. Noun-Verb Agreement (Regular Verbs)

Singular	Plural
The boy runs.	The boys run.
The girl drinks.	The girls drink.
The boy climbs.	The boys climb.
The boy paints.	The boys paint.
The plane flies.	The planes fly.
The boat sails.	The boats sail.
The girl dances.	The girls dance.
The boy climbs the tree.	The boys climb the tree.
The duck swims.	The ducks swim.
The girl sits on the couch.	The girls sit on the couch.

Diskette 2 - VERB FORMS

A. Set 1 (People)

Present Progressive	Simple Present
She is opening the door.	She opens the door.
The boys are fishing.	The boys fish.
The man is hammering the nail.	The man hammers the nail.
The girl is buttoning her coat.	The girl buttons her coat.
She is kicking the ball.	She kicks the ball.
He is pouring the juice.	He pours the juice.
He is picking up the toys.	He picks up the toys.
She is painting a picture.	She paints a picture.
He is cooking.	He cooks.
She is walking down the stairs.	She walks down the stairs.

Future	Past
She will open the door.	She opened the door.
The boys will fish.	The boys fished.
The man will hammer the nail.	The man hammered the nail.
The girl will button her coat.	The girl buttoned her coat.
She will kick the ball.	She kicked the ball.
He will pour the juice.	He poured the juice.
He will pick up the toys.	He picked up the toys.
She will paint a picture.	She painted a picture.
He will cook.	He cooked.
She will walk down the stairs.	She walked down the stairs.

B. Set 2 (Animals and Things)

Present Progressive	Simple Present
The monkey is peeling the banana.	The monkey peels the banana.
It is snowing.	It snows.
The rabbit is hopping.	The rabbit hops.
The bird is landing on the piano.	The bird lands on the piano.
It is raining on the duck.	It rains on the duck
The ball is rolling down the hill.	The ball rolls down the hill.
The beaver is gnawing the tree.	The beaver gnaws the tree.
The duck is hatching.	The duck hatches.
The frog is jumping.	The frog jumps.
The mouse is nibbling the cheese.	The mouse nibbles the cheese.

Future	Past
The monkey will peel the banana.	The monkey peeled the banana.
It will snow.	It snowed.
The rabbit will hop.	The rabbit hopped.
The bird will land on the piano.	The bird landed on the piano.
It will rain on the duck.	It rained on the duck.
The ball will roll down the hill.	The ball rolled down the hill.
The beaver will gnaw the tree.	The beaver gnawed the tree.
The duck will hatch.	The duck hatched.
The frog will jump.	The frog jumped.
The mouse will nibble the cheese.	The mouse nibbled the cheese.

C. Set 3 (People)

Present Progressive	Simple Present
She is climbing up the stairs.	She climbs up the stairs.
The boy is picking the flowers.	The boy picks the flowers.
The woman is combing her hair.	The woman combs her hair.
The man is playing the piano.	The man plays the piano.
The girl is wiping her tears.	The girl wipes her tears.
She is petting her dog.	She pets her dog.
He is planting the flower.	He plants the flower.
They are disappearing.	They disappear.
He is wrapping the present.	He wraps the present.
He is watering the flowers.	He waters the flowers.

Future	Past
She will climb up the stairs.	She climbed up the stairs.
The boy will pick the flowers.	The boy picked the flowers.
The woman will comb her hair.	The woman combed her hair.
The man will play the piano.	The man played the piano.
The girl will wipe her tears.	The girl wiped her tears.
She will pet her dog.	She petted her dog.
He will plant the flower.	He planted the flower.
They will disappear.	They disappeared.
He will wrap the present.	He wrapped the present.
He will water the flowers.	He watered the flowers.

Diskette 3 - PREPOSITIONS

A. In, On, Under (People)

In	On
He is in the wagon.	He is on the wagon.
He is in the bathtub.	He is on the bathtub.
She is in the bathtub.	She is on the bathtub.
They are in the bathtub.	They are on the bathtub.
He is in the car.	He is on the car.
She is in the car.	She is on the car.
They are in the car.	They are on the car.
He is in the box.	He is on the box.
She is in the box.	She is on the box.
They are in the box.	They are on the box.

Under

He is under the wagon.	She is under the car.
He is under the bathtub.	They are under the car.
She is under the bathtub.	He is under the box.
They are under the bathtub.	She is under the box.
He is under the car.	They are under the box.

B. In, On, Under (Animals and Things)

In	On
The block is in the can.	The block is on the can.
The flower is in the vase.	The flower is on the vase.
The rabbit is in the shoe.	The rabbit is on the shoe.
The toothbrush is in the glass.	The toothbrush is on the glass.
The pencil is in the holder.	The pencil is on the holder.
The dog is in the house.	The dog is on the house.
The rabbit is in the wheelbarrow.	The rabbit is on the wheelbarrow.
The ball is in the box.	The ball is on the box.
The brush is in the bucket.	The brush is on the bucket.
The shovel is in the pail.	The shovel is on the pail.

Under

The block is under the can.	The dog is under the house.
The flower is under the vase.	The rabbit is under the wheelbarrow.
The rabbit is under the shoe.	The ball is under the box.
The toothbrush is under the glass.	The brush is under the bucket.
The pencil is under the holder.	The shovel is under the pail.

C. Behind, Next to, In front of

Behind

The cat is behind the chair.
He is behind the bathtub.
She is behind the bathtub.
They are behind the bathtub.
He is behind the car.
She is behind the car.
They are behind the car.
The dog is behind the house.
The bowl is behind the house.
The plant is behind the chair.

Next To

The cat is next to the chair.
He is next to the bathtub.
She is next to the bathtub.
They are next to the bathtub.
He is next to the car.
She is next to the car.
They are next to the car.
The dog is next to the house.
The bowl is next to the house.
The plant is next to the chair.

In Front Of

The cat is in front of the chair.
He is in front of the bathtub.
She is in front of the bathtub.
They are in front of the bathtub.
He is in front of the car.
She is in front of the car.
They are in front of the car.
The dog is in front of the house.
The bowl is in front of the house.
The plant is in front of the chair.

Diskette 4 - PRONOUNS

A. Subjective

He	She
He is happy.	She is happy.
He is sad.	She is sad.
He is big.	She is big.
He is little.	She is little.
He is angry.	She is angry.
He is climbing.	She is climbing.
He is riding.	She is riding.
He is in the bathtub.	She is in the bathtub.
He is holding the flower.	She is holding the flower.
He is on the couch.	She is on the couch.

They

They are happy.	They are climbing.
They are sad.	They are riding.
They are big.	They are in the bathtub.
They are little.	They are holding the flower.
They are angry.	They are on the couch.

B. Objective

Him	Her
He jumps over him.	He is jumping over her.
She is jumping over him.	She jumps over her.
He is pointing to him	He points to her.
She points to him.	She is pointing to her.
He hugs him.	He hugs her.
She is hugging him.	She is hugging her.
He is squirting him.	He is squirting her.
She squirts him.	She squirts her.
He pushes him.	He pushes her.
She is pushing him.	She is pushing her.

Them

He jumps over them.	She is hugging them.
She is jumping over them.	He is squirting them.
He is pointing to them	She squirts them.
She points to them.	He pushes them.
He hugs them.	She is pushing them.

C. Possessive

His	Her
This is his dog.	This is her dog.
This is his ball.	This is her ball.
This is his parrot.	This is her parrot.
This is his balloon.	This is her balloon.
This is his flower.	This is her flower.
This is his pumpkin.	This is her pumpkin.
This is his computer.	This is her computer.
This is his painting.	This is her painting.
This is his horse.	This is her horse.
This is his umbrella.	This is her umbrella.

Their	
This is their dog.	This is their pumpkin.
This is their ball.	This is their computer.
This is their parrot.	This is their painting.
This is their balloon.	This is their horse.
This is their flower.	This is their umbrella.

Diskette 5 - NEGATIVES

A. Determiner No (Has No)

Has	Has No
This apple has a worm.	This apple has no worm.
He has a bat.	He has no bat.
This tree has leaves.	This tree has no leaves.
This house has a chimney.	This house has no chimney.
She has a cone.	She has no cone.
The lamp has a shade.	The lamp has no shade.
This girl has a racket.	This girl has no racket.
This dog has a tail.	This dog has no tail.
This door has a doorknob.	The door has no doorknob.
This boy has a shirt.	This boy has no shirt.

B. Negation (Is Not)

Is	Is Not
She is dancing.	She is not dancing.
The book is on the table.	The book is not on the table.
He is happy.	He is not happy.
She is sleeping.	She is not sleeping.
The flower is in the vase.	The flower is not in the vase.
He is eating.	He is not eating.
This hat is black.	This hat is not black.
She is happy.	She is not happy.
This shovel is under the pail.	This shovel is not under the pail.
He is playing the piano.	He is not playing the piano.

C. Negation (Are Not)

Are	Are Not
These pigs are wearing hats.	These pigs are not wearing hats.
These horses are jumping.	These horses are not jumping.
They are happy.	They are not happy.
They are decorating the tree.	They are not decorating the tree.
The flowers are in the bowl.	The flowers are not in the bowl.
These pigs are eating.	These pigs are not eating.
The rabbits are holding carrots.	The rabbits are not holding carrots.
They are behind the bathtub.	They are not behind the bathtub.
The strawberries are in the basket.	The strawberries are not in the basket.
These birds are singing.	These birds are not singing.

D. Negation (Does Not Have)

Has	Does Not Have
This boy has a shirt.	This boy does not have a shirt.
He has a bat.	He does not have a bat.
This tree has leaves.	This tree does not have leaves.
This house has a chimney.	This house does not have a chimney.
She has a cone.	She does not have a cone.
The lamp has a shade.	The lamp does not have a shade.
This girl has a racket.	This girl does not have a racket.
This dog has a tail.	This dog does not have a tail.
The door has a doorknob.	The door does not have a doorknob.
This apple has a worm.	This apple does not have a worm.

Diskette 6 - DEICTIC EXPRESSIONS, PASSIVE, & WH- QUESTIONS

A. Deictic Expressions

This, These	That, Those
This is my ball.	That is my ball.
This is my book.	That is my book.
This is my cat.	That is my cat.
This is my dog.	That is my dog.
This is my shoe.	That is my shoe.
These are my glasses.	Those are my glasses.
These are my flowers.	Those are my flowers.
These are my mittens.	Those are my mittens.
These are my tools.	Those are my tools.
These are my pets.	Those are my pets.

B. Deictic Expressions

Here	There
Here is my ball.	There is my ball.
Here is my book.	There is my book.
Here is my cat.	There is my cat.
Here is my dog.	There is my dog.
Here is my shoe.	There is my shoe.
Here are my glasses.	There are my glasses.
Here are my flowers.	There are my flowers.
Here are my mittens.	There are my mittens.
Here are my tools.	There are my tools.
Here are my pets.	There are my pets.

C. Passives

Present Passive	
The mother is kissed by the baby.	The baby is kissed by the mother.
The cat is chased by the dog.	The dog is chased by the cat.
The mouse is chased by the cat.	The cat is chased by the mouse.
The boy is squirted by the girl.	The girl is squirted by the boy.
The boy is kissed by the girl.	The girl is kissed by the boy.
The pig is kicked by the sheep.	The sheep is kicked by the pig.
The ghost is scared by the boy.	The boy is scared by the ghost.
The man is hugged by the woman.	The woman is hugged by the man.
The man is painted by the woman.	The woman is painted by the man.
The boy is hugged by the girl.	The girl is hugged by the boy.

D. Wh Questions

Who	What
Who is on the chair?	What is on the chair?
Who is under the table?	What is under the table?
Who is on the table?	What is on the table?
Who is on the couch?	What is on the couch?
Who is in the bathtub?	What is in the bathtub?
Who is in the wheelbarrow?	What is in the wheelbarrow?
Who is under the water?	What is under the water?
Who is the man washing?	What is the man washing?
Who is next to the car?	What is next to the car?
Who is the woman pointing to?	What is the woman pointing to?

Diskette 7 - PREPOSITIONS II

A. Between, Behind, In Front Of

Between

The dogs are between the doghouses.
The children are between the bushes.
The children are between the cars.
The children are between the tables.
The children are between the beds.
The cats are between the trees.
The cats are between the chairs.
The girls are between the signs.
The dogs are between the hydrants.
The boys are between the wagons.

Behind

The dogs are behind the doghouses.
The children are behind the bushes.
The children are behind the cars.
The children are behind the tables.
The children are behind the beds.
The cats are behind the trees.
The cats are behind the chairs.
The girls are behind the signs.
The dogs are behind the hydrants.
The boys are behind the wagons.

In Front Of

The dogs are in front of the doghouses.
The children are in front of the bushes.
The children are in front of the cars.
The children are in front of the tables.
The children are in front of the beds.
The cats are in front of the trees.
The cats are in front of the chairs.
The girls are in front of the signs.
The dogs are in front of the hydrants.
The boys are in front of the wagons.

B. Above, Below, On

Above

The little triangle is above the big triangle.
The circle is above the triangle.
The circle is above the box.
The triangle is above the box.
The little circle is above the big circle.
The box is above the circle.
The x is above the line.
The triangle is above the circle.
The circle is above the line.
The little box is above the big box.

Below

The little triangle is below the big triangle.
The circle is below the triangle.
The circle is below the box.
The triangle is below the box.
The little circle is below the big circle.
The box is below the circle.
The x is below the line.
The triangle is below the circle.
The circle is below the line.
The little box is below the big box.

On

The little triangle is on the big triangle.
The circle is on the triangle.
The circle is on the box.
The triangle is on the box.
The little circle is on the big circle.
The box is on the circle.
The x is on the line.
The triangle is on the circle.
The circle is on the line.
The little box is on the big box.

C. Beside, Above, In Front Of

Beside

The picture is beside the couch.
The cow is beside the moon.
The duck is beside the house.
The lamb is beside the fence.
The girl is beside the box.
The rabbit is beside the table.
The flag is beside the building.
The plant is beside the bookcase.
The sign is beside the door.
The bird is beside the nest.

Above

The picture is above the couch.
The cow is above the moon.
The duck is above the house.
The lamb is above the fence.
The girl is above the box.
The rabbit is above the table.
The flag is above the building.
The plant is above the bookcase.
The sign is above the door.
The bird is above the nest.

In Front Of

The picture is in front of the couch.
The cow is in front of the moon.
The duck is in front of the house.
The lamb is in front of the fence.
The girl is in front of the box.
The rabbit is in front of the table.
The flag is in front of the building.
The plant is in front of the bookcase.
The sign is in front of the door.
The bird is in front of the nest.

Appendix D
TRANSCRIPTS OF THE DISCOURSE INTRODUCTIONS

Diskette 1- PLURALS AND NOUN-VERB AGREEMENT

REGULAR NOUNS
Here is the horse. When there's only one, we say, "the horse."
Here are the horses. When there's more than one, we say, "the horses."

NOUN-VERB AGREEMENT (has/have)
What does the tree have? The tree has leaves.
What do the trees have? The trees have leaves.

NOUN-VERB AGREEMENT (regular verbs)
What does the boy do? The boy runs. When there's only one, we say "runs."
What do the boys do? The boys run. When there's more than one, we say "run."

Diskette 2 - VERB FORMS

Set 1

PRESENT PROGRESSIVE FUTURE/PAST	SIMPLE PRESENT FUTURE/PAST
She is getting ready.	She is getting ready.
What will she do?	What will she do?
She will open the door.	She will open the door.
What is she doing now?	What does she do here?
She is opening the door.	She opens the door.
She is done.	She is done.
What did she do?	What did she do?
She opened the door.	She opened the door.

Set 2

PRESENT PROGRESSIVE FUTURE/PAST	SIMPLE PRESENT FUTURE/PAST
The monkey is getting ready.	The monkey is getting ready.
What will he do?	What will he do?
The monkey will peel the banana.	The monkey will peel the banana.
What is he doing now?	What does the monkey do here?
The monkey is peeling the banana.	The monkey peels the banana.
The monkey is done.	The monkey is done.
What did he do?	What did he do?
The monkey peeled the banana.	The monkey peeled the banana.

Set 3

PRESENT PROGRESSIVE FUTURE/PAST	SIMPLE PRESENT FUTURE/PAST
She is getting ready.	She is getting ready.
What will she do?	What will she do?
She will climb up the stairs.	She will climb up the stairs.
What is she doing now?	What does she do here?
She is climbing up the stairs.	She climbs up the stairs.
She is done.	She is done.
What did she do?	What did she do?
She climbed up the stairs.	She climbed up the stairs.

Diskette 3 - PREPOSITIONS

IN ON UNDER (people)
Where is he? He is in the wagon.
Where is he? He is on the wagon.
Where is he? He is under the wagon.

IN ON UNDER (animals and objects)
Where is the block? The block is in the can.
Where is the block? The block is on the can.
Where is the block? The block is under the can.

BEHIND NEXT TO IN FRONT OF
Where is the cat? The cat is behind the chair.
Where is the cat? The cat is next to the chair.
Where is the cat? The cat is in front of the chair.

Diskette 4 - PLURALS AND NOUN-VERB AGREEMENT

SUBJECTIVE
Who is happy? The boy is. Or we can say, "He is happy."
Who is happy? The girl is. Or we can say, "She is happy."
Who is happy? The children are. Or we can say, "They are happy."

OBJECTIVE
He is jumping over the boy. Or we can say, "He jumps over him."
He is jumping over the girl. Or we can say, "He is jumping over her."
He is jumping over the children. Or we can say, "He jumps over them."

POSSESSIVE
The dog belongs to the boy. This is his dog.
The dog belongs to the girl. This is her dog.
The dog belongs to the children. This is their dog.

Diskette 5 - NEGATIVES

DETERMINER NO (has no)
This apple has a worm. What about this one? This apple has no worm.

NEGATION (is not)
What is this girl doing? She is dancing.
What about her? She is not dancing.

NEGATION (are not)
What are the pigs wearing? These pigs are wearing hats.
What about these pigs? These pigs are not wearing hats.

NEGATION (does not have)
What does this boy have? This boy has a shirt.
What about him. This boy does not have a shirt.

Diskette 6 - DEICTIC EXPRESSIONS, PASSIVE, & WH- QUESTIONS

DEICTIC EXPRESSIONS (this, these/that, those)
When it is close, we say, "This is my ball."
When it is not close, we say, "That is my ball."
"When they are close, we say, "These are my mittens."
When they are not close, we say, "Those are my mittens."

DEICTIC EXPRESSIONS (here/there)
When it's dose, we say, "Here is my ball."
When it's not close, we say, "There is my ball."

PASSIVE
When we ask, "Who is kissed by the baby?" we say, "The mother is kissed by the baby."
When we ask, "Who is kissed by the mother?" we say, "The baby is kissed by the mother."

WH-QUESTIONS
When it is a person, we ask "Who is on the chair?"
When it is an object or thing, we ask "What is on the chair?"

Diskette 7 - PREPOSITIONS II

BETWEEN BEHIND IN FRONT OF
Where are the dogs? The dogs are between the doghouses.
Where are the dogs? The dogs are behind the doghouses.
Where are the dogs? The dogs are in front of the doghouses.

ABOVE BELOW ON
Where is the little triangle? The little triangle is above the big triangle. Where is the little triangle? The little triangle is below the big triangle. Where is the little triangle? The little triangle is on the big triangle.

BESIDE ABOVE IN FRONT OF
Where is the picture? The picture is beside the couch.
Where is the picture? The picture is above the couch.
Where is the picture? The picture is in front of the couch.

Appendix E
STIMULUS PHRASE VOCABULARY

A
a
above
angry
apple
apples
are

B
baby
ball
balloon
banana
basket
bat
bathtub
bats
beaver
beds
behind
below
beside
between
big
bird
birds
black
block
boat
boats
book
bookcase
bowl
box
boy
boys
brush
bucket
building
bushes
butterfly
butterflies
button, buttoned, buttoning,
by

C
cake
cakes
can
candles
car
carrot
carrots
cars
cat
cats
chair
chairs
chased
cheese
children
chimney
circle
climb, climbed, climbing, climbs
cloud
clouds
coat
comb, combed, combing, combs
computer
cone
cones
cook, cooked, cooking, cooks
couch
cow

D
dance
dances
dancing
decorating
disappear, disappeared, disappearing

does
dog
doghouses
dogs
door
doorknob
down
drink
drinks
duck
ducks

E
eating

F
fence
fish, fished, fishes, fishing
flag
flies
flower
flowers
fly
frog
front

G
ghost
girl
girls
glass
glasses
gnaw, gnawed, gnaws, gnawing

H
hair
hammer, hammered, hammering, hammers
happy
has
hat
hatch, hatched, hatches, hatching
hats
have
he
her
here
hill
him
his
holder
holding
hop, hopped, hopping, hops
horse
horses
house
hugged
hugs
hugging
hydrants

I
ice cream
in
in front of
is
it

J
juice
jump, jumped, jumps, jumping

K
kick, kicked, kicking, kicks
kissed

L
lamb
lamp
land, landed, landing, lands
leaves
line
little

M
man
mittens
monkey
moon
mother
mouse
my

N
nail
nest
next to
nibble, nibbled, nibbles, nibbling
no
not

O
of
on
open, opened, opening, opens
over

P
pail
painting (noun)
paint, painted, painting, paints
parrot
peel, peeled, peeling, peels
pencil
pets (noun)
pet, pets, petted, petting
piano
pick, picked, picking, picks
picture
pig
pigs
plane
planes
plant (noun)
plant, planted, planting, plants
play, played, playing, plays
point
pointing
points
pour, poured, pouring, pours
present
pumpkin
pushes
pushing

R
rabbit
rabbits
racket
rain, rained, raining, rains
riding
roll, rolled, rolling, rolls
run
runs

S
sad
sail
sails
scared
shade
she
sheep
shirt
shoe
shovel
sign
signs
singing
sit
sits
sleeping
snow, snowed, snowing, snows
squirted
squirts, squirting
spots
stairs
strawberries
string
strings
swim
swims

T
table
tables
tail
tails
tears
that
the
their
them
there
these
they
this

those
to
tools
toothbrush
toys
tree
trees
triangle

U
umbrella
under
up

V
vase

W
wagon
wagons
walk, walked, walking, walks
washing
water (noun)
water, watered, watering, waters
wearing
what
wheelbarrow
where
who
will
wings
wipe, wiped, wipes, wiping
woman
worm
worms
wrap, wrapped, wrapping, wraps

X
x

Appendix F
OPERATIONS SUMMARY

A. Equipment Needed
Apple II Microcomputer (64K)
One 5 1/4" Disk Drive
Echo Speech Corp. speech synthesizer
Color (Preferred) or Black and White Monitor
Printer (Optional)
Paddles, joystick, Left/Right Rocker Switch, Touch Window or individualized single switch

B. Boot the diskette. The Title Page will appear. Select <1 > for Testing,< 2> for Training.

C. Constructions Menu
Select by typing in the associated number. Note for diskette 2, Verb Forms, before you select a construction you can change the present verb form by pressing the space bar. Press <ESC> to return to Title Page.

D. Parameters Menu
Type <l > to run construction with the parameters shown. Enter 2 through O (training) or 2 through 5 (testing) to change the parameters. Press <ESC> to return to the Constructions Menu.

E. The program will load and wait. To start "PRESS SPACE BAR OR CONTROLLER BUTTON."

F. When criterion is met in training or the test is completed, the program will end and a Lesson or Test Summary will appear. Entering <CTRL>C will also exit the program to a Lesson or Test Summary. Press the Space Bar to receive the remainder of the summary data. You will be asked if you want a printout. Type <N> for no if you do not have a printer. You'll be returned to the Title

Page. If you want to record the data, you can copy it from the screen.

G. If you have a powered up printer, press <Y>for yes to obtain a prinout of the summary data. you will now be asked to type in some optional information. You will be prompted to enter a name, the date, and a comment. You can enter in up to 255 charaters of information including spaces and punctuation.

H. If the program "hangs," reboot the system.