

A Guide To Testing  
And Identification  
Of

**Reverse Position Sensation**  
**RPS**

For Prevention and Elimination of  
**Written Language Disability**  
**WLD**

Version 0052

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Of  
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Produced By  
Rowe Kaple and Rand Nelson

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Peterson Directed Handwriting  
Greensburg PA

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the examination kit to all interested educators.

# INTRODUCTION

A long-term study of individuals with identified learning disabilities\* has revealed a perceptual condition that is a major contributor to problems associated with learning to use written language. These problems lead to a variety of labels including; WLD, LD, AD, ADHD, Dyslexia and Dysgraphia. Most importantly, the investigation revealed this perceptual condition can be identified and corrected to eliminate interference with written language skill development.

The condition is called Reverse Position Sensation. Based upon the study data, a high percentage of most LD populations will be affected by the condition. There are genetic connections and several profiles have been identified leading to important impact on the education system. A significant number of learning disabilities could be avoided by early intervention.

At the same time, identification and remediation can greatly reduce the impact of symptoms for many people who are already crippled by frustration and failure. Overcoming physical habits that lead to RPS is more difficult, but remediation has lead to success where interventions that are commonly used in our schools were producing little if any progress.

This manual and the accompanying examination kit give a teacher the power to take direct action toward avoiding learning problems and solving them for many who suffer. Identification and remediation involves a time commitment that is unavoidable, but with relatively simple physical skill instruction, problems with written language skill development can be greatly reduced.

\* Psychology, 2012. Vol.3, No.1, 36-44

Published Online January 2012 in SciRes (<http://www.SciRP.org/journal/psych>) DOI:10.4236/psych.2012.31006

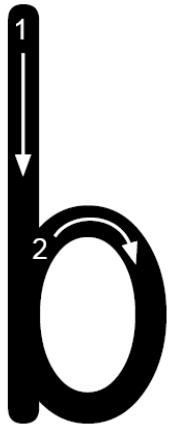
“Physical and Behavioral Markers Help Identify Written Language Disability (WLD) Related to Attention Deficit Hyperactivity Disorder (ADHD)”

## Description

Reverse Position Sensation is difficult to understand when one does not have the condition. When the condition is present the feeling of movements that are made in a counter-clockwise direction feel like the movement is clockwise.

A specific example related to a kindergarten learning activity, should make clear how this condition sets the stage for problems with written language skill development.

The lesson presents the lowercase print letter b. The teacher demonstrates the start point and direction of movement for the stroke sequence and asks the children to trace a model of the letter on the page she has copied for each child.



The child tries to follow the directions, but when attempting to execute the clockwise movement for stroke 2, reverse sensation causes movement in the opposite direction for the “ball” portion of the letter. The stroke moves counter-clockwise and produces a d.

The visual does not match with the movement dynamics sent back to the brain. The exercise becomes confused and frustrating. The pupil is not learning the letter because of the difference between visual and physical feedback received by the brain. It doesn't match.

Attempts to write the form result in something that looks very different from the model. To you it looks upside down or backward.

Imagine you are standing inside a large picture window and you want to write a message on the glass that can be read from the outside. You would need to start at the right and create mirror letters that travel to the left. If you wrote normally, those on the outside would be looking at everything backwards.

qnoz rof ni emoC

Try to do this and you will feel reversed directional movements for the letters. Our victim feels the reverse movement letter-by-letter. The illustration below would be a likely result if the child actually were able to construct a whole sentence.

Comē in 7or zong.

You can see how this would cause handwriting, spelling and reading problems.

## **Cause And Effect**

The clash between physical and visual input results in attempts to compensate. The most common compensations affect the pencil grip, writing arm and wrist positions as the child attempts to get movements and visual feedback in sync. The student is faced with inventing a process for use of written language that does not lend to change of perceptions. Some manage through compensation to find a way to get the work done, but in reality they are not learning at a rate anywhere close to their potential.

Meanwhile those pupils who are not struggling with the clash of perceptions are learning how to write and read. The curriculum advances steadily and surely, but our subject is not progressing and feels lost.

The pupil is distracted constantly, falling further behind each day and frustration grows continually while trying to cope with the mixed signals being fed to the brain. It seems like the student is not paying attention, and increasingly gives up on the frustrating task as attempts to write continue to result in unacceptable images. The teacher doesn't understand why the pupil isn't learning, continually fails spelling tests, can't write legibly and is obviously not learning to read on pace with peers.

The student is referred for testing and an Individual Educational Plan (IEP) is developed. The future holds continued frustration in special education classes because the perceptual problem is still there.

If the teacher could identify the cause of the trouble, and teach how to correct the perceptual input that prevents success, learning could progress. This manual and examination kit allow that to happen if the school and teacher are willing to invest the time to identify the condition and conduct specific training exercises to correct it.

## **Time, Timing And Cost**

Few schools could invest the time needed to screen every child. But, considering the amount of time and money invested in marginally effective support for the LD students in intermediate grades, would identification and remediation before the end of grade two, have a positive effect on the cost of support for those students?

Based upon the study data, RPS may well be present in 10% of a school population. It was found to be present in 55% to 75% of the LD population studied. How much would be saved if LD case loads in grades 3 and beyond were reduced by 50%?

Primary teachers can conduct a time-efficient group screening of students to identify specific students for testing. That screening activity would require five minutes of class time once a week, or even once a month. It will reveal the students who are below basic proficiency with language skills by the end of the second unit of instruction. The screening process is explained in this manual. See page 12.

# RPS Testing Preparation

The long-term study has identified marker behaviors that strongly suggest the presence of reversed position sensation. The Examination Kit included with this manual provides you with the materials for recording behaviors you observe, and perceptions reported, as the subject participates or responds to the activities. The screening activities are described in this section of the manual.

Please read through the explanations that follow so that you will understand what to look for as you lead the various activities. In some instances you may need to record multiple behaviors observed during a relatively short activity. Background and suggestions for making the observations are provided here, but not in the examination kit itself.

## **Part One – Paper and Pencil Activities**

An activity worksheet is included in the Examination Kit. See page 2. It is designed for use with a range of age groups. You will also have the subject use the reverse side of the worksheet to collect a handwriting sample. You need to identify and save the worksheet, and your observation pages for use with the Interpretation Guide in this manual.

You will need to print at least one copy of the activity worksheet for use by the subject. It might be a good idea to have extra copies. If you establish an ID code process to blind the worksheets, and find need to have a subject use more than one copy, be sure to place the correct ID code on both and on your observation record.

### **Item 1 – Writing Hand Preference and Use, Lateral Processing/Sequencing**

The Activity page offers a set of lines for writing, and a series of shapes for coloring. You will ask the subject to write his or her name on the lines and then color the geometric shapes.

You will be looking for several things as the subject completes the tasks. You will note the preferred hand, and note if the subject switches hands while coloring the shapes. You will number the shapes on your record sheet to identify the sequence used by the subject. Does the subject progress left-to-right, right-to-left or randomly select a shape to color. Mark the first shape colored # 1, the second # 2, etc. If the subject switches hands while coloring, draw a vertical line on your record between the shapes to indicate where the switch occurred.

You will note which muscle groups are moving the pencil, mostly fingers, mostly wrist, or mostly arm. And you need to note the position of the writing hand relative to the image being colored. Is the hand under, beside or above the image? Last but not least, you need to note how the pupil positions the paper.

### **Pencil Grip**

You need to notice specifics regarding how the subject grips the pencil. We want to note, which fingers are touching the pencil and where they are positioned relative to vertical plane in space. The wrist position affects these observations.

If the wrist is rolled outward (hand inverted) the thumb may be on top of the pencil. Depending upon placement, the pointer (or several fingertips may be riding on the barrel of the pencil. When the wrist is rolled outward, they will actually be touching the side of the pencil.

And, the tips of one or more fingers may not be touching the pencil directly. The pencil may be touching the side of the middle, ring or pinkie finger. If the finger on the bottom feels like it is the digit that is pushing on the pencil, the student may be feeling the movements from the bottom and rotational strokes in mirror direction.

### Items 2 and 3, The Curly Line Test

The goal here is to find out the subject's preference for lateral and rotational movement of the pencil. The Activity sheet offers two trials. You will ask the subject to draw a curly or loopy line (a garland or series of loops) starting at the "X" which is positioned in the middle of the page on a baseline. You will explain that the drawing may be placed on either side of the X, but only on one side, and emphasize the X as the start point. You may draw a loopy line in the air with your pointer finger to illustrate as you give the instruction.

Your record sheet offers the following images for recording your observations.



We want to record the direction of movement chosen and the direction of rotation. Note carefully whether the curly line begins with an over-curve or an under-curve, and whether it was produced to the right or the left of the X in the center. Mark the image that represents the subject's movement preference.

The curly line test can tell you if your student tends to prefer clockwise movement or counterclockwise movement with either hand. The student who uses clockwise movement with their dominant hand is usually not found to have RPS. Counterclockwise movement is indicative of RPS, but is also found in many non-RPS students. So, this alone will not be a true indicator. However, consistency for side and direction of movement with each hand is a good indicator that no RPS is present.

Therefore, should trial one reveal either of the preferences below, ask the subject to use the opposite hand in trial two. If the result shows the same tendency with either hand, RPS is not likely.



However, you are testing because the student is having trouble with written language. Please continue the assessment. You will discover specific targets for remediation that will improve the student's proficiency.

Note the posture of the writing hand and wrist during the activity.

## **Pencil Grip, Handwriting Legibility and Fluency**

A means of timing the activity is needed. The timer function on your cell phone would work well.

We want to find out if the pupil can write all of the lowercase letters and ten numerals from memory, and we want to measure the amount of time the pupil needs to complete the task. A formula in the interpretation section of this manual will allow us to establish a production rate for the activity.

An alphabet is provided in the testing kit. You will use it as the subject writes to mark miscues such as capital substitutions and skipped or missing forms. When the subject writes a capital letter instead of the lowercase, write a **C** over the letter image on your sheet. Mark reversals with **R**. Mark missing forms by marking an **X** over the image on your record sheet. Record the amount of time needed to complete the task.

Some pupils may not remember how to write some letters. You will instruct the child to skip a letter they can't remember. If the child stops writing for several seconds, it is likely he or she cannot remember any more letters. Stop your timer and call stop. You can indicate "Task Terminated" on your record along with the amount of time.

0 1 2 3 4 5 6 7 8 9  
a b c d e f g h i j k l  
m n o p q r s t u v w x y z

## **Bi-manual Rotation – The Bottle Test**

An empty bottle with a one-inch cap is needed for these observations. An empty plastic water bottle is well suited. You will ask the subject to pick up the bottle and remove the cap.

We want to record which hand grasps the bottle, which hand grasps the cap, and which hand does the twisting. Does the subject hold the bottle in the right or left hand? Does the pupil twist the cap to remove it, or does the child twist the bottle and hold the cap still? Does the student twist both cap and bottle?

After recording the subject's initial approach, you will demonstrate the alternatives, and ask the child to try each process. You will ask the subject if each alternative feels comfortable or natural, and record any that feel OK.



## Perception of Arm and Hand Positions

### Hand Position

You will ask the student to lay forearms and hands on the table surface with palms down. Ask the child to close his or her eyes and concentrate on how the hands feel.

1. Do your hands both feel like they are in the same exact resting position?  
a. Yes, same. \_\_\_ b. No, different \_\_\_
2. If YES -- do your hands both feel as if they are facing downward?  
a. yes \_\_\_ b. no \_\_\_
3. If NO -- do both hands feel like they could be facing upward?  
a. yes \_\_\_ b. no \_\_\_ **Yes = reversed feeling in writing hand.**
4. If NO -- does one hand feel palm up and one hand feel palm down?  
a. yes \_\_\_ b. no \_\_\_
5. If YES -- which hand feels palm side up?  
a. right \_\_\_ b. left \_\_\_ **Is this the preferred writing hand? Yes \_\_\_ No \_\_\_**

### Forearm Position

Ask the subject to close the eyes again and concentrate on the arms. Try to sense a feeling of up or down in your forearms.

1. Do your arms feel like they are in the same or in a different position?  
a. Yes, same. \_\_\_ b. No, different \_\_\_
2. If the same — do both the arms feel as if they are facing downward?  
a. yes \_\_\_ b. no \_\_\_
3. If NO -- do both arms feel like they could be facing upward?  
a. yes \_\_\_ b. no \_\_\_ **Yes = reversed sensation in writing arm.**
4. If NO -- does one arm feel downward and one arm feel upward?  
a. yes \_\_\_ b. no \_\_\_
5. If YES -- Which arm feels upward?  
a. right \_\_\_ b. left \_\_\_ **Is this the writing arm? Yes \_\_\_ No \_\_\_**

## Physical Arm and Hand Positions

You will ask the subject to stand facing you with arms and hands hanging relaxed by the sides. The record sheet provides questions to guide your direct observations of forearms and hands. The subject should be wearing a short-sleeved shirt or you won't be able to make the observations.

You will next ask the student to extend or stretch the arms downward toward the knees, and record any changes in the forearm and hand positions. A picture is provided to guide your observations of this genetic marker.

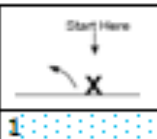
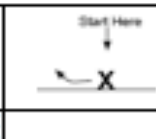
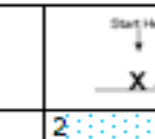
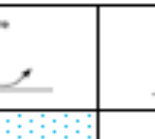
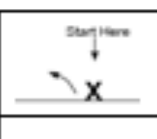

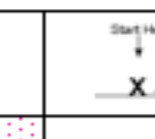
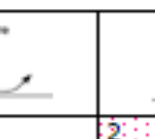
# Testing Interpretation

The charts on pages 10 and 11 are designed to guide interpretation of your observations. As you look at each observation you will find a place on the chart to record it. Simply place an X in the appropriate field. Some fields are colored with a pattern. The patterned fields are the markers for interpretation. Red fields are the strongest markers associated with RPS. Blue marker fields indicate needs for remediation that should be much easier to handle.

The column at the right is available for indicating the number of markers found in each row. If you have placed an X in one or more fields in the row, write the number of marker fields in the space provided. Count blue and red markers separately and indicate the total of each at the right. After filling in the chart, you will total the marker column, # B and # R. The total will lead you to decide upon the remediation plan for execution. Note the chart example below.

RPS WLD Interpretation Chart							Subject ID			
	Writes With			Primarily Moves			Relative To Image			# of colored boxes
	Left	Right	Both	Fingers	Wrist	Arm	Below	Beside	Above	
Preferred Hand		<b>X</b>		<b>X</b>				<b>X</b>		2b
Shape Coloring	Left-to-Right			Right-to-Left or Random						
				<b>X</b>						1b
Grip Posture	Tripod Yes		Tripod No		Odd Thumb	Pointer + Middle/Ring		Closed Fist		
			<b>X</b>			<b>X</b>				2b
Pencil Pressure	Top		Bottom		Side					
			<b>X</b>		<b>X</b>					1r
Which Finger?	Pointer		Middle		Ring	Pinky		Thumb		
					<b>X</b>	<b>X</b>				1b
Karate Edge on Page?	No		Yes							
			<b>X</b>							1b

If your totals show three or more red markers, a strong need for RPS remediation is indicated. The need for intervention grows stronger as the number of markers increases. The blue markers on the chart reveal specific skill needs that should be relatively easy to correct with instruction, directed exercise and correlation of the skill goals into classroom applied work. Two blue markers can easily indicate lagging skill development in written language, particularly when one of those markers is low handwriting fluency. These students will struggle to achieve basic proficiency on state assessments because poor habits retard growth in spelling and composition skills. As a result, reading fluency and comprehension will suffer.

RPS WLD Interpretation Chart						Subject ID				
	Writes With			Primarily Moves			Relative To Image			# of colored boxes
	Left	Right	Both	Fingers	Wrist	Arm	Below	Beside	Above	
Preferred Hand										
Shape Coloring	Left-to-Right			Right-to-Left or Random						
Grip Posture	Tripod Yes	Tripod No		Odd Thumb	Pointer + Middle/Ring		Closed Fist			
Pencil Pressure	Top	Bottom		Side						
Which Finger?	Pointer	Middle		Ring	Pinkle		Thumb			
Karate Edge on Page?	No	Yes								
Paper Holding	LH Good	RH Good		No Turn, R/L		LH Over	RH Inverted			
<p>The curly line observations below should be used in combination. Counter-clock movement trial 1, is a marker, but only when the opposite hand in trial 2 produces the opposite direction. Match the numbers in the colored marker fields.</p>										
Curly Line Trial 1										1 and 1 or 2 and 2 indicate a marker.
Curly Line Trial 2										
Timed Writing	Task Complete	Terminated		# of Reversals		# of symbols C or missing				
	Total seconds	Total seconds		More than 2		More than 2				
Fluency Score	# of Symbols X 60 ÷ Total # of Seconds = LPM					Score Under 40 LPM				
	LPM Score									

Interpretation Chart Pg. 2				Subject ID				
Bottle Test	Holds bottle, twists cap with:		Holds cap twists bottle		Twists both cap and bottle			
	RH		LH	RH	LH	Right hand on cap		Left hand on cap
Bottle Test Try All	If the subject reports twisting bottle with opposite hand feels OK add an additional marker. When LH cap twisting is the only process that feels comfortable add another.							
Hand Position Sensation	Palms down, but feels like facing up		Feels one palm up, one palm down		Dominant hand feels up			
Arm Position Sensation	Both feel up		One up one down		Dominant feels up			
Forearm Observation	Relaxed, forearms and/or hands look different.							
	When stretched, forearm/s rotate outward at elbow but hand/s do not turn outward.							

Total number of red markers: \_\_\_\_\_ Total number of blue markers: \_\_\_\_\_

When red totals exceed two, intensive retraining is highly recommended. A Remediation Guide is available on request from Peterson Directed Handwriting. Send an email request to Rand Nelson or Rowe Kaple and a link to download the PDF document will be provided in a reply.

Rand Nelson <mrpencil@peterson-handwriting.com>  
Rowe Kaple <roweyk@gmail.com>

Peterson Directed Handwriting also offers unique, printable “e-workbook” tools under a building license which covers all teachers for use. A one-time building license fee is \$29.95. The e-workbook allows teachers to print lesson pages for student use from Acrobat Reader as often as needed.

Great emphasis must be placed upon establishing correct approach skills, especially the grip on the pencil, to successfully eliminate the Reverse Position Sensation. The guide teaches a unique “Remediation Grip” that will eliminate the problem and allow letter-writing process re-training to progress smoothly once mastered. A series of arm-movement exercises allow adjustment to the grip posture which corrects hand, wrist and arm position to allow correct perception of movement. Letter formation instruction continues the adjustment in movement-based exercises and extends to application in words.

The same guide can be followed to correct blue-marker skills when a sequenced plan is needed. Non-RPS students will progress rapidly through the directed exercises.

## Quick Classroom Screening Procedure

This short group timed-writing exercise lets you quickly screen your students to identify specific students for RPS assessment. The simple exercise, conducted several times will provide an objective measure that reveal pupils that should be assessed for habits that will retard learning if left uncorrected.

One screening exercise will establish a baseline indicator for each of your pupils. Follow-up exercises will reveal those who are not progressing and they can be assessed thoroughly one-on-one. The group screening activity requires about five minutes including management time.

You will provide paper and ask students to write all of the lowercase letters of the alphabet they remember, in order, and beginning when you give the command. Students should stop writing when you give that command. You can allow 20 seconds, 30 seconds or as much as one minute for writing.

Explain that they can finish the current letter when “stop” is called, and that they should begin again if they have time. Please note, fluent grade-one pupils should be able to write the whole alphabet legibly in less than 30 seconds. You might want to include the ten numerals in the assignment also.

Have students write name or initials and the date on the page and collect the papers for processing. Count the number of legible letters written and write that number on each paper. The goal is to establish a handwriting fluency score. That score is expressed as the number of letters written per minute (LPM).

If you allowed 20 seconds for writing, multiply the number of letters by 3 to convert to LPM. Multiply by 2 if 30 seconds was allowed. If you allowed one minute for writing, the count is the score. Save the papers for comparison to the next exercise. It is recommended that you record the LPM score in your grade book for easy reference and comparison to spelling scores.

In first or second grade an LPM score below 40 is immediately suspect, particularly those less than 30. That student is likely having problems with spelling and lagging in reading. The follow-up activity will be telling. If there has been no improvement you need to find out what’s causing the trouble and correct the problem.

Screening in kindergarten should be done as soon as the children are expected to be able to write words. The minimum fluency goal for kindergartners by year end is 40 LPM. If your curriculum demands use of handwriting for language activities, a lack of fluency will greatly reduce any learning expected from those activities.

The timed-writing exercise will, in and of itself, induce improvement and the children will enjoy having the opportunity to raise their score. Conducting the exercise once each week, will quickly result in increased scores when no issue is blocking progress. A first-grade child may double their LPM score on the second trial because they suddenly recognize the production-rate goal. The activity actually helps the child learn how to tap into the motor system for fluent movement.