

Twisted Pictures

Twisted Pictures helps participants develop sentence comprehension skills, and helps participants improve syntax and working memory as well as vocabulary skills, all of which are crucial for flexible, fluent reading. Twisted Pictures also helps participants improve their logic skills, another important factor for proficient reading.

Reading Curriculum Standards and Twisted Pictures

Twisted Pictures reinforces the following nationwide Language and Reading Arts curriculum standards that center on third grade but contain items above and below grade level:

- Use sentence and word context to find meaning of unknown words
- Understand and be able to use complete and correct declarative, interrogative, and imperative sentences
- Identify articles
- Identify adjectives and compound words
- Identify pronouns
- Identify past, present, and future verb tenses properly
- Demonstrate comprehension by pinpointing answers in text
- Extract appropriate and significant information from text, including problems and solutions

The Skills Developed in Twisted Pictures

Twisted Pictures helps the participant improve sentence comprehension in the following ways:

- **Sentence comprehension:** Twisted Pictures presents four syntactically similar sentences, one of which best describes the picture shown. The participant must comprehend each presented sentence in order to choose the sentence that best describes the picture on the screen.
- **Syntax:** Twisted Pictures presents 17 syntactic structures of varying complexity.
- **Working memory:** The participant must hold each word of the four presented sentences in mind to construct a gist for each sentence, and then must hold those gists in mind while choosing the correct sentence. Developing working memory abilities will help the participant not only keep sentence gist in mind but also read and comprehend more complicated and lengthy texts.
- **Logical reasoning:** Because sentences use reversible nouns, similar vocabulary, and similar syntax, the participant must use logical reasoning rather than relying only on common sense to comprehend each sentence and choose the correct sentence. Using logical reasoning

to comprehend sentences allows the participant to become a flexible reader.

- **Vocabulary:** As the participant progresses, Twisted Pictures presents longer sentences that use more advanced vocabulary words. Vocabulary skills contribute to automatic word recognition, which is an important factor in fluent reading. Reading a key set of words several times in different sentences further contributes to automatic word recognition.

How Participants Work on Twisted Pictures

When the participant clicks the yellow paw, a painting and four sentences appear. The participant must choose the sentence that most accurately describes the painting.

How Participants Progress through Twisted Pictures

Twisted Pictures progresses through three levels of difficulty as follows:

- **Level 1:** The participant works on sentences that contain, on average, 6 words. Words are at the 2nd grade level at highest.
- **Level 2:** The participant works on sentences that contain, on average, 8 words. Words are at the 3rd grade level at highest.
- **Level 3:** The participant works on sentences that contain, on average, 12 words. Words are at the 4th grade level at highest.

At each level, Twisted Pictures presents 6 tiers of syntactic complexity. Each tier contains several different syntactic structures (categories) that are all mastered at roughly the same age:

- **1st tier:** Simple clauses, prepositional phrases, negations, conjunctions
- **2nd tier:** Subject relativization—sentences containing a relative clause that describes the subject of the main clause
- **3rd tier:** Transformations and embeddings that challenge Subject-Verb-Object parsing
- **4th tier:** Complex subject relativization—sentences containing a Subject-Verb-Object relative clause that describes the subject of the main clause
- **5th tier:** Object relativization—Subject-Verb-Object sentences containing a relative clause that describes the object of the main clause
- **6th tier:** Cleft sentences and subject infinitival clauses

Twisted Pictures works on syntax through the level expected for 3rd grade.

How Participants Advance in Twisted Pictures

Twisted Pictures presents syntactic structure categories in variable order to give the participant exposure to all syntactic structures. This strategy simulates real-life

situations in which the participant is surrounded by people using a variety of syntactic structures in everyday conversation. It also prevents the participant from advancing steadily and then suddenly getting stuck, becoming frustrated, and withdrawing attention from the exercise.

The participant works on 4 different trials for each category, and the participant works on all 4 of these trials before Twisted Pictures moves on to the next category.

Twisted Pictures presents a total of 17 different syntax structure categories at each level.

Plateau-Based Transitions

Twisted Pictures does not use plateau-based transitions for the following reasons:

- Twisted Pictures presents all categories of syntactic complexity at each level.
- Each level increases the difficulty of sentence length and vocabulary level but not the complexity of the syntax.

Therefore, Twisted Pictures requires the participant to work on the trials at each level until he or she achieves 90 percent accuracy. At that point, the participant is better prepared to work on the same syntactic structures in longer sentences with more difficult vocabulary words.

Points Rewarded in Twisted Pictures

Twisted Pictures awards points to the participant based on the following conditions:

- **Correct answers:** The participant earns 7 points for each trial that is correctly completed.
- **Bonus points:** After the participant completes 10 trials correctly, Twisted Pictures rewards the participant's performance with 20 bonus points.