

# A MODEL FOR UNDERSTANDING THE POINTS OF STORIES\*

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## ABSTRACT

This paper describes a proposal and some preliminary evidence in support of a model for understanding the points of simple stories. The proposed model differs from existing systems in that it includes, in addition to a representation of the plans and goals of each of the story characters, a model of the beliefs and intentions of the author and the reader. It is hypothesized that readers use story-specific information in conjunction with their own beliefs about the story events in order to make inferences relevant to the point of the story that the author intended. Evidence from adult readers is presented in support of each of the components of the model and their interaction. The proposed model has relevance for psychological and computational research on story understanding. The work also has implications for more general discourse situations in which understanding is predicated on the knowledge of shared beliefs.

## 1. INTRODUCTION

During the past decade, a great deal of research in cognitive science has been devoted to understanding the nature of stories and story understanding abilities. Some of this work has focused specifically on the plans and goals of story characters [Rumelhart, 1977; Schank and Abelson, 1977; Bower, 1978; Wilensky, 1978], while other research has attempted to describe characteristics that make stories interesting [Wilensky, 1983], enjoyable [Brewer, 1982; Brewer and Lichtenstein, 1982], and thematically significant [Dyer, 1982; Lehnert, *et al.*, 1982; Schank, *et al.*, 1982]. Despite recent progress in analyzing stories, current story processing models have been concerned far more with the plans, goals, motivations, and emotions of story characters than with the beliefs and intentions of readers and authors. An important assumption underlying the research presented here is that, in order to understand the *thematic content* or the *point* of a simple story, a human reader or a story understanding system must be able to represent its own beliefs, as well as the beliefs and intentions of the story's author. In this paper, we present a model of story understanding that consists of several kinds of information that readers use in making inferences relevant to the points of stories. Following a description of the model, we discuss the results of several experiments that provide tentative support for each of the components of the model and their interaction.

## 2. DESCRIPTION OF THE MODEL

### 2.1. Story Outcome Component

In order to understand the points of simple stories, a reader or a story understanding system must be able to infer the author's purpose in writing stories. Consequently, an important component of any theory capable of generating the points of stories is a model of what the author thinks or believes. In didactic stories, such as fables, the author's beliefs are usually reflected by the story's outcome, or by the positive or negative consequences experienced by each of the characters at the conclusion of the story. For example, in the fable *The Tortoise and the Hare*, the reader can infer from the story's outcome that the author believes that it is morally correct to be diligent and hard-working like the tortoise, and morally wrong to be boastful and over-confident

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like the hare. Given this characteristic of didactic stories, it is possible to account for many aspects of story points by a theory that focuses on the story's outcome. Within this framework, a simple procedure for generating the points of stories can be described as follows:

- (1) IDENTIFY OUTCOME: Identify the positive or negative outcome of each story character.
- (2) IDENTIFY ACTION: Identify the morally significant action(s) that lead to the story outcome.
- (3) GENERALIZE: Provide a general description for each morally significant action that occurs in the story.
- (4) STATE POINT: Assert that people should perform morally significant actions that have positive outcomes, and should not perform morally significant actions that have negative outcomes.

A representation of *The Tortoise and the Hare* in terms of this simple framework is shown in Figure 1.

CHARACTER	OUTCOME	SPECIFIC ACTION	GENERAL ACTION	POINT
TORTOISE	+	Persistent in running a race against the hare.	DILIGENT	BE DILIGENT
HARE	-	Negligent in running a race against the tortoise.	OVER-CONFIDENT	DON'T BE OVER-CONFIDENT

Figure 1. An outcome-based analysis of *The Tortoise and the Hare*

## 2.2. Just World Component

In section 2.1 we described a simple procedure for generating the points of stories based on information relevant to the story's outcome. While this procedure is adequate for many simple stories, an outcome-based approach does not always generate the best point for stories in which the outcome-based point is inconsistent with the point inferred to be the author's. For example, consider the case in which the outcome of *The Tortoise and the Hare* is reversed, so that the hare rather than the tortoise wins the race. Based on the outcome of each character, the story outcome component would generate the following set of points:

PEOPLE SHOULD BE OVER-CONFIDENT  
PEOPLE SHOULD NOT BE DILIGENT.

Given this set of points, the reader can make one of two assumptions:

- (1) the outcome-based point is the point of the story that the author actually intended;
- (2) the outcome-based point is *not* the point of the story that the author actually intended. The author's real purpose in writing the story is to point out that there are instances of moral injustice in the world. That is, sometimes lazy and over-confident people are rewarded, while hard-working and diligent people are not.

In order to arrive at the latter, or *ironic* interpretation of the story, the reader must compare the actions and outcomes of each of the story characters to his or her own beliefs about moral justice. Since the model described here is intended to account for the comprehension of didactic stories, such as fables, the reader's belief system is based on Lerner's [1980] concept of a *just world*. In the context of the story world, the just world hypothesis predicts that stories will be morally satisfying when "good" characters experience positive outcomes and "bad" characters experience

negative outcomes. Unlike the simple procedure based on story outcome, the just world component generates story points by evaluating story outcome information relative to the positive or negative valence of each of the character's actions. An example in which the story outcome component and the just world component interact to produce an ironic story point is provided below.

### 2.3. Story Outcome vs. Just World Interpretation

Ironic story points result when the action-outcome mappings represented by the story outcome component are inconsistent with the action-outcome mappings represented by the just world component. For example, in the reversed-outcome version of *The Tortoise and the Hare*, the hare is rewarded for being boastful and over-confident, and the tortoise is punished for being hard-working and diligent. Since the relationship between action valence and outcome valence is inconsistent with the beliefs specified by the just world component, the model concludes that the author intended the text to be ironic, and produces a story point that reflects the immorality or injustice of the story's outcome. A schematic representation of the interaction between the two components is shown in Figure 2.

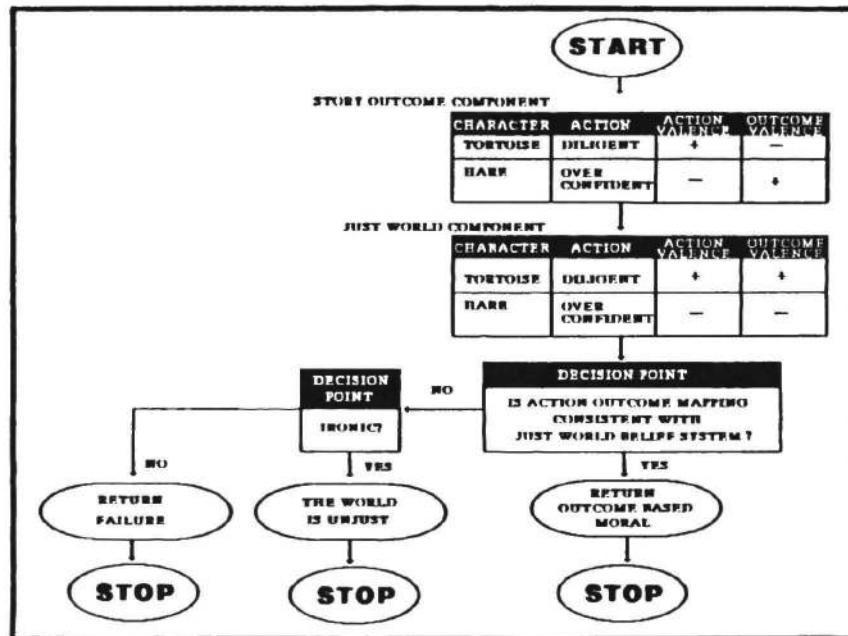


Figure 2. An ironic reading for the reversed-outcome version of *The Tortoise and the Hare*.

### 3. SUMMARY OF EXPERIMENTAL FINDINGS

In order to test the proposed model, we asked subjects to read and state the points of three types of stories. Type 1, or *canonical* stories, were selected from the Penguin edition of *Fables of Aesop* [1982] by two coders who independently rated each story for clarity of point. In each of the Type 1 stories, positive or negative action valence was consistently paired with the positive or negative outcome valence for each of the characters in the story. These stories served as the base narratives for the manipulated story types. Type 2, or *reversed-outcome* stories, were constructed stories in which the outcome of the focus character was reversed. In these stories, good characters were punished for performing good deeds (like helping another animal in trouble), and bad characters were rewarded for doing evil deeds (like being greedy or deceptive). Thus, in Type 2 stories, character valence and outcome valence were inconsistently paired. Type 3, or *no point* stories, were constructed by pairing a neutral event sequence with a positive or negative outcome for each of the focal characters in the story. In Type 3 stories, there was no causal relationship between the actions performed in the story and the positive or negative outcomes for each of the

story characters. As a result, type 3 stories were predicted to be the most unnatural story type for the reader.

If readers use information relevant to action valence and outcome valence in generating the points of stories, we would expect subjects to have more difficulty stating the points for Type 2 and Types 3 stories than for Type 1 stories. Table 1 indicates that this prediction is correct. A greater percentage of subjects were able to generate points for Type 1 stories than either of the manipulated story versions. In addition, subjects found the reversed-outcome and no-point stories less clear, less prototypical, and less likable than their canonical counterparts. A possible interpretation of the results is that subjects were simply better at generating points for stories with which they were familiar. However, an analysis of subjects' familiarity ratings indicates that the percentage of yes/no responses produced by the subjects does not vary as a function of familiarity, and that subjects are more likely to be responding to consistencies or inconsistencies in action valence and outcome valence included in the test stories.

	YES (%)	NO (%)
CANONICAL (TYPE 1)	97.11	2.89
REVERSED-OUTCOME (TYPE 2)	77.33	22.67
NO-POINT (TYPE 3)	45.50	54.50

Table 1. The percentage of adults who stated points for each story type.

Based on the proposed model, we also predicted that readers would be more likely to generate *ironic* interpretations when the mapping between action valence and outcome valence was inconsistent with the reader's beliefs about moral justice. Table 2 lists percentages of point types for Type 1 and Type 2 stories. Subjects' points were coded as *outcome-based* if the point of the story was based solely on information relevant to the story's outcome. Points were coded as *ironic* if the reader's point was in opposition to the outcome-based point, or commented on the immorality or injustice of the story's outcome. Points that were neither outcome-based nor ironic were coded as *other*, and cases in which readers were not able to state a point for the text were coded as *no point*.

	OUTCOME-BASED	IRONIC	OTHER	NO POINT
CANONICAL (TYPE 1)	80.55	1.38	15.27	2.77
REVERSED-OUTCOME (TYPE 2)	30.55	31.94	12.50	25.00

Table 2. The percentage of point types across each story type.

Table 2 indicates that most readers generated outcome-based points for the Type 1 stories, in which the story outcome component and the just world component were in agreement. However, in the case of the Type 2 stories, at least as many subjects generated ironic points as outcome-based points. This finding suggests that, when action valence is inconsistent with outcome valence, the reader's beliefs play a significant role in evaluating the author's intentions and in making inferences relevant to the point of the story.

#### 4. CONCLUSION

We have presented a model for understanding the points of simple stories that departs from previous research in some important ways. While existing models have focused on the plans and goals of story characters, the model presented here uses story-specific information to make inferences relevant to the author's purpose in writing the story. In order to reconstruct the author's intentions, the reader is hypothesized to rely on information relevant to the positive or negative actions of the story characters, the positive or negative valence of the story outcome, and his or her own beliefs about the universe of action described in the story. While this work is restricted to a highly specific domain, the mechanisms described in the model and supported by the data seem to characterize an important part of the point generation process. The findings have implications for psychological and computer-based models of story understanding. The results are also relevant to more general discourse situations in which the interpretation of meaning is contingent on the knowledge of shared beliefs.

#### 5. ACKNOWLEDGEMENTS

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