Bonnie J. F. Meyer,
D15 President
(2016–2017)
Thank you for the honor of serving our division.
Development, Impact, and Outreach of the Text Structure Strategy to Boost Reading Comprehension

Bonnie J. F. Meyer
Penn State – University Park
8/11/18
Intelligent Tutoring for the Structure Strategy (ITSS)

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grants R305G030072 to The Pennsylvania State University (PI Meyer); R305A080133, R305A120593, and R305A130327 to The Pennsylvania State University/TAMU (PI Wijekumar), and R305A150057 and R305A180060 to Texas A&M (PI Wijkemar). The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.
Critical Importance of Reading Comprehension Across the Life Span

But many struggle – 64% of 8th graders at or below basic reading levels (NAEP, 2017) and they lack needed proficiency.
Presentation

Overview

People
Passion
Persistence
Past
Present
Overview

Medical decision-making

Figure 1. Interactions among reader, strategy, text, and task variables.

Comparison Structure
relates ideas on the basis of differences and similarities.

Main Idea Pattern - Comparison and (two or more ideas) were compared on ____________ and ____________________.

Now write all you can remember about the Crocodilians article. USE THE MAIN IDEA TO HELP YOU REMEMBER DETAILS AS YOU WRITE WHAT YOU REMEMBER. Complete the first paragraph and then move down and complete the second paragraph.

Structure: Comparison

Main Idea: (two or more ideas)

Crocodiles and alligators are different. Crocodiles have long snouts, teeth outside their jaws, and live 50 to 60 years.

In contrast to crocodiles, alligators have __________ snouts, teeth __________ their jaws, and live ____________ years.
OVERVIEW: Text Structure Strategy Increases Reading Comprehension of 4th Graders Through 80-year-olds

e.g., Meyer & Wijekumar (2007, 2016) Intelligent Tutoring of the Structure Strategy (ITSS): A Reading Strategy Tutor

Below grade-level reader in Grade 5 – student’s recall of an article comparing pygmy monkeys to emperor monkeys **before ITSS:**

“The monkeys are the smalls Monkeys weghy Less 4 onces a few in. tall.”

Same student’s recall of an article comparing black flying fox bats to leaf-nosed bats **after 10 ITSS lessons with comparison texts:**

“There are 2 different kinds of bats. A Black flying fox bat and a leaf-nosed bat. The Black flying fox bat is one of the biggest, they grow up to 6 feet wide and weigh more than 3 pounds. They are jet black.

Leaf-noised is smaller than the Black flying bat. The leaf-nois bat is only 1 foot wide. The leaf-nois bats come in different (colors) and mostly feeds on masquitoes and moths.”
Strong Evidence What Works Clearinghouse

IES › WWC What Works Clearinghouse

WWC REVIEW OF THIS STUDY

Large-scale randomized controlled trial with 4th graders using intelligent tutoring of the structure strategy to improve nonfiction reading comprehension.


RANDOMIZED CONTROLLED TRIAL EXAMINING 2,371 STUDENTS, GRADE 4

Reviewed: July 2013
For:

- Single Study Review (105 KB) [Findings for Intelligent Tutoring for Structure Strategy (ITSS)]

Using:

- Single Study Review Review Protocol 2.0
- Review Standards 2.1

Rating:

- Meets WWC standards without reservations

This review may not reflect the full body of research evidence for this intervention.
Evidence for ESSA

Intelligent Tutoring for the Structure Strategy (ITSS) - Elementary

**Program Description**

Intelligent Tutoring for the Structure Strategy (ITSS) is a web-based approach in which students are taught to read nonfiction texts by seeking signals within texts to guide their comprehension. For example, students would learn to look for words like “differ” and “in contrast” to know that a text is making comparisons. After identifying the text structure, students are scaffolded by the text structure patterns to select important ideas from the text to form a main idea and generate strategic hierarchical memory structures. These text structures can also be used to generate summaries, inferences, and elaborations, and to monitor comprehension. Students work with software in which animated “tutors” model and guide the learner, using graphic organizers, highlighted text, and other devices. Students practice, take regular assessments, and receive feedback, proceeding at their own pace through the material.

**Program Outcomes**

ITSS has been compared to control groups in two studies involving fourth and fifth grade students from 45 rural and suburban schools across 3 states. One of the studies showed significant positive effects on a reading comprehension measure, qualifying ITSS for the ESSA “Strong” category. The mean effect size was +0.15. A study involving seventh graders also showed positive effects.
Evidence for ESSA

Intelligent Tutoring for the Structure Strategy (ITSS) - Secondary

<table>
<thead>
<tr>
<th>Essa Rating</th>
<th>No. Studies</th>
<th>No. Students</th>
<th>Average Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRONG</td>
<td>1</td>
<td>2489</td>
<td>+0.18</td>
</tr>
</tbody>
</table>

Program Description

ITSS (Intelligent Tutoring for the Structure Strategy) is a web-based approach in which students are taught to comprehend nonfiction text by categorizing text structures using key elements in the text to find the main idea, activating prior knowledge, supporting cognitive monitoring, and using graphic organizers and flow charts to summarize texts. ITSS is used during regular language arts classes 30-45 minutes a week. Animated "tutors" model and guide learners. Students practice, take regular assessments, and proceed at their own pace through self-instructional units. In the qualifying research, paraprofessionals helped students with the software.

Program Outcomes

ITSS was evaluated in 108 7th grade classrooms in 25 rural and suburban schools. These were randomly assigned to receive the program or serve as controls. On the Gray Silent Reading Test, the effect size after 6-7 months was +0.18. Qualifying ITSS for the ESSA "Strong" category. Positive effects were also found in grades 4 and 5.
https://doi.org/10.1037/edu0000168
PEOPLE

Passion for research area

Persistence and curiosity

Past development and impact

Present outreach & future for text structure instruction
People: Thanks to research collaborators (partial listing)

<table>
<thead>
<tr>
<th>Name</th>
<th>Name</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>George W. McConkie</td>
<td>Sherry L. Willis</td>
<td>Wendy Middlemiss</td>
</tr>
<tr>
<td>Carol H. Walker</td>
<td>Michael Marsiske</td>
<td>Elena S. Theodorou</td>
</tr>
<tr>
<td>G. Elizabeth Rice</td>
<td>Andrew P. Talbot</td>
<td>Ana I. Schwartz</td>
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<tr>
<td>Brendan J. Bartlett</td>
<td>Carlee (Pollard) Ranalli</td>
<td>James P. Dillard</td>
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<tr>
<td>Bruce K. Britton</td>
<td>Connie Russo</td>
<td>Carole Young</td>
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<tr>
<td>Roy O. Freedle</td>
<td>Dorothy Evensen</td>
<td>Yu-Chu Lin</td>
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<tr>
<td>Leonard W, Poon</td>
<td>Melissa N. Ray</td>
<td>Karen R. Harris</td>
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<tr>
<td>Kausalia (Kay) Wijekumar</td>
<td>Gregory Convertino</td>
<td>Roy B. Clariana</td>
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<tr>
<td>Pui-Wa Lei</td>
<td>Kristen M. Weber</td>
<td>Ping Li</td>
</tr>
<tr>
<td>Jennifer J. Ireland</td>
<td>John Carroll</td>
<td>Steve Graham</td>
</tr>
<tr>
<td>D. Jake Follmer</td>
<td>Denise H. Solomon</td>
<td>David Brandt; Michael Cook</td>
</tr>
</tbody>
</table>
PEOPLE home and schools

- Passion – developing
- Persistence & Curiosity
- Past
- Present
Three Grown Children: teacher, veterinarian, & computer scientist

Three grandchildren ages two to five years
Home-Grown Productive Partnership

• Daughter/teacher

• National Board Certified Teacher; taught text structure strategy & extensions in Grades 5 – 8

• Team leader across middle school disciplines where she integrated the text structure strategy into science, math, and writing classes.

• Regional Literacy Coordinator working with 59 school districts
Daughter, a teacher and collaborator—a “homegrown” Productive Partnership in schools

Her quick Sketch of K-12 Evidence-Based Best Practices

Note back of chair: Text Structure as Integral Component of Reading Comprehension Instruction
PEOPLE participating in our studies of all ages and backgrounds

Passion – developing
Persistence & Curiosity
Past
Present

INTELLIGENT TUTORING USING THE STRUCTURE STRATEGY to Improve Reading Comprehension of Middle School Students, Meyer [PI], Co-PI: Wijekumar, Middlemiss, & van Horn; collaborators: Lei & Sperling

Improving Reading Comprehension of Middle Grades English Language Learners by Combining Structure Strategy with Web-Based Adaptive Tutoring for ELLearners (SWELL), Wijekumar [PI], Co-PI: Meyer, Lei, & Schwartz

Development of a web-based writing partner (WE WRITE PERSUASIVELY) to improve writing persuasive essays for 5th grade students, Wijekumar [PI], Co-PI: Harris, Graham, Meyer, & Lei
Two Efficacy Grants from IES

(Another 2 IES efficacy grants just began in July 2018 following up on the SWELL and We-Write grants to TAMU [PI Wijekumar])


Efficacy and Replication Trial of the Individualized Adaptive ITSS with 4th- and 5th-Grade Students in High Poverty Schools. Wijekumar [PI], Co-PIs: Meyer, Lei, & Walpole.
People

PASSION – for developing programmatic research about text structure

- Persistence & Curiosity
- Past
- Present
Passion:
Find, Use, & Think About Relationships Among Ideas & Data

Tip: Look for relationships between different research areas (Meyer & McConkie, 1973)

Recall method & hypotheses from Verbal Learning Psychology with word lists

Related to ideas from Reading Comprehension & authentic materials: *Scientific American* articles (informative & persuasive science texts)
Scientific American articles varied in logical structure (outline of all text ideas)
Text Structure Studies That Influenced Current Web-Based Tutoring of the Structure Strategy: Basic Research

<table>
<thead>
<tr>
<th>Study</th>
<th>Findings</th>
<th>Influence on Structure Strategy Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meyer (1971)</td>
<td>Logical structure predicted text recall better than serial position or rated importance. Structure of text was related to aspects of cognitive structures constructed by readers.</td>
<td>Method for studying comprehension: Identifying main ideas versus details in the logical structure of a text</td>
</tr>
<tr>
<td>Meyer &amp; McConkie (1973)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Reading the Brain and Reading in the Brain: Integrative Approaches toward First and Second Language Comprehension. Li, P [PI], Clariana, R. & Meyer, B. J. F. [Co-PI], National Science Foundation, 8/1/2015-7/31/2019.


Similar to my 1971 master’s thesis but with high technology: fMRI & eye movements data of children and adults reading STEM texts in the scanner along with programs to generate recall patterns per participant (serial, recency, or hierarchical) rather than paper & pencil & Wang calculators in a Cornell room the size of a closet!
Miyatsu, Nguyen, & McDaniel (2018). Cited the text structure strategy work for optimal implementation of outlining and marking (highlighting and underlining)

Miyatsu et al.’s (2018) goal:
Making study strategies that are popular with students work to their best advantage based on evidence-based

Cited our text structure strategy work with both Grades 4-8 with ITSS (e.g., Meyer et al., 2002) Meyer & Wijekumar, 2017) and adults in classrooms (e.g., Meyer & Poon, 2001) as best practice implementation of two of five student-favored practices: outlining & marking.
Speaking of Outlines

I made an appointment with Dr. Grimes, took his advanced seminar that became his 1975 book, *The Thread of Discourse*, put him on my doctoral committee, and made my special interest for Educational Psychology, semantic discourse analysis.

May have kept outlining with intuitive structures (with 91% agreement) had I not taken a linguistics class, where the professor noticed the parallel between my master’s thesis and Dr. Joseph E. Grimes’ work in linguistics.
Upshot: more tools to experimentally manipulate text to answer research questions

Free flowing hierarchical structure (Meyer, 1971)

Application to texts of multiple paragraphs: Grimes’ Semantic Grammar of Propositions (Meyer, 1974; 1975)
Text from Scientific American article (Meyer, 1971; 1974; 1975)

Top Level Structure of Breeder Reactor High Passage: Problem-Solution Type of Expository Text

**In Schizophrenia High Passage: 1 = NEED TO CHANGE ABNORMAL BEHAVIOR OF ADULT SCHIZOPHRENICS, 2 = IMPROVE ADULT SCHIZOPHRENICS ABILITY TO PROCESS INFORMATION, 3 = TREATMENT OF CHILDREN WITH SCHIZOPHRENIA, 4 = ANTI-S-PROTEIN**

**A** = arguments
## Text Structure Studies
### Basic Research

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<td>Meyer (1974/1975)</td>
<td>Patterns of rhetorical relationships influenced learning and memory from text when high in the hierarchical, logical structure, but not low in the structure. Location in hierarchical structure of organization was a factor in main ideas vs. details.</td>
<td>Focus on top levels of the content structure. Identification and study of different top-level structures; led to Meyer et al. (1980). Role of signaling words for cueing different text structures.</td>
</tr>
</tbody>
</table>
Pattern & type of relationships affect recall high in the structure, but not low (Meyer, 1975) -- Led to ---> Focus on relationships at the top levels of logical hierarchical structures = top-level structures
# Passion: Text Structure Studies

**Basic Research**

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<tr>
<td>Meyer, Brandt, &amp; Bluth (1980)</td>
<td>Good 9th grade readers can use problem-and-solution and comparison top-level structures to organize recall, while poor readers just list things remembered. Signaling text structure switches readers with good decoding and poor comprehension skills to use of structure strategy instead of default list strategy.</td>
<td>Identification of the structure strategy and default list strategy. Importance of teaching students with poor comprehension skills how to use signaling words as part of the structure strategy.</td>
</tr>
</tbody>
</table>
problem/
solution

problem
PREVENT OIL SPILLS FROM SUPERTANKER

description (specifics attributes)

explanation
cause/effect

cause
LACK POWER & STEERING

description

effect

cause
SPILLS

description

effect
KILLS

description

200,000 SEABIRDS

description

solution (listing)

(1) TRAIN OFFICERS

description (specifics attributes)

(2) BUILD TANKERS

description (specifics attributes)

(3) INSTALL GROUND CONTROL STATIONS

description

comparison
HALT USE

description

problem/
solution

top-level structure

CAPITALIZED WORDS ARE WORDS FOR THE TEXT and lowercase words show interrelationships.
A PROBLEM OF VITAL CONCERN IS PREVENTION OF OIL SPILLS FROM SUPERTANKERS. A typical supertanker carries a half-million tons of oil and is the size of five football fields. A wrecked supertanker spills oil into the ocean; this oil kills animals, birds, and microscopic plant life. For example, when a tanker crashed off the coast of England, more than 200,000 dead seabirds washed ashore. Oil spills also kill microscopic plant life which provide food for sea life and produces 70 percent of the world's oxygen supply. Most wrecks RESULT FROM THE LACK of power and steering equipment to handle emergencies, such as storms. Supertankers have only one boiler to provide power and one propeller to steer the ship.
THE SOLUTION TO THE PROBLEM IS NOT TO IMMEDIATELY HALT THE USE OF TANKERS ON THE OCEAN since about 80 percent of the world's oil supply is carried by supertankers. INSTEAD, THE SOLUTION LIES IN THE TRAINING OF OFFICERS OF SUPERTANKERS, BETTER BUILDING OF TANKERS, AND INSTALLING GROUND CONTROL STATIONS TO GUIDE TANKERS NEAR SHORE. First, officers of the supertankers must get top training in how to run and maneuver their ships. Second, tankers should be BUILT with several propellers for extra control and backup boilers for emergency power. Third, GROUND CONTROL STATIONS SHOULD BE INSTALLED at places where supertankers come close to shore. These stations would act like airplane control towers, guiding tankers along busy shipping lanes and through dangerous channels.
Text Structure Studies
Basic Research

Only 48% of the entire sample of 9th-grade students organized their recall with the same structure as the text on at least one of the problem-and-solution and comparison texts (Meyer et al., 1980).

Sample of default list strategy:
“This passage is about oil spills. The oil spills on the ocean and poisons them. When the oil spills it kills animals too and, poisons them. I can only remember something about 3 football fields.”
## Text Structure Studies
### Basic Research

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</thead>
<tbody>
<tr>
<td>Meyer (1984), Meyer &amp; Rice (1982)</td>
<td>Think-alouds and recall data supported the structure strategy processing model and importance of signaling cues.</td>
<td>Importance of top-level structure in finding the main idea. Emphasis in subsequent interventions on signaling.</td>
</tr>
</tbody>
</table>
Processing model for use of the structure strategy (Meyer, 1984; Meyer & Rice, 1982).
The Structure Strategy

The structure strategy teaches readers to identify the structure of expository text (Comparison, Problem & Solution, Cause & Effect, Sequence, Description, Listing) and to use that structure to organize their reading comprehension.

PASSION – for developing programmatic research about text structure
## Text Structure & Signaling: Comparison

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Signaling Words used in Comparison Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relates ideas on the basis of differences and similarities. The main idea is organized in parts that provide comparison between differences and similarities.</td>
<td>instead; but; however; or; alternatively; whereas; on the other hand; while; compare; in comparison; in contrast; in opposition; not everyone; all but; have in common; similarities; share; resemble; the same as; just as; more than; longer than; less than; act like; look like; unlike despite; although; just; options; difference; differentiate; different; ...(plus others you can find).</td>
</tr>
</tbody>
</table>

For example: Comparing Killer whales and Blue whales on size, color, and life span.

Meyer, Young, & Bartlett, 1989
Text Structure & Signaling: Problem & Solution

<table>
<thead>
<tr>
<th>Problem/Solution Structure</th>
<th>Signaling Words used in Problem/Solution Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>The main ideas are organized into two parts: a problem part and a solution part that responds to the problem by trying to eliminate it, or a question part and an answer part that responds to the question by trying to answer it.</td>
<td>Problem: problem, trouble, difficulty, hazard, need to prevent, threat, danger, puzzle, question (?), query, riddle, perplexity, enigma, riddle, issue,...and more you can find....</td>
</tr>
<tr>
<td>Examples: Scientific articles often first raise a question or problem and then seek to give an answer or solution.</td>
<td>Solution: to satisfy the problem, ways to reduce the problem, to solve these problems, protection from the problem, solution, response, answer, reply, comeback, recommendation, rejoinder, return, to set the issue at rest, suggestions ...and more you can find....</td>
</tr>
<tr>
<td>Problem of 7 endangered whale species, and solution of a whale sanctuary in Antarctic Ocean</td>
<td></td>
</tr>
</tbody>
</table>

Meyer, Young, & Bartlett, 1989
# Text Structure & Signaling: Cause & Effect

<table>
<thead>
<tr>
<th>Cause and Effect Structure</th>
<th>Signaling Words used in Cause and Effect Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presents causal or cause and effect-like relationships between ideas. The main idea is organized into cause and effect parts.</td>
<td>cause, lead to, bring about, originate, produce, make possible owing to, by means of, accomplish, by, since, due to, because, in order to, reasons, give reasons for, the reason why, if/then, this is why, on account of, in explanation, effect, affects, so, influenced by, as a result, result from, consequence, consequent, thus, therefore, accordingly, for the purpose of, ... and more.…</td>
</tr>
<tr>
<td>Directions often follow the Cause and Effect Structure. For example, if you want good pictures, follow these steps (the cause). Your good pictures are the effect.</td>
<td>For example: Inner ear damage can lead whales to beach themselves.</td>
</tr>
<tr>
<td>Signaling in example: lead to</td>
<td></td>
</tr>
</tbody>
</table>
# Text Structure & Signaling: Sequence

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Signaling Words used in Sequence Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideas grouped by <strong>order</strong> in time (sometimes order of location). The main idea is the sequence of steps, procedure, or history presented.</td>
<td>Later, afterwards, afterward, after, after that, later on, then, subsequently, as time passed, following, continuing on, to end, finally, year(s) ago, at the start of first year...later that year, in the first place, in the second place, first and foremost, first, second, third, 1, 2, 3, 4, ..., next, primarily, secondarily, early, before, to begin with, to start with, more recently, again, finally, until, additionally, the former, the latter, not long after, soon, now, today, after a short while, meanwhile, immediately, last, steps, stages, time line, history, sequence, development.........and more – plus look for a series of dates for histories.</td>
</tr>
<tr>
<td>Examples: history of the Civil War, growth from birth to 12 years old, procedures in a recipe or manual.</td>
<td></td>
</tr>
<tr>
<td>Growth stages of humpback whale: stage 1 nursing calf – up to 6 months, stage 2 leaving mom – 2 years old, stage 3 jumping high – 3 years old, stage 4 reaching adult size – 6 years old.</td>
<td></td>
</tr>
</tbody>
</table>
## Text Structure & Signaling: Listing

<table>
<thead>
<tr>
<th>Listing</th>
<th>Signaling Words Cueing the Use of a List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listing can go with any of the other structures. Listing simply groups</td>
<td>And, and also, also, in addition, in addition to, and then, further,</td>
</tr>
<tr>
<td>ideas together. Articles are often organized as a listing of descriptions</td>
<td>furthermore, include, besides, moreover, first, second, third, fourth, etc., two, three, four, five, .....</td>
</tr>
<tr>
<td>about a topic. A sequence always has a listing of ideas, but more than</td>
<td>subsequent, again, at the same time, another, and so forth, too, plus, together, jointly, likewise, double,</td>
</tr>
<tr>
<td>that the list has a set order in time. A listing can occur when groups</td>
<td>to name a few, and more you can find…..</td>
</tr>
<tr>
<td>of causes are presented, groups of effects are listed, groups of</td>
<td></td>
</tr>
<tr>
<td>problems are stated, groups of solutions are listed, groups of ideas</td>
<td></td>
</tr>
<tr>
<td>are compared to another idea, and so forth.</td>
<td></td>
</tr>
</tbody>
</table>

For example: My favorite whales include humpbacks, finbacks, minkes,     |
and also the rare Right whale.

Meyer, Young, & Bartlett, 1989
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</table>
Power of structures (e.g., comparing, finding causes & effects, looking for solutions)

• Text structures not only describe text, but are cognitive entities in coherence representations of good readers

• (Meyer & Freedle, 1984; Sanders & Noordman, 2000).
The Power of the Structure Strategy

Enables learners to:

1. Follow the logical structure of text and understand how an author organized and emphasized ideas.

2. Use processes parallel to these structures to increase learning and thinking (e.g., comparing, finding causes, looking for solutions to block causes of problems).

3. Students to use these text structures to organize their own thinking and writing.
Text structures parallel to the way we think well: (e.g.,) comparing, identifying and evaluating evidence for causes or effects, ordering, describing, eliminating causes of problems for a reasonable solution.

Comparison: contrast

NOT

NOT pour in text information
Passion: Text Structure Studies

Power of Structure Strategy enables learners to use text structures to organize their own reading, thinking, and writing from single or multiple sources.

Meyer & Poon (2001)

e.g., medical decision making
Structure Strategy

• promotes understanding compatible with coherence-based processes in the Landscape model for text comprehension (e.g., van den Broek, P., Young, M., Tzeng, Y., & Linderholm, T. (1999), situation models (Kintsch, 1998), and macrostructures (van Dijk, 1980).

• teaches that text structures can embed and build on each other to provide a hierarchical, logical structure for nonfiction texts.
Structure Strategy

• Good readers use their knowledge of text structures to build coherent memory representations (e.g., Meyer, Brandt, & Bluth, 1980; Meyer et al., 2010).

• Goal for proficient readers is to ultimately use their knowledge of these relationships to build coherent memory representations even with muddled texts.
Signaling words ("in contrast")

can cue text structure and guide readers toward coherent text representations with their key role in selection and encoding (e.g., Meyer & Poon, 2001).

Explicit signals of important relationships within and among paragraphs in expository texts provide efficient processing instructions for readers with strategic knowledge about text structures (Meyer & Poon, 2001; Sanchez, Garcia, & Bustos, 2016).
What About Readers Who do Not Know How to Use Signal Words or Text Structures Strategically?
Haunted by Average Verbal Adults Not Benefitting from Signaling Words,  

while older adults with more verbal skills benefited from Signal Words as did young adults with average and high verbal skills.
Emperor penguins and Adelie penguins are __________ from one another. Emperor penguins are large penguins. They are the largest of all penguins and may grow to 4 feet tall. These penguins can weigh more than 90 pounds. Emperor penguins display orange ear patches. They have long, yellow-orange streaked beaks in black faces. Emperor penguins feed principally on shallow water seafood. Emperor penguins live on Antarctica's pack ice.

___________ the large emperor penguins, Adelie penguins are __________ penguins. Adelie penguins grow only about 2 feet high. They weigh only about 11 pounds. Adelie penguins have white ringed, beady, black eyes. Adelie penguins have short, feathered beaks on cute faces. Adelie penguins feed almost entirely on krill. __________ the emperor penguins, Adelie penguins live on Antarctica's pack ice.
Meyer, Ray, & Middlemiss (2012) Signaling Test (summed over two versions (Total Possible = 56) & Found Little Change Toward Understanding of Signals by Low Comprehenders
Meyer, Ray, & Middlemiss (2012) “Unlike” and “Same as” (scale is 14 summed over two versions of the Signaling test)
Default List Strategy from Young Adult

Meyer, Young, & Bartlett, 1989
Modeling the structure strategy, teaching the 5 text structures & signals, & how to strategically use them for encoding, monitoring, & retrieval (Meyer, Young, & Bartlett, 1989; Meyer & Poon, 2001) & ITSS
There has been a problem about how to divide the money up when a person dies without having a will. If you go to probate court to try to settle it, it might take up to 6 years to get your money plus all the court costs.

A solution to this problem is to make a trust. This is a substitute for a will. It avoids going to court. Trusts can never die. The trustor can divide up his money the way he wants and it will stay that way unless he changes his mind.
Two views that differ from each other about the railroads of early America.

The business men were excited about them. They knew that it could help their business. The early railroad tracks were short lines. The longest one in the world was 150 miles long.

It was only 14 days instead of 10 days on the boat if you wanted to go to Detroit from New York City.

The farmers were against it, though, because they said the trains were making too much noise and scaring their cattle. They also said it was catching their fields on fire by sparks from the trains. Doctors were worried because they didn't think the body could handle going 30 miles an hour.

The canal people were afraid of the competition.
Doubled Young and Old Adults’ Recalls: Teacher & Student Manuals in appendices of Meyer, Young, & Bartlett (1989, see below) and lessons adapted to fifth-graders in Meyer et al. (2002) and all versions of ITSS and SWELL.

Structure Strategy: Test for You!

“With eight brothers and sisters, birthdays used to be a problem.” Now I send the Birthday Party® Bouquet from my FTD® Florist. It’s more than a gift, it’s a celebration.

Send your thoughts with special care™.

Merlin Olsen
Structure Strategy: Test for You!
Comparison Text Structure in Everyday Life from Ads to Political Debates to Refutation text to Legal Documents
Structure Strategy: Test for You!

Heavy Duty Reynolds Wrap gives you 2 juicy options.

Juicy and Wrapped

You just wrap it all completely in Heavy Duty Reynolds Wrap and roast. When the turkey is almost done, turn back foil to brown the bird. This method makes turkey evenly, keeps it juiced and flavorful, makes it not splattering.

Many women say this is the best way to roast a turkey in perfection. And they’re right.

Juicy and Tented

To start, line roasting pan with Heavy Duty Reynolds Wrap. Then take a sheet of Heavy Duty Reynolds Wrap and “tent” it over lightly browned bird and roast. This method makes turkey evenly, keeps it juicy and flavorful, reduces excess splattering.

Many women say this is the best way to roast a turkey in perfection. And they’re right.
People

**Passion**—for developing programmatic research about text structure

**Persistence & Curiosity**

- Past
- Present
PERSISTENCE & Curiosity

First online instruction with the structure strategy:
Meyer et al. (2002) first on-line attempt teaching structure strategy on web to 5th graders with adult tutors.

Meet Miss Ivy, tutor for Web-based Intergenerational Tutoring of the Structure Strategy.

Tutor emails gave students delayed feedback on their last lesson, encouragement, daily assignments, other examples as necessary.
The structure strategy teaches readers to:

1. Identify text structures organizing expository text & their signaling words
2. Write a main idea using a particular pattern for each text structure (Main idea pattern for comparison: _____ and _____ (2 or more ideas) were compared on ________, ________, and __________).
3. Use the main idea & structure to organize their reading comprehension and recall

```
<table>
<thead>
<tr>
<th>Presidents</th>
<th>Order</th>
<th>Children</th>
<th>Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington</td>
<td>1</td>
<td>2</td>
<td>Farmer</td>
</tr>
<tr>
<td>Lincoln</td>
<td>16</td>
<td>4</td>
<td>Lawyer</td>
</tr>
</tbody>
</table>
```
# Initial Web-Based Structure Strategy Intervention (with random assignment)

<table>
<thead>
<tr>
<th>Study</th>
<th>Training Materials</th>
<th>Findings</th>
<th>Influences on the Structure Strategy Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meyer et al. (2002)</td>
<td>5&lt;sup&gt;th&lt;/sup&gt;-grade students typed work in structure strategy lessons on Internet; adult tutors prepared feedback &amp; assistance in email messages to 5&lt;sup&gt;th&lt;/sup&gt;-graders. 25 lessons</td>
<td>structure strategy groups superior to control group ( (d = .43 - .92) ).</td>
<td>Emphasis on comparison and problem-solution structures: review in later lessons &amp; integration with multiple text structures. Needs for improvements: immediate feedback, audio for poor reader, &amp; better delivery.</td>
</tr>
</tbody>
</table>
Meyer et al. (2002)

Difference between structure strategy group (with tutoring) vs. control (regular school reading activities) evident $2\frac{1}{2}$ months after the end of training (effect size for total recall = .92).
Presentation

Overview
People
Passion
Persistence
Past
Present
Instruction about text structures yielded positive effects for reading comprehension with children and younger and older adults


- Also recent meta-analysis in JEP and RRQ
See: Special Issue on Reading Comprehension edited by Karen Zabrucky in *International Electronic Journal of Elementary Education* (IEJEE)


Presentation

Overview
People
Passion
Persistence
Past
Present  ITSS grants
Overall Goals for our Studies in Schools

How to better reach and teach children the structure strategy to improve their reading comprehension
What is Intelligent Tutoring of the Structure Strategy (ITSS)?

Reading comprehension instruction based on the structure strategy (Meyer, Young, & Bartlett 1989, 2014; Meyer & Poon, 2001) and particularly Meyer et al. (2002) with Grade 5 students & web-based delivery.
Structure Strategy with ITSS and Reading Comprehension

- Text Structure – Comparison, Problem and Solution, Cause and Effect, Sequence, and Description
- Expanding access to the structure strategy
- Consistent delivery, modeling, assessment scaffolding, and feedback
- Multiple domains
- Wide range of reading levels and prior knowledge
- Designing for learners
- Integrating with current practices
What is Intelligent Tutoring of the Structure Strategy (ITSS)?

Identification of text structure

Strategic use of text structure for encoding and retrieval

Learning signaling words for each of five text structures

Monitoring comprehension through summarizing main points according to identified text structure.

Retrieval using text structure as a guide.
What is ITSS?

- Web-based tutoring program
- Animated talking tutor
- Teaching the Structure Strategy
- Began with 5th- and 7th-grade students extended in current efficacy grant to 4th graders and 8th graders
- Extended to ELL learners – native Spanish speakers in Grades 4-6; ITSS lessons with adaptations for Spanish ELL is called SWELL
The Structure Strategy

• Selection, Encoding, Strategic Memory, Comprehension Monitoring, and Application
• Five Text Structures and Nested Structures
• 4 Steps to Application
  • Signal Words (AKA linking words, clue words,...)
  • Identify Text Structure
  • Summarize Using a Main Idea Pattern
  • Recall/apply/monitor
ITTS Texts

- 34% science
- 28% social studies & history
- 23% animals
- 9% sports/contemporary famous people
- 6% foods or recipes
Initial ITSS Lessons (+multi-lessons in content domains for 8\textsuperscript{th} graders)

- 65 lessons with another 30 parallel lessons for extra practice or choice of topics
- 145 texts
  - 13 to 810 words
    - $M = 95$ words
  - Lexiles
    - range 320 - 2060
    - $M$ lexile grade equivalent = 5.43
  - Flesch-Kincaid grade equivalent
    - range 2.6 - 12
    - $M = 7.0$
    + Easy versions at 2 or 3 grade levels
Table 2. Order, Number, and Type of ITSS Lessons by Structure

<table>
<thead>
<tr>
<th>Lessons</th>
<th>Highlighted top-level structure (in context of other structures)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comparison (C&lt;sup&gt;a&lt;/sup&gt;)</td>
</tr>
<tr>
<td>Order of lessons</td>
<td>1</td>
</tr>
<tr>
<td>Total number</td>
<td>12</td>
</tr>
<tr>
<td>Type of lessons</td>
<td></td>
</tr>
<tr>
<td>IT models strategy</td>
<td>2</td>
</tr>
<tr>
<td>Practice&lt;sup&gt;b, c&lt;/sup&gt;</td>
<td>7&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Let’s check</td>
<td>1</td>
</tr>
<tr>
<td>Review structures</td>
<td>1</td>
</tr>
<tr>
<td>Review via writing</td>
<td>1</td>
</tr>
<tr>
<td>TLS integration&lt;sup&gt;d&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>Taught in context of other structures&lt;sup&gt;i&lt;/sup&gt;</td>
<td>d&lt;sup&gt;i&lt;/sup&gt;, c&amp;e</td>
</tr>
<tr>
<td>Other&lt;sup&gt;e&lt;/sup&gt;</td>
<td>2</td>
</tr>
</tbody>
</table>
Evidence that comparison text structure is within the range of elementary and middle school students but not yet completely mastered (Cain, Patson, & Andrews, 2005; Cain & Nash, 2011; Englert & Hiebert, 1984; McClure, Geva, 1983; Meyer, Wijekumar, & Lei, 2018; Peterson, 1986; Richgels, McGee, Lomax, & Sheard, 1987).
Table 3. Counterbalanced Reading Comprehension Measures: Reliability, Testing Time, and Range

<table>
<thead>
<tr>
<th>Measure type</th>
<th>Measure name</th>
<th>Reliability</th>
<th>Testing (Pre, P1, P2)</th>
<th>Score range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple-choice questions correct</td>
<td>GSRT</td>
<td>0.85&lt;sup&gt;b&lt;/sup&gt;–0.95&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Pre, P1</td>
<td>0–65</td>
</tr>
<tr>
<td>Transfer task: Standardized reading comprehension test</td>
<td>(Gray Silent Reading Test [GSRT])</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimenter-designed measures&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem-and-solution free recall task</td>
<td>Total recall</td>
<td>93%&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Pre, P1, P2</td>
<td>0–72</td>
</tr>
<tr>
<td></td>
<td>Top-level structure</td>
<td>97%&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Pre, P1, P2</td>
<td>1–9</td>
</tr>
<tr>
<td>Competency rating for use of problem-and-solution structure</td>
<td>Problem-and-solution competency</td>
<td>93%&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Pre, P1, P2</td>
<td>1–6</td>
</tr>
<tr>
<td>Comparison free recall task</td>
<td>Total recall</td>
<td>90%&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Pre, P1, P2</td>
<td>0–96</td>
</tr>
<tr>
<td></td>
<td>Top-level structure</td>
<td>96%&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Pre, P1, P2</td>
<td>1–9</td>
</tr>
<tr>
<td>Competency rating for use of comparison structure</td>
<td>Comparison competency</td>
<td>98%&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Pre, P1, P2</td>
<td>1–6</td>
</tr>
<tr>
<td>Fill-in comparison signaling</td>
<td>Signaling test</td>
<td>97%&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Pre, P1, P2</td>
<td>0–28</td>
</tr>
</tbody>
</table>

<sup>a</sup> Pre = pretest; P1 = immediate posttest administered at the end of ITSS instruction; P2 = delayed posttest administered four months after ITSS instruction.
<sup>b</sup> Test–retest reliability coefficient.
<sup>c</sup> Cronbach alpha.
<sup>d</sup> Percentage agreement between scorers for all experimenter-designed measures of reading comprehension.
Documentation

• Teacher Manual
• Teacher Monitoring Screen
• Student Keys for Structures & Signals
Keys to Success - Comparison

Comparison Structure relates ideas on the basis of differences and similarities.

Main Idea Pattern - Comparison _______ and _______ (two or more ideas) were compared on _______, _______, and _______.

For example: Comparing Killer whales and Blue whales on size, color, and life span.

Your Key to Success!

From Meyer et al., 2010
Keys to Success - Comparison

From Meyer et al., 2010
Elephants

Two different kinds of elephants exist today; these two types are the African elephant and the Indian elephant. These interesting creatures differ dramatically in ears, backs, and how long they live. African elephants have very large ears. Their backs arch down in the middle. African elephants live 50 to 60 years.

Indian elephants have small ears. The backs of the Indian elephants arch up in the middle. They live 70 to 80 years.

Structure: Comparison

Main Idea:

African and Indian elephants

(two or more ideas) were compared on

ears, back, life span

The African and Indian elephants are different.

In contrast to the African elephant the Indian elephant has...
Simple Main Idea

**Crocodile and Alligator were compared on**

**snouts, teeth, and lifespan**

---

**Double-click the key to close it.**

**Comparison Structure**

Relates ideas on the basis of differences and similarities.

**Main Idea Pattern - Comparison**

___ and ___

(two or more ideas)

were compared on __________, __________, and __________.

---

**Structure: Comparison**

**Thorough main idea:**

**Crocodile and Alligator were compared on**

snouts (Crocodile = long tapered; Alligator = broad rounded), teeth (Crocodile = visible (open and closed jaws); lifespan (Crocodile = 50 to 40 years).**

---

**Your Key to Success!**
Now write all you can remember about the Crocodilians article. USE THE MAIN IDEA TO HELP YOU REMEMBER DETAILS AS YOU WRITE WHAT YOU REMEMBER. Complete the first paragraph and then move down and complete the second paragraph.

Structure: Comparison

Main Idea: (two or more ideas)

Crocodiles and alligators were compared on snouts, teeth, life span.

Crocodiles and alligators are different. Crocodiles...have long snouts, teeth outside their jaws, and live 50 to 60 years.

In contrast to crocodiles, alligators have...rounded snouts, teeth inside their jaws, and live 30 to 40 years.
Some of baseball’s greatest home run hitters are Ruth, Hank Aaron, and Barry Bonds. There are many similarities and some differences among these great hitters. Babe Ruth played 22 seasons of professional baseball. He started his career with the Red Sox and then was traded to the New Yorkers in 1919. New York fans loved Babe, however, Bostonian fans felt cursed after 1919 by selling “The Babe” to the Yankees they believed greatest baseball player of that time. Babe 714 career home run in 1935 setting an existing world record. 

Hank Aaron was another legendary hitter, career spanned 23 years in which time he broke Ruth’s record and hit 755 career home runs in 23 years. Hank Aaron played for the Milwaukee Braves and Milwaukee Brewers.

Just like Babe Ruth and Hank Aaron, Barry Bonds is a great home run hitter. Barry Bonds is beginning his 19th season in professional baseball. He began his career with the Pittsburgh Pirates and now plays for the San Francisco Giants. Baseball fans think that Barry Bonds will break Hank Aaron’s record of career home runs. So far he has hit 658 home runs.
Remember to use one signaling word in your first sentence when you start paragraph 1 about Babe Ruth and another signaling word in your first sentence when you start paragraph 2 about Hank Aaron, and another signaling word in your first sentence when you start paragraph 3 about Barry Bonds. Use your main idea to help you remember the details for your paragraphs.

Signaling words found: similarities, differences, however, similarly, just like

Structure: Comparison

Main Idea:

Babe Ruth, Hank Aaron, and Barry Bonds

(two or more ideas) were compared on
career/years playing professional baseball (Babe Ruth = 22; Hank Aaron = 23; Barry Bonds = 19 so far), # of career homeruns (Babe Ruth = 714; Hank Aaron = 755; Barry Bonds = 658 so far), and what teams they played for (Babe Ruth = Boston Red Sox and New York Yankees; Hank Aaron = Milwaukee & Atlanta Braves and Milwaukee
Less typing/clicking adaptation for 4\textsuperscript{th} graders

Now try using this grid or matrix to fill in the important details (those that we put in our parentheses for our main idea). These are the important details that support the main idea that compares the three athletes on type of athlete, first year of Olympic Competition, medals won, and age. Making a matrix like this can help when you study for a test and need to remember how things compared differ. Watch as I fill in the first row. Now click on the information in the article to fill in the rest of the cells.

### Olympic Women

Olympic athletes Mary Lou Retton, Michelle Kwan, and Dara Torres have many differences. Mary Lou Retton was a gymnast. She competed in her first Olympic Games in 1984 and won a gold medal. She was 15 years old when she won this medal.

Michelle Kwan, on the other hand, is a figure skater. She won her first Olympic medal at the 1998 Olympics when she was 18 years old. It was a silver medal. Michelle says she always competes wearing a necklace her grandmother gave her for good luck.

Unlike Mary Lou and Michelle, Dara Torres is a longtime Olympic swimmer. She won four gold medals at Olympic Games. She won her first gold medal in 1984 when she was 17 years old.
Problem-and-solution key

From Meyer, Wijekumar, & Lin (2011)
Problem-and-solution key

Signaling Words Problem Solution

Problem:
- problem, trouble, difficulty, hazard,
- need to prevent, threat, danger,
- puzzle, question (?), query, riddle,
- perplexity, enigma, riddle, issue,
...and more you can find....

Solution:
- to satisfy the problem, ways to reduce the problem, to solve these problems,
- protection from the problem, solution, response, answer, reply, comeback,
- recommendation, rejoinder, return, to set the issue at rest, suggestions.....

Problem Solution Structure - Recall Pattern:
- The problem is _______ [paragraph(s) includes a description of the problem and, if known, its cause(s)] ________________.
- The solution is _________ [paragraph(s) include a description of the solution and how it gets rid of the cause(s) of the problem(s) or tries to] _________.

Your Key to Success!
Remember to use your main idea to help you remember the details about the article. Check to make sure you have stated the problem. Look to see that you stated what causes the problem (why there is a problem). Be sure you wrote about who the problem affects and how, when, and where the problem affects them. Also, check to be sure you have two solutions that each try to get rid of the cause of the problem.

When you have finished writing, check to make sure you have stated the problem and the solutions with as many details as you can remember. If you remember anything else after checking, then add it.

Structure: Problem/Solution
Signaling Words: solutions, problems, solution

Structure: Problem / Solution

Main Idea: The problem(s) is/are

Suffering from allergies often means a stuffy nose, red and puffy eyes, itchy throat, sneezing, and coughing. Breathing bits of waste and body parts of house dust mites causes problems for people

and the solution(s) is/are

One important solution in treating allergies to dust mites is to completely seal up pillows, mattresses, and box springs with special covers that trap bits from dust mites inside. Another solution to be used with these special covers is to wash blankets and sheets every two weeks in water hot enough to kill the live dust mites

Please Complete your full recall for Problem and Solution

Submit Answer
Let's look at an article that fits this organization.

Rabies is a serious threat to the health of people. Rabies is passed to a person through a bite from an animal with rabies. Pets that can get rabies include dogs, cats, and ferrets. Rabies attacks the central nervous system and it kills people unless they get treatment right after they are bitten and before they get sick.

The solution is not killing all pets that might bite, but instead taking the danger out of possible bites. The best solution to the rabies problem is to be sure pets get their rabies vaccines and booster shots.

Click on the five signaling words for the Problem/Solution structure. When you click on them, they will appear in the top-level structure of the diagram. Carefully look at the article and your list of signaling words on your Problem/Solution key.
Hi, Bonnie, the structure strategy helps you to figure out the most important information to learn and remember.

Today let's see how both the Comparison and Problem/Solution structures can work together in one article. One structure will be the structure at the top (called the top-level structure), which organizes all the information in the article together, and the other structure will support the top-level structure by organizing one of its parts. In the diagram below, the top-level structure is Problem/Solution. The Solution part is organized by a comparison between a solution favored by the author and a solution not favored by the author. Remember, the higher the idea in the structure diagram, the more important it is to the author.
First let's write a main idea with the Problem/Solution structure's pattern. I will write my main idea first, and then you can write your main idea below mine. Remember, don't write in my space!

The problem is people can get rabies from getting bitten by animals with rabies, and the solution is to get rabies vaccines and booster shots for pets.

Structure: Problem / Solution

Main Idea: The problem(s) is/are

first part of main idea

and the solution(s) is/are

second part of main idea

Submit Answer
Watch me as I fill in the diagram with ideas from the article. First I'll put the problem in the space for the problem. For the problem I'll write, 'People get rabies from bites of animals like pet dogs, cats, and ferrets.' Then, I'll write about the favored solution. I'll write, 'Get pets their rabies vaccines and booster shots.' Next, I will add the unfavored solution at the bottom of the diagram. I'll write, 'kill all pets that might bite'. That is an awful solution -- I really like my dog and I always take him for his rabies shots. I agree with the author, that solution should definitely be unfavored at the bottom of the diagram! Since the top-level structure for the article is Problem/Solution we will use the pattern for writing with the Problem/Solution structure, not the pattern for the Comparison structure. When we recall, we will organize our solution part with the Comparison structure, comparing the good solution to the bad one.
Teachers and tests ask you questions about what you read. For example, what would be a good title for this article? What is the main idea? What's happening in the article? For a Problem/Solution article, you might be asked, What was the problem? What caused the problem? How could the problem affect you? What was the solution to the problem? How did the solution solve the problem?

Try answering some of these Problem/Solution questions about the rabies article. If you need some help click here to see the diagram we made of the structure. Also, you can look at what you recalled from the passage.

Your recall:

Rabies is a serious threat to the health of people. Rabies is passed to a person through a bite from an animal with rabies. Pets that can get rabies include dogs, cats, and ferrets. Rabies attacks the central nervous system and it kills people unless they get treatment right after they are bitten and before they get sick. The solution is not killing all pets that might bite, but instead taking the danger out of possible bites. The best solution to the rabies problem is to be sure pets get their rabies vaccines and booster shots.
Cause-and-effect key

From Meyer et al., 2010

Cause & Effect Structure
For example: Inner ear damage can lead whales to beach themselves.

Your Key to Success!

Main Idea Pattern
Cause and Effect

The cause is __________,
and the effect is __________.
Cause-and-effect key

Signaling Words - Cause & Effect
cause, lead to, bring about, originate, produce, make possible, owing to, by means of, accomplish, by, since, due to, because, in order to, reasons, give reasons for, the reason why, if/then, this is why, on account of, in explanation, effect, affects, so, influenced by, as a result, result from, consequence, consequent, thus, therefore, accordingly, for the purpose of, ... and more....

Cause & Effect Structure - Recall Pattern:

The cause is ___________ [paragraph(s) includes a description of the cause of the situation] ____________.

The effect is _________ [paragraph(s) includes a description of the effects or results] ____________.

Your Key to Success!
Increasing complexity with practice and progress

cause and effect

cause DAM BURST

effect

cause FLOOD

effect DEAD & MISSING
Be sure to use at least two signaling words and to include all the causes and effects. To help you remember, use your main idea. When you finish writing CHECK your work! Do you have the causes and the effects and two signaling words? If you have just remembered anything, add it now.

Signaling Words:
1.) Causes
2.) As a result
3.) because
4.) result

Structure: Cause / Effect

Main Idea: The cause is

destroying all of the adult chicken hawks and their nests, breeding grounds, and babies

and the effect is

rats multiplying and overrunning farms and eating the grain in the farmers' barns.

Please complete your full recall for cause and effect

Submit Answer
First Four Paragraphs for Michael Goldman's (1997) 2-page article

Basic Training

You can't teach your dog to read as television's Wishbone does. But you can teach it to be obedient -- and maybe even do a few tricks.

Jackie Martin Kaptan, who trains the famous jack Russell terrier, has 20 years' professional experience working with dogs -- and even tigers, bears and wolves! Her plan can help you develop a perfectly behaved pooch.

Welcome to the Family, Fido!

All dogs need some training. A dog that acts nice and friendly today might not next week. It is, after all, an animal, and can act accordingly.

An untrained dog may bite, chew furniture, bark all night or run away. A trained dog will be a welcome, safe member of the family.
**Cause**

KAPTAN’S DOG TRAINING

**Effect**

TRAIN DOG TO BE OBEDIENT

**Comparison**

**Untrained Dog:** Bites, chews furniture, barks

**Trained Dog:** Is welcome, safe family member
Effect
Train dog to be obedient

Cause
Jackie Kaptan’s basic training

Comparison
Trained dog is welcome, safe family member
Untrained dog: bites, chews furniture, bark all night, run away

Description
Sequence
Getting started:
1. Don’t wait - start 8 weeks
2. Get right equipment: crate, collar, leash, pack or bag, tennis ball & toys
3. Take a class
4. Start with basics: Use leash & teach "Come"

Teach Basic Commands: "Come" is the most important of basics; other basics = sit & stay

List of Basic Rules for 1st 8 weeks of training:
1. Praise often & consistently
2. Correct with sharp "NO" or a gentle tug on leash
3. Short training time close to meals

After 1st 8 weeks training:
Polish basics & add simple tricks

Train yourself to be consistent
Basic Dog Training Text

**Cause**
Jackie Kaptan’s basic training

**Effect**
Train dog to be obedient

**Comparison**
Trained dog is welcome, safe family member

Untrained dog: bites, chews furniture, bark all night, run away

Dog has much to offer: want to be with you & work

**Description**
Maybe even teach a few tricks: speak, shake, roll over

**Comparison**
Not happy sitting in backyard week after week

**Sequence**
Getting started:
1. Don't wait - start 8 weeks
2. Get right equipment: crate, collar, leash, pack or bag, tennis ball & toys
3. Take a class
4. Start with basics: Use leash & teach "Come"

Teach Basic Commands: "Come" is the most important of basics; other basics = sit & stay

List of Basic Rules for 1st 8 weeks of training:
1. Praise often & consistently
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3. Short training time close to meals

After 1st 8 weeks training:
Polish basics & add simple tricks

Train yourself to be consistent
First ITSS grant examined how best to deliver ITSS.

Examined types of feedback & choice (Meyer et al., 2010) and my favorite individualized vs. standard ITSS – online assessment in a lesson to determine the best next lesson for a student (Meyer, Wijekumar, & Lin, 2011).
Improvement of ITSS Through Greater Individualization

Primary Research Questions

Did students in the more individualized ITSS perform better than students in standard ITSS on

- generation of comparison signaling words on an unpracticed task?
- far transfer to a standardized test of reading comprehension?
Secondary Research Question

Did the variation in individualization of instruction affect learning goals or quality of work in ITSS lessons?
Individualized ITSS did not provide students with more time in ITSS, lessons, or texts read than standard ITSS

<table>
<thead>
<tr>
<th></th>
<th>Standard ((n = 66))</th>
<th>Individualized ((n = 65))</th>
<th>(t(129))</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of texts read</td>
<td>51.52 (27.23)</td>
<td>51.72 (23.25)</td>
<td>.05</td>
<td>.963</td>
</tr>
<tr>
<td>Number of lessons worked</td>
<td>37.11 (15.65)</td>
<td>38.40 (14.01)</td>
<td>.50</td>
<td>.619</td>
</tr>
<tr>
<td>Number of 30-minute ITSS sessions</td>
<td>34.53 (10.44)</td>
<td>35.06 (9.51)</td>
<td>.31</td>
<td>.759</td>
</tr>
</tbody>
</table>
Instead, more Individualized ITSS better matched a student’s practice lesson to the student’s online performance in the immediately prior practice lesson.
More Individualized Lessons (vs. Standard Lessons)

- Parallel lessons for extra practice with harder and easy versions while keeping text structure and signaling constant

- Change in sequencing of lessons

- Skipping of lessons
Standard ITSS path from Lesson 14 to 15

- Lesson 14
- any scores of main idea in recall
- Lesson 15
  - dog (standard)
  - F-K = 5.6

Remediation path with easy texts

- Lesson 14
- main idea in recall less than 25%
- Lesson 15
  - 15ae
  - pig (easy)
  - main idea in recall less than 25%
- Lesson 15e
  - dog (easy)
  - F-K = 4.9

Remediation path with standard and alternate texts

- Lesson 14
- 24% < main idea in recall < 50%
- Lesson 15
  - dog (standard)
  - F-K = 5.6
  - 24% < main idea in recall < 50%
- Lesson 15a
  - pig (alternate)
  - F-K = 7.9

Enrichment path with alternate texts

- Lesson 14
- main idea in recall 50% or greater
- Lesson 15a
  - pig (alternate)
  - F-K = 7.9
### Classification of Differentiation Paths for 65 Individualized Students Varying in Reading Comprehension

<table>
<thead>
<tr>
<th>Classification of Differentiation Paths in Individualized ITSS</th>
<th>Reading Comprehension Ability Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>All Remediation</td>
<td>7</td>
</tr>
<tr>
<td>Balance of Remediation &amp; Enrichment</td>
<td>8</td>
</tr>
<tr>
<td>Mainly Enrichment</td>
<td>2</td>
</tr>
<tr>
<td>All Enrichment</td>
<td>2</td>
</tr>
</tbody>
</table>

*Note. \( \chi^2(6) = 12.85, \ N = 65, \ p = .045 \)*
Adapt ITSS to On-line Performance vs. Standard Lesson Sequence

Students in more Individualized ITSS condition showed greater improvements \( (d = 0.55) \) than students in Standard ITSS \( (d = 0.30) \) on the GSRT, a standardized reading comprehension test.
### Interaction Between Standard Versus Individualized ITSS on GSRT Pre- and Posttests

<table>
<thead>
<tr>
<th>Individualization Condition</th>
<th>Reading Ability</th>
<th>M (SD) Pretest</th>
<th>M (SD) Posttest</th>
<th>Paired sample t-test</th>
<th>Paired sample t-test d&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard (n = 66)</td>
<td></td>
<td>35.41 (13.33)</td>
<td>39.35 (11.87)</td>
<td>t(65) = 2.58, p = .012</td>
<td>0.30</td>
</tr>
<tr>
<td>Low (n = 24)</td>
<td></td>
<td>23.58 (9.89)</td>
<td>31.62 (11.54)</td>
<td>t(23) = 3.37, p = .003</td>
<td>0.81</td>
</tr>
<tr>
<td>Middle (n = 20)</td>
<td></td>
<td>37.95 (9.47)</td>
<td>41.05 (9.38)</td>
<td>t(19) = 1.16, p = .260</td>
<td>0.33</td>
</tr>
<tr>
<td>High (n = 24)</td>
<td></td>
<td>46.00 (8.83)</td>
<td>46.23 (9.51)</td>
<td>t(21) = .08, p = .934</td>
<td>0.03</td>
</tr>
<tr>
<td>Individualized (n = 65)</td>
<td></td>
<td>34.05 (12.76)</td>
<td>41.06 (11.95)</td>
<td>t(64) = 5.12, p &lt; .0005</td>
<td>0.55</td>
</tr>
<tr>
<td>Low (n = 19)</td>
<td></td>
<td>22.74 (8.51)</td>
<td>35.47 (11.10)</td>
<td>t(18) = 6.39, p &lt; .0005</td>
<td>1.50</td>
</tr>
<tr>
<td>Middle (n = 24)</td>
<td></td>
<td>32.46 (8.87)</td>
<td>40.08 (11.68)</td>
<td>t(23) = 3.42, p = .002</td>
<td>0.86</td>
</tr>
<tr>
<td>High (n = 22)</td>
<td></td>
<td>45.55 (9.55)</td>
<td>46.95 (10.71)</td>
<td>t(21) = .62, p = .541</td>
<td>0.15</td>
</tr>
</tbody>
</table>

<sup>a</sup> Cohen's d
Adapt ITSS to On-line Performance vs. Standard Lesson Sequence finding for Signaling Test

Students in the more Individualized ITSS condition made more substantial gains on the signaling test from pretest to immediate posttest ($d = .78$) and pretest to delayed posttest ($d = .61$), than students in Standard ITSS from pretest to immediate posttest ($d = .25$) and pretest to delayed posttest ($d = .30$).
Adapt ITSS to On-line Performance vs. Standard Lesson Sequence

Students receiving more individualized ITSS demonstrated higher mastery achievement goals when working in ITSS than students receiving standard ITSS instruction ($d = 0.53$).
Achievement Goals on the Posttest for Individualization Conditions and Reading Ability Levels

<table>
<thead>
<tr>
<th>Goal Orientation</th>
<th>M (SD)</th>
<th>d^a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard (n = 66)</td>
<td>Individualized (n = 65)</td>
</tr>
<tr>
<td>Mastery/Learning Goals</td>
<td>16.60 (5.28)</td>
<td>19.39 (4.39)</td>
</tr>
<tr>
<td>Low (n = 43)</td>
<td>16.88 (4.87)</td>
<td>20.24 (3.64)</td>
</tr>
<tr>
<td>Middle (n = 44)</td>
<td>18.10 (5.00)</td>
<td>19.16 (4.91)</td>
</tr>
<tr>
<td>High (n = 44)</td>
<td>14.94 (5.71)</td>
<td>18.91 (4.47)</td>
</tr>
</tbody>
</table>
Present: Current
Videos online for outreach

Three videos by Wijekumar and Meyer giving information with slides about the text structure strategy:

The Structure Strategy about the structure strategy with the comparison text structure
http://youtu.be/GGBUcfXxqZM

The Structure Strategy - Problem and Solution and Cause and Effect
http://youtu.be/lkPKtZlxrjl

The Structure Strategy - Sequence and Description
http://youtu.be/W78aU7d0xoY
Peppy videos about text students for student and teachers: Focus on strategic memory related to 5 text structures, e.g., [http://youtu.be/d_ZL0yEeUac](http://youtu.be/d_ZL0yEeUac)
Application: Book for Teachers


Recent Development: Recognition of the Importance in Elementary & Middle School of the Text Structure Instruction to Increase Reading Comprehension
Two recent meta-analyses with positive results for text structure instruction and further questions:

Hebert et al. (2016)

Pyle et al., 2017
Present


I am excited about the articles in the special issue and Joanna Williams’ introduction to them. I have read most of articles and they have much to offer.
Emperor penguins and Adelie penguins are different from one another. Emperor penguins are large penguins. They are the largest of all penguins and may grow to 4 feet tall. These penguins can weigh more than 90 pounds. Emperor penguins display orange ear patches. They have long, yellow-orange streaked beaks in black faces. Emperor penguins feed principally on shallow water seafood. Emperor penguins live on Antarctica's pack ice.

Unlike the large emperor penguins, Adelie penguins are different penguins. Adelie penguins grow only about 2 feet high. They weigh only about 11 pounds. Adelie penguins have white ringed, beady, black eyes. Adelie penguins have short, feathered beaks on cute faces. Adelie penguins feed almost entirely on krill. Unlike the emperor penguins, Adelie penguins live on Antarctica's pack ice.

Meyer et al., 2010; 2011, 2018

**Interaction of ITSS by signal words for blanks on posttest for Grade 7 Efficacy Trial**

- Blank 1 – “different”
- Blank 2 – “Unlike”
- Blank 3 – “smaller”
- Blank 4 – “The same as”

*Average Signaling Word Scores*

ITSS lessons with two types of adaptations for native Spanish speakers:

*English extension SWELL* —teaching of novel vocabulary in English and providing students access to on-click assistance at the *word & sentence level* —easy definitions, paraphrasing, and pictures (context clues) with linguistically easier versions of sentences.

• 86% of sample were bilingual and classified as English proficient; they used English extension SWELL
Polar bears hunt mainly seals and feed on much seal meat.
Now let's move on with the comparison articles. Authors often use these comparison articles. Let's move them together and see if you there are signaling words.

Polar bears and Black bears are two species that are very different from one another. Polar bears are native to the Arctic regions, while Black bears live in the forest areas. The two species of bears can weigh more than 900 pounds. Polar bear fur is white and fluffy, while Black bears have dark brown fur. They have a small area around the Arctic Circle. Polar bears live on seals, which are mainly on vegetation and insects.

Unlike huge Polar bears, Black bears have varied diets. Some kinds of Black bears eat only insects, while others eat plants and other meat. These bears, they have sharp teeth. Their lower teeth have flat tops. If you eat a lot of deer, they more common in the available food, such as mainly on vegetation in North American forests.
Now let’s move on with the comparison. Authors often use these signalling words when writing comparison together and there are signs... There are many animals that are huge. They live in all the oceans. Beaked whales are the same as Blue Whales. Beaked whales are much smaller. Some Beaked whales have about 15 feet in the lower and weigh 220+ tons.
Now let's move on with the comparison structure. Authors often use these signaling words when writing comparison articles. Let's read this text together and see if you can find the three places where the authors use comparison words:

Double click to return to the lesson. Haga doble clic para volver a la lección.

Blue Whales eat much krill.

Krill are tiny animals that float in the ocean.
Now let's move on to beaked whales. Authors often use comparison and contrast to explain how these animals live together and survive. There are similarities and differences.

There are several species of beaked whales and Beaked whales are just one of the many types of animals that live in the ocean. They can grow to be over 100 feet long and weigh over 20 tons. They are dull, blue-gray animals that live in all the oceans of the world. They feed on krill, which are tiny shrimp-like animals.

Unlike the other whales we've discussed, beaked whales are smaller. Some species are only about 15 feet long and weigh about 3,000 pounds. Beaked whales have two blowholes in the middle of the melon above the mouth. Beaked whales have two blowholes and their bodies are shaped to resemble those of the birds. They have a beak-like snout that looks like a bird's beak and has 2 to 4 teeth in their bottom jaw.
Now let's move on with the comparison structure. Authors often use these signaling words when writing comparison articles. Let's read the article about whales together and see if you can find the three places where there are signaling words.

<table>
<thead>
<tr>
<th>Blue Whale</th>
<th>Beaked Whale</th>
</tr>
</thead>
</table>

Unlike the huge Blue Whales, Beaked whales are smaller.

The Beaked whales have no upper teeth. The Beaked whales feed mainly on squid and fish. The same as the Blue whales, the Beaked whales live in all the oceans.
Wink growls if picked up from Mrs. Jello's lap.
Two Very Different Dogs

Double click to return to the lesson. Haga doble clic para volver a la lección.

Dakota never growled.

Click 'Finished Reading' when you have finished reading the article.

ITSS lessons with two types of adaptations for native Spanish speakers:

*Spanish scaffolding SWELL* — procedural instructions on using the structure strategy and practice text previewed in Spanish followed by the English language of the lesson (with easier or usual ITSS text versions – see Meyer, Wijekumar, & Lin, 2011)

- 3% of sample: children classified as Spanish speakers who were receiving instruction in Spanish and the ITSS Spanish scaffolding.
Hola Bonnie, hoy vamos a leer el artículo "Rabia". Al igual que el artículo de adelgazamiento de la mascota regordeta, este artículo es típico en los artículos de ciencia, medicina, y medicina veterinaria que utilizan la estructura de problema / solución. Primero, el autor presenta el problema y te indica a quién o quién afecta el problema. El autor también dice que tan grande es el problema y por qué es un problema. El autor a menudo dice el "quién, qué, cuándo, dónde, por qué y cómo" del problema. A continuación, el autor te da los pasos para evitar el problema (o deshacerse de él). Hoy, para el artículo "Rabia" escribirás el nombre de la estructura, darás clic en las palabras de señalización, escribirás la

Hi Bonnie, today we are going to be reading the article "Rabies". Just like the slimming the plump pet article, this article is typical of articles in science, medicine, and veterinary medicine that use the problem and solution structure. First the author presents the problem and tells you who or what the problem hurts. The author also tells how big the problem is and why it is a problem. The author often tells you the "who, what, when, where, why, and how" of the problem. Then, the author gives you the steps for avoiding the problem (or getting rid of it). Today for the "Rabies" article you will type the name of the Structure, click on the signaling words, type your main idea, and type your recall. Let's get started. Listen and read along as I read the article.
Main research question from SWELL development grant:
Do students in Grades 4 and 5 classrooms randomly assigned to SWELL, as a partial substitute for the standard language arts curriculum, outperform students in control classrooms on standardized and researcher-designed measures of reading comprehension?

Promising Answer:
Effect sizes of SWELL on the standardized GSRT reading comprehension measure ranged from moderate (.47 for Grade 5) to large (.79 for Grade 4).
Awareness and strategic used of text structure are important skills of good readers (Meyer, Brandt, & Bluth, 1980), and we have found that these skills can be taught to students who haven’t picked up these skills on their own. Understanding nonfiction text is critical to success in school and throughout life.

The structure strategy provides students with a framework for organizing their learning that is linked to how they interpreted what they read. A reader’s cognitive representation using the structure strategy is hypothesized to be organized based on how big ideas from the text are related by comparing, describing, sequencing, explaining, and arguing for solutions.
Text Structure Strategy integral component of reading comprehension instruction – not just supplemental!

Joanna William’s view text structure instruction should be included as a prominent part of a full reading comprehension curriculum

Next Thorndike Awardee, J. P. Williams, taught 2nd graders to use the text structure strategy
Main point for moving ahead:

Text structure instruction (strategic use of text structures & signaling) as a critical component of regular reading comprehension curricula for Grades 2 – 7, rather than supplementary
Why?

You can integrate other strategies and skills within strategic use of the text structure strategy. It already has systematic procedures for finding main ideas, monitoring comprehension and self-regulation, self-questioning, making inferences related to text structure relationships, and encoding and retrieval strategies.
Why?

Everyone needs to be able to follow the logical structure of important texts.
Text Structure as Integral Component of Reading Comprehension Instruction

Jennifer Ireland, a “homegrown” Productive Partnership in schools

Partners in schools to optimize in local settings.
Bonnie J. F. Meyer

Professor of Educational Psychology at Penn State; bjm8@psu.edu

https://ed.psu.edu/directory/bjm8