Plot Analysis for Describing Punch Line Functions in Shinichi Hoshi's Microfiction

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Abstract

This paper proposes a method of describing narrative structure, that focuses on the behavior of the characters in the story. It also proposes to assign the concepts of focus, polarity, dynamic, motivation, and result as attributes of behavior. Utilizing these attributes, the plots of short-short stories by Shinichi Hoshi can be represented formally. Moreover, the method presented here shows that some reversal punch-line patterns can be described using the data captured from plot representations.

1 Introduction

Through information processing technologies developed in recent years, many quantitative analyses of literature, including bibliometrics, have been carried out in various ways. Though it is difficult to capture all story structures and their interpretations using machines at present, it is possible to incorporate quantitative indicators of narrative analysis in order to enhance the objectivity of the story analysis. Utilizing an eclectic approach including quantitative and traditional humanities methods, such as structural analysis [1] and conventional plot analysis [2], the characteristics of narrative structure and changes in the narrative pattern can be extracted [3]. However, the narrative descriptions produced to date only focus on identifying individual plot functions. Therefore, existing descriptions are not sufficient to extract the narrative functions of the story as a whole, including motivation, behavior, outcome, irony, and other rhetorical devices. Moreover, complex stories with parallel narrative structures have not been analyzed.

The purpose of this paper is to develop a plot analysis method to describe parallel story lines and punch lines. If it were possible to describe punch lines in complex stories, a database suitable for capturing general narrative structure could be realized. Moreover, if a punch line can be automatically extracted from the proposed plot description, it would be possible to compare stories quantitatively and to create "elaborate" story structures automatically using artificial intelligence [4].

2 The goal of plot analysis

Since the purpose is to develop a narrative structure description suitable for a database, the major problem is how to describe the plot as an element of the story. In traditional plot analysis, the plot is generally described as a sequence of functions in each part of the story

[2]. However, the story functions in a specific portion of text are not always reducible to a single type. Therefore, several story functions, constructed from the words and actions of the characters, need to be extracted in parallel for each portion of the text. In this paper, the plot is defined as the sequence of those parallel functions. In addition, it is necessary to consider the hierarchical structure of story functions in plots. Several functions of a small portion of the text sometimes compose one abstract function in the larger plot structure [5].

Firstly, in order to describe parallel story functions, this paper focuses on the character's behavior. Moreover, the desired outcome of the present study is to arrange and categorize character behaviors and store them in a database system [6]. In order to implement the description of punch lines in the plot structure, it is necessary that all the elements that constitute the punch line are included in the data.

Therefore, as a case study, the plot structure of microfiction known as the "short-short stories" of Shinichi Hoshi, is featured in this paper. Hoshi is the most famous short-short writer in Japan and the author of 1000 short-short stories. The short-short story has many genres, but, as an example of microfiction, is composed of less than 10000 Japanese characters. Most short-short stories have a concise text style and clear punch lines. Hoshi's work is characterized by various plot structures that include a variety of unexpected punch lines.

Although there are many definitions of a punch line, in this paper, a punch line is defined as the unexpected turning point of a story. In many short humorous stories or jokes, these turning points are near the end of the story. Punch lines are positioned near the end in order to arouse readers' feelings at the conclusion. Moreover in other genres, unexpected turning points often take place in the end or the latter part of stories. These turning points also function to arouse interest, excitement, or surprise for readers. In this paper, the definition of a punch line includes all such intentionally-structured turning points.

Based on an analysis of Hoshi's work, the elements required to describe the data regarding various punch lines can be derived. This analysis will be useful for constructing an "elaborate" story.

3   Plot and behavior of characters

When the characters' behaviors are classified and registered in a database, it will be useful to ascribe attributes to them in order to compare their functions in similar stories. For example, if the relationship between the protagonist and antagonist is hostile, the representation of hostility can take various forms, such as the destruction of property, damage of reputation, or physical harm. However, it is desirable that these representations be categorized in a unified manner.

In order to identify the changes in plot structure, it will be useful to identify the active agent, hereafter A, who is the person given agency, and the recipient or intended victim of the action, hereafter B. Furthermore, the motivation of the action and the outcome also need to be distinguished. In addition, the speech acts of A and B need to be included and distinguished from physical behavior so that the role of the punch lines can be captured.

Therefore, in this case study, the behavior of the characters is categorized according to three attributes: focus, polarity, and dynamic. The focus is the type of behavior. The polarity is the negativity or positivity of the effect of the behavior. The dynamic is the relationship between A (the agent) and B (the intended recipient) in the story. The motivation of the behavior and its results are described in accordance with these three attributes in order to record the plot data before and after the behavior.

3.1 Focus, polarities, and behavioral dynamics

Firstly, concerning the focus of behaviors, five major categories (Target, Self, Situation, Intention, and Evaluation) are adopted in this version of the study. Included in those major categories, there are fourteen sub-categories. Secondly, concerning polarity, at least two attributes, negative and positive, are required. In some cases, it will also be necessary to attribute the extent of the polarity involved. In this paper, which focuses on clear reversal patterns of the positive and negative in the punch lines of Hoshi's short-short stories, a bipolar attribute (positive-negative) is employed. Thirdly, concerning the behavioral dynamic, a first-person situation is one in which A's behavior plays the most important role. A second-person situation is one in which the relationship between B and the other characters is assumed. Third-person situations occur when the active agent of the behavior is unclear or unknown.

It is expected that the list of behaviors will vary by genre and author. Hence, it is impossible to prepare a comprehensive list of all behaviors from the outset. Therefore, this paper lists the behaviors necessary for analyses conducted to date. Although the table 1 does not provide a complete list of behaviors in all stories, it is assumed that the list and classifications will be extended appropriately in future analyses.

Table 1 shows the current categorization based on the three above-mentioned attributes, of the characters' behavior that occurs frequently in Hoshi's short-short stories. For example, when the major focus of the behavior is the target and the sub-category is information, positive behavior is related to actions about obtaining information, and negative behavior is related to the concealment of information. In addition, in the case of positive behavior, regarding the behavior (Investigation) that A displays, the most important role is categorized as first person. Behavior (Question) that requires another character to satisfy, is categorized as second person. Behavior (Watch, such as watch TV) for which the source of the information is unclear, is categorized as third person.

3.2 Motivations of behaviors

To make a database of character behavior, in addition to recording the functional attribution of behavior, it seems useful to record the motivations of characters to achieve a deeper analysis of the story. This is because, although the pattern of behavior changes in the story, the underlying motivation can remain the same. However, although Maslow's structure of hierarchical desires [7] is well known, many motivations are not included. For example, he does not include mandatory behavior, habitual behavior, impulsive behavior, anger and frustration, or boredom and curiosity. Therefore, a bottom-up approach to the collection and classification of motivation was adopted. Table 2 shows the current classification of behavior motivation, constructed by listing the motivations necessary for analyses conducted to date.

3.3 Results of behaviors

Information about the narrative progression of stories that results from the characters' behavior is also essential in understanding the structure of the story. Therefore, in addition to the motivation and type of behavior, the results of the behavior should also be classified and stored in a database of plot structures. Table 3 shows the classification of the results of character behavior.

■ **Table 1** Attribute categories of character behaviors in plot analysis.

Focus		Polarity	First person	Second person	Third person
Target (about a concrete object)	Information	Positive	Investigation, Discovery, Consideration	Question, Explanation	Observation, Watch
		Negative	Concealment, Forgetfulness	Lie, Pretense	Ignorance
	Material	Positive	Creation	Donation, Purchase	Generation
		Negative	Destruction	Theft	Collapse
	Work	Positive	Labor	Employment	Service
		Negative	Laziness	Resignation	Unemployment
Self (about the agent itself)	Entity	Positive	Birth	Summons	Appearance
		Negative	Death	Killing, Exile	Exit
	Body	Positive	Growth	Healing, Dosing	Strengthening, Beautification
		Negative	Decline	Harm	Deterioration
	Perception	Positive	Arousal	De-brainwashing	Sanity
		Negative	Dream, Hallucination	Brainwashing	Madness
Situation (about the agent's environ-- ment)	Movement	Positive	Moving	Transportation	Transportation
		Negative	Stillness	Constraint	Safekeeping
	Relationship	Positive	Safety	Friendship, Victory	Peace
		Negative	Risk	Competition	Disturbance
	Circumstance	Positive	Satisfaction	Marriage	Prosperity
		Negative	Depression	Exploitation, Divorce	Downfall
Intention (behavior which affects behaviors)	Order, Promise	Positive	Compliance	Agreement	Establishment
		Negative	Violation	Default	Obsolescence
	Imperative	Positive	Request	Permission	Proposal
		Negative	Restraint	Ban	Criticism
	Assist	Positive	Effort	Help	Wish
		Negative	Abandonment	Interference	Curse
Evaluation (about the agent's evaluation)	Assessment	Positive	Confidence	Praise	Popularity
		Negative	Regret	Contempt	Unpopularity
	Approval	Positive	Boastfulness	Love	Strong point
		Negative	Self-denial	Hatred	Weak point

■ **Table 2** Motivation categories of character behaviors in story plots.

Bodily	Appetite	Improvement, Evaluation	Greed
	Rest, Laziness		Safety, Fear
	Boredom, Delectation		Fame, Beauty
Social	Obligation		Satisfaction
	Custom	Interpersonal	Lust, Love
Knowledge	Curiosity		Antipathy, Anger
	Suspicion		Empathy, Compassion
Subordination	Impulse, Addiction		Guilt, Humility
	Resignation		Contempt
	Inevitability		Respect

■ **Table 3** Result categories of character behaviors in story plots.

Start	The start of behavior, but result is not yet known.
Continuation	The behavior has already started and continues, but the result is not yet available.
Abandon	The behavior is abandoned before the result is known.
Success	The behavior has been completed.
Failure	The behavior could not be completed.

3.4 Nested Behavior Structures

Some behaviors have a complicated object or purpose. Within such behaviors, the object and the purpose of the behavior is a different behavior in some cases. For example, if A is considering purchasing a book, the target of the behavior of his or her consideration is the behavior of purchasing. Furthermore, the object of the purchase is a book.

In order to enable a description of these situations, a nested structure for behavior descriptions is included in the plot data. Here, plots are described as (Agent: Behavior: Target) and "A considers buying a book" is represented as (A: consider: (A: purchase: book)). In the case of two targets of behavior, it is possible to describe these as (Agent: Behavior: Target: Target 2). For example, if A asks B to purchase the book, this can be represented as (A: request: (B: purchase: book): B).

In some cases, there is no depiction of the behavior performed in the story, but only descriptions of commands or requests to perform the behavior are depicted. By adopting a nesting structure of behavior, it is possible to include these types of behavior in the data as well.

4 Describing punch lines

The effectiveness and validity of the proposed behavior classification is examined in the following examples.

4.1 An example of behavior categorization

The first example is taken from Shinichi Hoshi's very short work "Eternal youth," which can be summarized as follows:

> A youth had a date with his girlfriend, but he was visited by a man who introduced himself as a member of the lifestyle guidance committee in the district. The official said that he would give the youth a medicine for perpetual youth and longevity. The youth accepted and took the free medicine.
>
> After the official returned, the youth could not remember the meaning of a date with his girlfriend. Then he read the statement concerning the efficacy of the medicine, which stated that, when someone takes it, they lose all knowledge of and desire for reproduction. Rather than enhance youth and longevity, the medicine was designed to curb the problem of overpopulation.
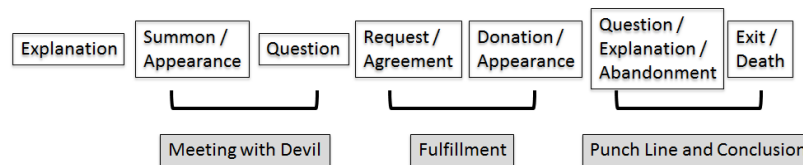
The sequence of events was divided manually by a coder at the points where the location changes, where the character changes, and where time has elapsed. In this case, the exit of the official divides the story. The reproducibility of the division by two independent coders was evaluated, and was statistically significant [3]. The behavior was also categorized manually. In this case study, the validity of this categorization has not yet been evaluated statistically. In the opening sequence, the youth's behavior is categorized as "Dosing" the elixir of life, and the official's behavior is categorized as the "Donation" of that elixir. In the second sequence, the youth's behavior is categorized as "Forgetfulness" of libido and/or the concept of sexual pleasure.

4.2 An example of plot analysis and a punch line

Table 4 shows an analysis of Shinichi Hoshi's work "Contractant." In the table, at each stage of the development of the plot, the nested behavior of the agent, the target, its result, and the agent's motivation are listed in each row.

Table 4 An example of plot analysis based on categorized behavior.

Plot Stage	Behavior	Result	Motivation
1	(Lucifer: command: work: Devil)	Success	Obligation
	(Devil: abandonment: (Lucifer: command: Devil))	Failure	Laziness
2	(Devil: agreement: (Devil: kill: Man): Man	Success	Obligation
	(Man1: agreement: (Devil: assist: (Man1: victory)): Devil)	Success	Greed
3	(Man1: request: (Devil: default: (Devil: kill: Man)): Devil)	Failure	Safety
4	(Devil: agreement: (Devil: kill: Man): Man	Success	Obligation
	(Man2: agreement: (Devil: assist: (Man2: victory)): Devil)	Success	Greed
5	(Man1: proposal: (Man1: competition: Man2): Devil)	Success	Safety
	(Devil: request: (Man1: abandonment: (Man1: competition: Man2)): Man1)	Success	Obligation
	(Man1 and Man2: agreement: (Devil: default: (Devil: kill: Man)): Devil)	Success	Safety
	(Devil: abandonment: (Lucifer: command: Devil))	Success	Resignation
6	(Devil: contempt: "You are the Devil!": Man1 and Man2)	Success	Anger

Figure 1 The general pattern of Hoshi Shinichi's devil stories.

This story can be summarized as follows: according to the command of Lucifer, the Devil makes a contract with a man to take his soul in return for victory in a match. However, the Devil cannot complete the contract because he made the same agreement with two men who compete with each other. Therefore, the Devil relinquishes their souls and blames them for his failure instead.

From Table 4, it can be seen that the relationship of the man and the Devil changes in stage 5 of the plot. Before stage 5, the man asks the Devil to take the life of his opponent, but in stage 5, the Devil requests that he abandon the competition. This is an example of one of the punch-line patterns of reversal between agent A and recipient B. The punch line can be detected as a role reversal that ironically pivots on the same behavior types. The contents of the contract were also reversed in stage 5 of the plot.

4.3 Punch-line patterns in short-short devil stories

As the example in Table 4 shows, it may be possible to identify the position of the punch line in relation to the attributes of the characters' behavior. Furthermore, Table 5 shows the results of the punch-line classification using the same method, of all sixteen short-short stories about the Devil by Shinichi Hoshi. Table 6 shows the types of reversed punch lines and explains the descriptions of the punch lines.

The punch line types in devil stories, such as agent-recipient, reasoning, trade-off, evaluation, commonsense, and purpose, shown in Table 6, correspond to types of reversal in the stories. Therefore, in many instances, it can be determined that the punch lines relate to reversals of elements of the story. Using the plot analysis of sixteen short-short stories, the basic plot pattern of Hoshi devil stories is shown in Figure 1. Here, the categories of behavior are given above and the explanation of the sequence is below.

■ **Table 5** Punch lines in short-short stories about the Devil.

Title	Reversal Type in Punch Line	Punch Line of Each Story
Mirror	Agent-Recipient	An abuser is killed
Contractant	Agent-Recipient, Commonsense	Humans trick the Devil
Whispers of the Devil	Reasoning	A person's crime is uncovered, because he looks like a good man
Window	Agent-Recipient	A person who blames others is blamed
Devil	Trade-off	A person loses what he gained
Dirty Book	Agent-Recipient, Trade-off	A person is summoned by the Devil A book is bought and sold
Lot of money magic	Evaluation	A person loses what he gained
Trading	Evaluation	Devil loses the ones obtained
Chair of the Devil	Agent-Recipient	A person commands the Devil to die
Conditions	Purpose	Contradiction of desire
Example for the first time	Commonsense, Purpose	A person wants to die Contradiction of desire
Friendly Devil	Evaluation	A person regrets a realized wish
Guy that appeared	Commonsense	The summoned one is not a devil
Trouble and money	Evaluation	A person gives up the desire to take revenge on the Devil

■ **Table 6** Punch line reversal types.

Types	Explanation
agent-recipient	the reversal of agent and recipient
trade-off	the reversal of obtaining and losing
evaluation	the reversal of positive evaluation and negative evaluation
commonsense	the reversal of the general story pattern
reasoning	the reversal of general reasoning / logic
purpose	the reversal of causality such as putting the cart before the horse

Agent-Patient reversal			Trade-off reversal		
Plot 1	**...**	**Plot n**	**Plot 1**	**...**	**Plot n**
A: <u>steal</u>: *B*: book		*B*: <u>steal</u>: *A*: book	A: <u>steal</u>: book		A: <u>donation</u>: book

■ **Figure 2** Examples of reversal patterns.

4.4   Punch lines in plot structure

Furthermore, in other stories that feature a reversal or trade-off in the agent-recipient relation, it is possible to detect the position of the punch line with a computer algorithm applied to the information by extracting the relationship between the recipient and agent of the behavior description.

Specifically, detecting an agent-recipient reversal punch line pattern is possible by searching the database for three conditions, as shown in Figure 2 - firstly, that the same type of behavior exists in another plot; secondly, that the two agents of the same type of behavior differ; and thirdly, the two agents become recipients of the behaviors of others.

In the case of a trade-off reversal, the punch line can be detected by analyzing the reversal of negative or positive behaviors concerning the target object. More specifically, detecting the punch line of the trade-off type is possible by determining that there are several behaviors toward the same kind of target object, the focus of those behaviors is the same in at least two cases, and those behaviors are characterized by polarity.

The commonsense pattern of reversal in the devil stories can be specified by locating the position of the punch line in relation to the general plot description of stories of the same genre. In other words, by comparing with the general plot pattern of the genre and detecting the reversed elements (agent-recipient, trade-off, and so on), the punch line of the reversed commonsense pattern can be detected.

Concerning reversal of purpose and reversal of evaluation punch lines, detection is difficult using the current form of data, but will become possible by extending the behavior description. A reversal of purpose does not appear directly as a component of the behavior, but can be found in the description of the motivation, and it would be possible to analyze a reversal of purpose by adding the contrary relation between motivation and behavior.

For example, "Conditions" is a story in which a person misses the opportunity to become beautiful in the sense that he intends to maintain his handsome appearance. In that story, "beauty" is the motivation because it is sufficient to describe the relation between the behavior of "beautification" and the goal "beauty" in order to extract the reversal pattern in the story. It may also be possible to deal with reversal of the evaluation by extending its description.

Concerning the reversal of reason, it is difficult to detect the punch line by searching for corresponding elements in the narrative plot database. In order to identify a punch line concerning a reversal of reason, it seems that there is a requirement for a new way to describe the causal relation between the behaviors in the plot structure data. However, it is expected that this causal relationship will be very complex and a relational database is not suitable for that process.

5   Conclusion and discussion

This paper proposed a method for describing narrative structures that focuses on the behaviors of the characters in a story. It also assigned the concepts of focus, polarity, dynamic, motivation, and result as attributes of each behavior. Utilizing these descriptions of behavior attributes, the plots of Shinichi Hoshi's short-short stories can be formally captured. Moreover, it was also shown that some reversal punch-line patterns can be described with the data of the plot representation data.

In some cases, an extension of this method of plot representation is required in order to detect punch lines from the behavior data of the characters. Therefore, in order to describe narrative plot patterns in general and to detect various types of punch lines, the proposed method should be extended by an analysis of other genres.

In order to ensure scientific results, the validity of the categorization for each of the plot functions and attributes should be evaluated. To evaluate objectivity, the kappa value, which represents the correspondence of categorization by two coders, as used in the fields of psychology and cognitive science [8], would be useful.

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