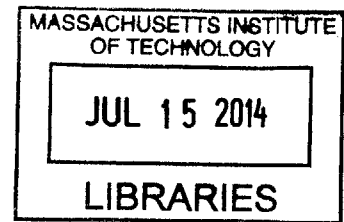


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Old Man Coyote Stories:
Cross-Cultural Story Understanding in the Genesis Story Understanding System

by

Wolfgang Victor Hayden Yarlott

Submitted to the Department of Electrical Engineering and Computer Science
in partial fulfillment of the requirements for the degree of

Master of Engineering in Electrical Engineering and Computer Science

at the

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Signature redacted

Author

Department of Electrical Engineering and Computer Science
May 27, 2014

Signature redacted

Certified by

Patrick H. Winston
Ford Professor of Artificial Intelligence and Computer Science
Thesis Supervisor

Signature redacted

Accepted by

Prof. Albert R. Meyer
Chairman, Masters of Engineering Thesis Committee

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Abstract

The original question was: “Can machines think?” Alan Turing asked: “Does there exist a digital computer that can do sufficiently well at the imitation game?” Patrick Winston asked: “What makes human intelligence different from that of other primates?”

Winston’s answer came in the form of four hypotheses that are the core behind the vision of the Genesis group at MIT’s Computer Science and Artificial Intelligence Laboratory, which has developed the Genesis story understanding system. The key focus behind this system is: stories are an essential component of what makes human intelligence so remarkably different from that of other animals.

I believe that if Winston and the Genesis group are correct and stories are a key part of human intelligence, then it is necessary that Genesis, the system that serves to demonstrate this point, be capable of handling stories from all cultures, including less well-known cultures such as that of the Crow Indians, a tribe from the northern plains of the United States.

Over the course of my work, I analyzed three collections of Crow literature, created a list of cultural features present in the stories, identified four as particularly important (unknowable events, medicine, differences as strengths, and uniform treatment of entities), and developed a set of five Genesis-readable stories in which those four features were prominent. This led to several new elements in the story understanding model; with these new elements, Genesis is capable of understanding stories from the Crow culture, bringing it one step closer to being a universal story understanding system.

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Introduction

Alan Turing’s seminal work, *Computing Machines and Intelligence* (Turing, 1950), is most famously remembered for what we now refer to as the “Turing Test,” in which an interrogator communicates with two entities, a computer and a person, with the intent of discovering which is the computer. If the interrogator has no more than a 70% chance of making the right identification after five minutes, then the computer has passed the test. Alan Turing posed this problem in response to the question, “Can machines think?” Turing believed the question “Can machines think,” to be too meaningless to deserve discussion, instead proposing that the question would be better framed in terms of the imitation game, or “Turing test,” instead asking if there exists a digital computer that can do sufficiently well at the imitation game.

The issue that Turing raised with the original question is that he felt it was ambiguous, especially in regards to the terms “machine” and “think.” Marvin Minsky refers to such words as “suitcase words” (Minsky, 2006) — that is, words that embody a large amount of meaning without specifying which meaning we should be considering when interpreting them. If we talk about someone “thinking,” they might be “considering” something or they could have an “opinion” on some matter. They might be “analyzing” a situation, or perhaps “inventing” something new. It quickly becomes apparent that Turing was right to try to pare down the question to something meaningful.

Since its introduction, the Turing test has encountered much praise and criticism. In 1966, Joseph Weizenbaum created a program, ELIZA (Weizenbaum, 1983), that did well at a limited form of the Turing test, although there was much contention once the methods by which ELIZA worked were revealed. Researchers today do not use the Turing test as a serious way to guide their work — in their textbook, “Artificial Intelligence: A Modern Approach,” Stuart Russell and Peter Norvig state that “AI researchers have devoted little attention to passing the Turing test” (Russell & Norvig, 2009).

If neither the original question, “can machines think,” nor Turing’s revision of the question, “is there a digital computer that can imitate a human sufficiently well,” are the right question, then what is?

The Right Question

While the usefulness of Turing’s new question and the imitation game that accompanies it is up for debate, it does bring up an interesting point. How should we define intelligence? Often, we talk about intelligence by comparing ourselves to other species. We are astounded when we hear stories of a gorilla that can communicate with sign language, a parrot that says “I love you,” and a dog that can answer simple math questions. When we talk about how intelligent octopodes are, a go-to example is that they are capable of opening jars, either to get out or to get in. Why do we find such examples incredible when human children are capable of all the same feats?

There is something special about human intelligence that separates it from that of other animals. While our close cousins in the primate family are capable of using simple tools and

basic communication, there is still something more that separates us from them, as well. It is this distinction between humans and other animals that produces what I, as well as the rest of the Genesis group at MIT, believe is **the right question**: What is it that makes humans smarter than other primates (and, indeed, other animals)?

Turing argued that human intelligence is a matter of complex symbolic reasoning. Minsky describes a hierarchy ranging from instinctive action to self-reflective thinking. Brooks contests that we cannot hope to understand human intelligence when we have yet to reproduce the intelligence of even the most basic insects. Tattersall suggests (Tattersall, 2008) that the primary difference is that humans are a symbolic species while other primates are not. Chomsky takes Tattersall's ideas further by suggesting that humans possess the unique ability to combine two concepts to make a third without limit and without disturbing either of the first two concepts.

Patrick Winston continues along the same line of thinking as both Chomsky and Tattersall (Winston, 2012a), providing us with four hypotheses (Winston, 2012b):

The Inner Language Hypothesis: Using a symbolic inner language, we construct symbolic descriptions of situations and events that are far beyond the reach of other primates.

The Strong Story Hypothesis: Our inner language enables us to tell, understand, and recombine stories, and those abilities distinguish our intelligence from that of other primates.

The Directed Perception Hypothesis: Our inner language enables us to direct the resources of our perceptual systems to answer commonsense questions about real and imagined events, generating commonsense knowledge as a by-product.

The Social Animal Hypothesis: Our social nature amplifies the value of story understanding and directed perception.

In short, it is our ability to construct, tell, imagine, and share stories that separate human intelligence from that of all other animals. The Genesis System, developed by the Genesis group under the direction of Patrick Winston, aims to explain these hypotheses (Winston, 2011).

Vision

To take the Genesis system to the next level, I believe it is necessary for Genesis to be able to handle stories from a wide range of cultural backgrounds. Extensive work has been put into Genesis using short, 80-sentence summaries of Shakespearean literature as a testing and demonstration corpus. It is vital, however, that we ensure that focusing on such a culturally homogeneous set of stories does not limit the power of Genesis. Genesis only demonstrates the correctness of the four hypotheses of the Genesis group if it can handle stories that are produced by people from all cultures.

I raise a few questions I believe are key in addressing this concern: Are there any concepts present in other cultures that Genesis is incapable of representing? Are there cultural biases present in Genesis that prevent it from operating on a wide range of literature? If we believe that the four hypotheses posed by the Genesis group are correct, it is imperative that we answer these questions.

To answer these questions and test the limits of the Genesis system's capabilities, I focused on bringing literature from the Crow (Apsáalooke) tribe's oral tradition into Genesis. This body of work is particularly interesting and important for me to test as a descendant of the Crow tribe. The Crow tribe, a nomadic tribe from the northern plains of the United

States, has a culture, spirituality, and world view that is distinct from the cultures of Europe. This distinction, as well as my own familiarity with the culture, makes it an ideal corpus to test the limit of Genesis' capabilities.

Chapter 1

Crow Folklore

The Crow tribe is thought to have migrated to the northern plains of the United States from the Ohio River Valley area. There are early stories about the separation of the Crow from the Hidatsa and the period of time that the Crow spent wandering in search of a sacred tobacco plant seen in a vision by one of their chiefs. Those stories talk of being in a country hot with rivers muddy and warm and of a big body of salty water before they eventually found the plant growing in the area that is now called home by the Crows.

Today, the Crow reservation is located in southern Montana. Some of the fondest memories of my youth are from summer camping trips that my family would often take into the mountains on the reservation — it was not only a break from the increasingly technologically-centered world that I was rapidly entering as I got older, but it was an opportunity for me to commune with both my family and with nature. Our trips were often centered around the fourth of July. The kids — a term used loosely, as we ranged from very young to out of college — would shoot off the large collections of fireworks that had been brought along with us, helping the youngest among us to take part, as the “adults” sat around the fire talking.

At times, we would listen to stories being told as the night grew long and we were all starting to fall asleep around the campfire. In the day, we might sit and chat about what had been going on recently, both in our lives and in the lives of those we knew. We might go out hunting and, if we got something, all the “kids” would help to get the meat ready to take it to be processed — we would often give a sizable portion of it away. We would cook out in the same way you might imagine having a picnic with a grill — we would make hotdogs and burgers over a campfire and, once the food was done, there would be jokes about who was the oldest and thus would get their food first. At the end of the trip, we would make sure that we had cleaned up everything we could before leaving.

Crow culture is one of deep respect — respect for family, elders, the tribe, the land, and nature are all highly emphasized. Nature and the land the tribe lives on is considered a sacred gift from the creator of the Earth, and Clara Nomee, a past chairwoman for the tribe, once said “Within the Crow culture, we are told by the elders that all Crow members are blessed with three mothers...the earth, our natural mother, and our tepees or lodges.”

I was always expected to treat my family with respect — and not just my parents, but my uncles and aunts, who were uncountable in number, as well as my grandparents, who were numerous due to the way that familial relationships work in the Crow tribe. Elders hold a special position of respect due to the experience that they have gained over their life — experience that, no doubt, will be passed down to the younger generations in the form of stories.

Knowledge in the Crow tribe is passed down through the generations primarily in stories that are told to the younger members of the tribe — the Crow culture is primarily an oral tradition that is passed on through these spoken tales. These stories can range from the mythical tales of Old Man Coyote, sometimes-creator and sometimes-trickster of the Crow

tribe and the entire world, to historical tales about the relationship between the Crow and the Hidatsa, to more personal stories. These stories were traditionally told in the winter, although they may be told at other times when the opportunity presents itself. This is likely due to the cycle of life in the Crow tribe: they were much more likely to be in their camps and lodges during the cold, winter months. In his collection, Lowie mentions another possible cause: the morningstar is visible only in winter and is thought to be one of the Crow who used to live in this world.

These stories are the fundamental basis of Crow culture, forming the entirety of the cultural knowledge that is passed down through the tribe. It is the importance of stories in Crow culture that inspired me to undertake this project — it is clear to me that stories play some fundamental role in the way that people accumulate and pass on knowledge and very likely play a pivotal role in human intelligence.

1.1 Unique Features

Crow culture is, in ways, strikingly different from many other cultures. There is a deep respect for all things that runs through the culture and a strong current of spiritual belief manifests itself in the tribe. Crows have a deep connection with the natural world as well as with people. I knew that the stories told in Crow culture would have strikingly unique story features that would make it ideal for putting the Genesis system to the test.

After extensive analysis of the stories available to me (the results of which can be found in Appendix D) and numerous discussions with my family (my father, being very traditional, was extremely helpful), I determined four key features that make Crow folklore unique:

- There are events, which I refer to as “unknowable events,” which we cannot know the

details of in the context of the story.

- The concept of “medicine,” which may be thought of as a sort of magic-like quality or mysterious power, is pervasive in Crow folklore. Robert H. Lowie covers medicine as part of his 1922 work, “The Religion of the Crow Indians” (Lowie, 1922).
- Differences are recognized as a strength throughout the stories, often manifesting as medicine.
- In many of the stories, animals and humans are treated no differently.

The first two features are “hard” features of the stories that represent interesting narratological structures or concept patterns that show up in Crow folklore. The last two features are “soft” features that describe how cultural ideals translate across into Crow stories. Although these features are almost certainly not comprehensive, I believe that they both represent Crow folklore and are capable of putting Genesis’s capabilities to the test.

1.1.1 Old Man Coyote and Unknowable Events

One story that I learned when I was younger was my introduction to Old Man Coyote, the traditional creator and trickster in Crow stories. In brief, the beginning of the story goes as such: Old Man Coyote walked alone in a world filled only with water and, disliking the emptiness, decided he wanted to create something. Coming across two ducks, he enlisted their help and had them gather materials from deep under the water. Retrieving the mud and roots from the ducks, he combined them, breathed on them three times, and the world was formed. He shaped the world and, finding the world still too empty, took up mud and made people. How he did this, no-one can imagine.

It is important to note that that last line is more than me being coy in my paraphrasing — this is part of how the story is traditionally told. As a creation story, the story (titled “Old Man Coyote Makes The World”) must show that Old Man Coyote must have some power or abilities beyond our imagining. We have no idea how to create a world, or people, or anything like that — certainly not by scooping up some mud. In the early phases of my work, I described this idea as the Unknowable Events Hypothesis:

The Unknowable Events Hypothesis: There exist connective narrative events for which we are unaware of or incapable of knowing the full nature of the events. The ability to address these events without knowing their details gives us the power to reason about these events.

The Unknowable Events Hypothesis, as I have described it, addresses more than just events that we cannot understand the full nature of. It is plain to see that a style of story analysis that allows for reasoning about any sort of unknown chain of events is useful for stories of all genres and cultures. It might even be considered a somewhat intuitive concept in stories — however, it only came to light due to the striking way it was presented within “Old Man Coyote Makes The World.”

1.1.2 Strong Medicine: Subverting Beliefs and Naming Contradictions

There is a story about two Crow who lived roughly around the 1870s, Little Head and Bull Snake. Little Head and Bull Snake had been out on the warpath when they came across a Sioux camp. Being discovered, the two tried to steal horses to make their escape, but were driven into a tree and surrounded. Little Head tells Bull Snake to close his eyes and starts

singing a song. When Bull Snake opens his eyes, they have been transported far away from the camp and they continue to make their getaway. There are two lines towards the end of the story that say the following: “These two were medicinemen. Little Head could not be shot.”

The concept of medicine in Crow stories is a little bit difficult to understand — it is somewhat akin to magic in stories from other cultures. Medicine could be a supernatural object; for example, a knife that can cut anything. Medicine can be an ability that is used in combination with some object: someone might, upon shooting an arrow, have the ability to travel alongside it. Medicine can be granted by various beings — one story has a young man who is rejected by his sweetheart. Dismayed, he seeks help and eventually receives medicine from an Elk that allows him to seduce all of the women in camp. Medicine can be less fantastical than the previous examples — rabbit medicine may help you to run more swiftly than others.

The question arises: is there a consistent way to represent this sort of ability in a story? I believe that there is — in each of these examples, we find the abilities to be something out of the ordinary or unexpected. This hinges on the idea that when reading stories, we have some frame of mind in which we are considering the story — we have a set of beliefs that we bring into stories. In fiction, authors often make use of the fact that we maintain a set of beliefs by doing their best to uphold suspension of disbelief, wherein they replace our standard set of beliefs with ones that work for the world that they have created. In order to represent medicine, then, it makes sense that we might want to model it as a subversion of our belief state:

The Subversion of Belief State Hypothesis: We can make meaningful conclusions about the world that we are encountering through stories by comparing them with an in-

ternal belief state. For example, these comparisons can help us conclude that something fantastical has happened (in the case of medicine) or that there is some disparity between what we believe and the “ground truth” that is being presented to us in the story.

In my first example, there was a line that was obviously meant to imply that someone had strong medicine: “Little Head could not be shot.” We can imagine what sort of belief state that statement might contradict: “People can be shot.” Immediately, we find that our belief state has been subverted because the “ground truth” of the story that we are reading states that Little Head, who is a person, cannot be shot. From this, we may conclude that Little Head had strong medicine.

There is another way of approaching this problem. A subversion of a belief state is simply a contradiction bundled up in a larger framework. If we did not want to represent an entire belief state, it might be more useful to us to represent the idea of a single contradiction. We must do more than simply recognize that a contradiction has occurred, of course; we must also be able to concretize it in some way that allows us to reason about it, such as naming it:

The Named Contradiction Hypothesis: The ability to recognize contradictions, name them, and bring attention to them allows us to perform powerful operations in stories. It can allow conclusions about our beliefs, about the truthfulness of a story, and allow us to recognize special cases wherein actors do not behave in a manner consistent with how we believe they should behave.

Our example from before remains relatively unchanged: now we want to recognize a contradiction regarding being shot and name it something like “evidence of medicine.” Again,

the same statement about Little Head triggers our contradiction and now we have a named contradiction that we can reason about — in this case, we may decide to conclude that the contradiction means that Little Head has strong medicine.

In both of these cases, Crow folklore has illustrated a powerful way of reasoning about our beliefs and the stories that we are told.

1.1.3 Animals and Dwarfs: The Strength of Diversity

This feature is tightly coupled to the idea of beliefs and medicine covered in the previous section and embodies a very powerful idea within Crow culture: differences are viewed as a strength rather than being viewed in a negative light. This is a way of thinking that is relatively unique to Crow culture; viewing differences as negative is so prolific in culture at large that it has been identified as a part of the social identity theory formulate by Henri Tajfel (Tajfel, 1970). Tajfel's theory describes something called Ingroup-Outgroup theory, which is the tendency of people favouring the group that they identify as a member of while discriminating against groups that they do not identify as.

One story describes a woman who encounters a woman not much taller than a nine-year-old. The dwarf grants the woman some medicine, which leads to her owning large tipis and having plenty of horses. In other stories, dwarfs are automatically assumed to have some inherent power — people are either described as having been granted medicine by dwarfs, or meeting dwarfs and being granted aid due to their incredible strength. It is apparent in animals, as well: animals are believed to have some inherent power in them that they can grant to people.

In his biography of Crow chief Plenty Coups, Frank Linderman says the following: “The

Indians of the Northwest (Montana and the surrounding country) believes that the Almighty gave each of His creations some peculiar grace or power, and that these favors, at least in part, may be obtained from them by him, if he is studious of their possessor's habits and emulated them to the limit of his ability."

Linderman's statement cuts to the heart of the matter: there is an inherent belief that every being is granted some power and differences are one way that this power manifests itself. It also makes it clear how closely tied this feature is to the idea of belief states discussed in regards to the previous feature. In this case, however, rather than searching for a subversion of a belief, we are asserting a belief — that if something is somehow different from the average person, it has some strength.

1.1.4 Animals in their Tipis: Uniformity of Beings

There is a traditional Crow story describing two mythical heroes in Crow folklore: Lodge Boy and Thrown Away. Lodge Boy's and Thrown Away's mother is killed and Lodge Boy is thrown behind a curtain in the lodge while Thrown Away is thrown outside and into a spring. The father returns home to discover what has happened, the two boys eventually join together, resurrect their mother, and kill all of the evil things on Earth — things like buffalo that eat people or coulees that swallow people up.

Eventually, Lodge Boy and Thrown Away catch the eye of Long Arm, who snatches up Lodge Boy, forcing Thrown Away to travel into the sky to retrieve him. Thrown Away stays in various lodges in the sky, finally reaching Long Arm's camp and retrieving Lodge Boy.

One important detail that I have left unmentioned up until now: Long Arm, along with all of the other residents of the sky, is a bird.

In many of the old Crow stories, there is very little distinction between people and animals, or even between people and things like plants. The animals have chiefs, they have lodges, and they sit around the campfire telling stories. There are stories where a young Crow man marries a buffalo. There are stories where a young Crow woman marries a bird. There are stories where a young Crow man marries both a buffalo and corn.

In one story, a young boy, Big Iron, is abandoned on a steep hill by his stepfather, who wants to be rid of him. There, he encounters an eagle who speaks with him and grants him help. In another story, a young boy is abandoned by his mother and is adopted by buffalo and a bear.

This theme continues throughout many of the stories, illustrating the deep spiritual connections that Crow culture describes with beings of all types. This is a connection that often doesn't exist in other cultures, which tend to rank beings in a hierarchical way: animals are often clearly below humans. However, it is important for Genesis to be able to handle this type of story and to avoid any in-built biases that may make assumptions about the relation between people and other beings, in order to be accommodating of all types of stories.

1.2 Collections Used

For my thesis, I relied on three collections of stories that have been published in English, both for ease of access and ease of inserting them into Genesis.

The first collection comes from the Little Big Horn College's library page (Various, n.d.) on their website. The Little Big Horn College is the Crow higher education and cultural

center and their library has links to various other websites that have text versions of many popular Crow stories, as well as a link to the second collection. Throughout the thesis, the collection of stories linked from the Little Big Horn College's page will be referred to as the "LBHC collection."

The second collection comes from the Anthropological Papers of the American Museum of Natural History. Titled "Myths and Traditions of the Crow Indians," (Lowie, 1918) it was compiled Robert H. Lowie and published in 1918. These stories were collected over the course of repeated trips by Lowie to the Crow reservation. The collection contains 81 stories, although there are many variants and slightly-related stories that are grouped together as a single "story" by Lowie. Throughout the thesis, the stories found in this collection will be referred to as the "AMNH collection."

The final collection comes from the biography of Plenty Coups, the last chief of the Crow tribe. Titled "Plenty-coups: Chief of the Crows," (Linderman, 2002) it stems from the stories told by Plenty Coups to Frank B. Linderman in response to Linderman's request to record Plenty Coups' story. It also contains many comments by Linderman, which often attempt to provide setup, describe what was happening in person at any given time, or clarify something that Plenty Coups has referenced. Throughout the thesis, this collection of stories will be referred to as the "Plenty Coups biography."

1.3 Selected Stories

I have selected five stories from the collections available to me that collectively cover the four features above: unknowable events, medicine, diversity as strength, and uniformity of beings. I believe that these stories are representative of the type of stories that are present in

Crow folklore: one is a creation story, one is a story explaining the origins of traditions, one is meant to characterize Old Man Coyote, one is a tale of a supernatural personal encounter passed on second-hand, and the final one is a first-hand anecdote. These five stories have supernatural elements that run through them, but represent the type of story that is often told among the Crow tribe. Each story has a title, either the title given to the story in the collection or one that I have made for it in the absence of a title, as well as the collection it originates from in parentheses.

Old Man Coyote Makes The World (LBHC): “Old Man Coyote Makes The World” is a story that describes the origins of the world and life on the world. According to this story, almost everything that we see today was crafted by Old Man Coyote, the trickster-creator of Crow folklore. This story features medicine quite prominently — Old Man Coyote’s power allows him to create the world from almost nothing. As mentioned in the Unique Features section, this story was also the inspiration for the Unknowable Events hypothesis with its explicitly mentioned unknowable event. Throughout the story, Old Man Coyote converses with animals as though there were no different from humans and there is no indication as to what Old Man Coyote himself is — he is not stated to be a human. As the story states, “Where Old Man Coyote came from, nobody knows. But he was, he lived.”

Old Man Coyote’s Visit to the Crow Indians (AMNH): Old Man Coyote sees that the Crow camp has grown large and decides that he wants to show off a little and play a small trick on the inhabitants of the Crow camp by showing up in fancy regalia. Medicine is featured strongly in this story as Old Man Coyote transforms many common items into very fine things in order to impress the Crows. There is a small section where Old Man Coyote converses with the mountain goat that he has transformed into a horse, when it asks him what he wants it to do. This story mainly serves to characterize Old Man Coyote as

the sort of person who, even though the Crows are scrambling for his advice at the end of the story, dresses up so he can impress them without being recognized.

The Bungling Host (AMNH): This story again features Old Man Coyote. This time, however, Old Man Coyote finds himself and his family hungry. Thinking quickly, he visits various chiefs: Owl chief, Elk chief, Condor chief, and the Crow chief — all of whom are animals rather than humans. They are gracious to him, grant him some food, and he leaves, later playing a trick on some of them when they come to visit and have him return the favor. As my brief description implies, this story displays a uniform treatment of beings of all types. The story also features medicine in the method by which each host produces the meal they treat their guests to. This story also serves to characterize Old Man Coyote as sort of a sly person, who looks for opportunities to gain something out of a trick.

Adventures with Buffalo (AMNH): “Adventures with Buffalo” is a strong departure from the previous three stories. The story features a young man who is hunting buffalo and shoots one. Instead of running, as the young man expected, the buffalo stood still, looking for him. Eventually, the buffalo chases the young man down and then things get strange. This story features medicine strongly, as well as representing that things recognized as different from usual are believed to have some special abilities. This story is a departure from the previous three not only because it no longer features Old Man Coyote, but because it is ended with the following statement: “This man died recently; he lived on the Big Horn.” This story is a second-hand account of a happening — an anecdote that is passed along as something that has happened in remembered history. While no-one claims they know who interacted with Old Man Coyote or Red Woman (a traditional supernatural being and often-antagonist of the Crow tribe) or Old Woman’s Grandchild (a traditional Crow hero), this event is one where the person who experienced it is known. It is thus contrasted to the

first three stories, which were all mythical tales.

Plenty Coups' Adoption by the Little People (Plenty Coups): This story describes a vision that Plenty Coups, the last chief of the Crow tribe, had while in the Little Rockies. Plenty Coups describes being called out to by some person, who leads him to a lodge in which he sees the great forces of nature as well as the dwarfs, or little people. At the end of the vision, Plenty Coups finds himself adopted by the Little People and sent home having been given powerful advice. This story relies heavily on the fact that the dwarfs are believed to possess great power, representative of the Crow belief that differences are indicative of strength. As with the previous story, this story is meant to be a "true story," one that is based on the direct experience of some Crow.

In order to run these stories through Genesis, all of them had to be converted into a reduced form of English that is parsable by Genesis — the full texts can be found in Appendix A and the reduced forms can be found in Appendix B.

Chapter 2

The Genesis System

2.1 Overview

In this thesis, I leverage the considerable power of the Genesis system, the product of Patrick Winston and the Genesis group at MIT's CSAIL. Genesis is a comprehensive human intelligence system currently in active development with the objective of providing a complete computational system for understanding stories with a focus on modeling how the human mind reasons.

2.2 Commonsense and Reflection

Genesis has two powerful sets of knowledge: commonsense rules and concept patterns. Commonsense rules may be predictive ("If xx is killed, then xx dies") or be available if an event would otherwise lack an explanation ("If yy hits xx, then xx may hit yy."). Concept patterns allow for the recognition of concepts such as revenge, suicide, and pyrrhic victory:

Start description of "Tit for Tat".
xx and yy are persons.
xx hits yy.
yy hits xx.
The end.

These forms of knowledge allow Genesis to perform powerful reasoning about and extract meaning from stories that are passed into Genesis. More information about the Genesis system and the vision behind the Genesis group can be found in a trilogy of papers: "The Strong Story Hypothesis and the Directed Perception Hypothesis" (Winston, 2011), "The Right Way" (Winston, 2012b), and "The next 50 years: A personal view." (Winston, 2012a)

2.3 Understandable Input, Understandable Output

Genesis aims to have input that is easily reusable and human understandable. As such, all stories that Genesis reads in are written in a form of simple English. Genesis does not take in stories written in full English due to the current state of natural language processing and English-digesting — however, the reduced set of English still allows for powerful concepts to be represented in Genesis:

Albert is a person.
Nancy is a person.
Albert loves Nancy.
Nancy is killed.

Genesis also represents commonsense rules and concept patterns in English, using a basic matcher syntax:

xx and yy are persons.
If xx is killed, then xx dies.
If yy loves xx and xx dies, then yy is inconsolable.

The majority of Genesis output that this thesis is concerned with is in the form of an elaboration graph, which is an intuitive set of boxes, representing events, and lines,

connecting the events together. Event boxes may have different colors depending on how they originate: yellow boxes are inferred events, blue boxes are the result of leads-to relations, orange boxes are those events that are explained as part of a “may” rule — a rule that attempts to provide an explanation for events, green boxes are those that are part of a selected concept pattern, and grey boxes are used in the case of “unknowable events” leading to that event. Figure 2.1 shows the results of running the story and rules from above through Genesis.

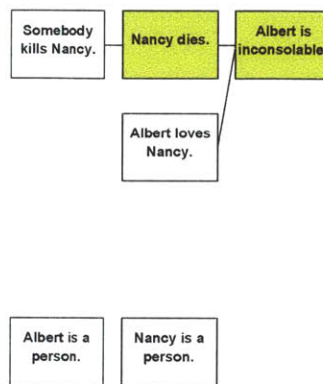


Figure 2.1: Demonstration of elaboration graph using the story and commonsense rules from Chapter 2.

Chapter 3

Results

Recall from Chapter 1 the four features that I identified as the features that make Crow folklore a distinct and interesting body of literature to examine:

1. Crow folklore demonstrates sequences of Unknowable Events — that is, events whose nature we are either currently unaware of or completely unable to determine — in both implicit and explicit forms.
2. Crow folklore has the concept of medicine — something akin to magic in other cultures — that can often be discovered by the fact that somebody does something unexpected, subverting our state of belief while reading the story.
3. Crow culture values differences, viewing them as a sign of strength, and this valuing of diversity carries over into the literature.
4. Crow culture, especially in the past, has treated all beings in a uniform way — animals are often represented in ways that are exactly the same as humans, with some stories going out of their way to explain why animals no longer behave like humans. This shows up in numerous stories: for example, animals might be found in lodges or telling stories around a campfire.

It is imperative that Genesis be able to understand stories that possess these features for two reasons:

1. These features may represent extreme forms of features that show up in other literature. The extremity of their presentation in Crow folklore allows us to identify them and later revisit other bodies of literature to see where these patterns apply. Ensuring that Genesis can understand these patterns now enables Genesis to operate on all bodies of literature in a more powerful way by using these features.
2. If the four hypotheses of the Genesis group are meant to be a theory of how human intelligence works and the Genesis system is meant to demonstrate the correctness of those hypotheses, Genesis must be able to understand stories from all cultures. Stories are how intelligence and knowledge is represented and passed down from generation to generation — an inability to understand any culture's stories means that either the hypotheses are wrong or the Genesis system needs more work.

In this chapter, I discuss in-depth the results of testing Genesis's ability to understand five stories from traditional Crow folklore:

1. Old Man Coyote Makes The World
2. Old Man Coyote's Visit to the Crow Indians
3. The Bungling Host
4. Adventures with Buffalo
5. Plenty Coups' Adoption by the Little People

I discuss the features of the stories, any difficulties that were encountered when trying to process the stories with Genesis, any mechanisms that had to be added to Genesis in order

to enable understanding of the stories, and the final result.

The following two sections describe difficulties encountered and mechanisms added that do not apply to any story in particular. For example, medicine is prominent in many of the stories examined in this thesis, and as such difficulties relating to it are covered in the General Difficulties section rather than being repeated in the in-depth discussion for each story.

3.1 General Difficulties

Many minor issues occurred over the course of inserting Crow folklore into Genesis — or perhaps it is more accurate to say that the same minor issue occurred many times. The Genesis system requires a stories to be passed in as a subset of English and often Genesis is very finicky in the way that it interprets statements. For example, rather than saying that “Owl Chief gave Old Man Coyote food,” it might be necessary to say that “Owl Chief gave food to Old Man Coyote.” However, this was not a major stumbling block in inserting the stories into Genesis: often, all I had to do was rephrase the sentence. This is also not an issue with the foundational principles that inspired Genesis, being born of the inherent difficulties of natural language processing.

There were two major difficulties that were faced when inserting the five stories into Genesis, both of which centered around the concept of medicine. How can Genesis recognize and represent medicine in stories? How can Genesis insert that concept back into the story?

There were two false starts on this front:

1. The Contradiction Engine – A modular addition to Genesis that would search for

inner-story contradictions as the story was being read by Genesis. For example, a story might have a commonsense rule that translates to, "If a person is hit by a car, they are hurt," and someone is hit by a car but not hurt. The commonsense rule would fire, resulting in two contradictory story elements: the person struck by the car is both harmed and not harmed by the car.

This idea was scrapped because Genesis has in-built mechanisms that are designed to prevent contradictions from arising as a sanity check. While the program was able to catch some contradictions, the contradictions had to be raised in round-about ways and did not work for all actions.

2. The Belief State Engine – A second modular addition to Genesis that modeled either a general or a named belief state. The belief state contained global rules that applied to all entities, such as "nothing can become invisible," as well as conditional rules, such as "people cannot fly." These beliefs were inserted into the system separately from the story, in order to avoid any difficulties in parsing as well as avoid the in-built sanity check mechanism that interfered with the first design.

This idea was also scrapped due to the fact that it was unnecessarily complex and was made redundant by concept patterns.

In the end, I recognized that concept patterns were capable of modeling subversions of belief states. For example, we might want to recognize that a medicine man has the unexpected capability to transform objects:

```
Start description of "Violated belief - Medicine Man".  
xx is an entity.  
yy is a thing.  
xx transforms yy.
```

The end.

Thus, when we see something with the ability to transform things, the concept pattern is recognized. This addresses the first difficulty: “How can Genesis recognize and represent medicine in stories?” It is necessary, however, that Genesis has the capability of inserting that concept back into the story, so that it can be reasoned about further. Such a capability did not originally exist in Genesis.

3.2 General Features Added

Inspired by my work on Crow Folklore and Sila Sayan’s work on Hansel and Gretel (Sayan, forthcoming), the ability for concept patterns to insert elements back into a story was added to Genesis. In turn, this new element can be reasoned about by the system, which can trigger additional concept patterns, which can add their own elements, and so on. This introduces a powerful recursive reasoning into Genesis. Using the previous example of recognizing a medicine man, we might now write the concept pattern as follows:

Start description of "Violated belief - Medicine Man".

xx is an entity.

yy is a thing.

xx transforms yy.

Consequently, xx has strong medicine.

The end.

One minor feature that was added to Genesis is the ability to deliver personality traits by classification as well as characterization. For example, previous to this change, this would work:

"Vicious" is a kind of personality trait.

...

Macbeth is vicious.

but this would not:

"Trickster" is a kind of personality trait.

...

Old Man Coyote is a trickster.

With the change that enables the second pattern, a wider variety of personality traits can now be recognized and operated on.

3.3 Old Man Coyote Makes The World

Old Man Coyote walks alone, seeing nothing but water, and says, "It is bad that there is only water and nothing else." After a while, he comes across two ducks — a younger duck and an older duck. He asks the ducks to help him and they dive down under the water, the little duck returning with a root and the bigger duck returning with mud. Old Man Coyote lumps the root and the mud together, blows on the lump, and creates the world. How he did this, no-one can imagine. Old Man Coyote meets a young coyote, Cirape, and discusses

many ideas with him. Old Man Coyote goes on to create the landscape, people, animals, dance, language, and war. How he does this, no-one can imagine.

3.3.1 Important Plot Features

“Old Man Coyote Makes The World” is immediately striking in four regards:

1. It is a creation story, starting from nothing and telling the origins of the natural world and traditions.
2. It features animals that communicate with Old Man Coyote the same way that people might.
3. There is an amazing display of some power, or medicine, that enables Old Man Coyote to create the world.
4. There are explicitly unknowable events that take place as part of the story: “How he did this, no-one can imagine.”

The version of the story at the beginning of this chapter is a highly abridged version of the full story, which can be found in the appendix. However, it is faithful to the events that take place in the story and serves to show why “Old Man Coyote Makes The World” is an ideal candidate for testing Genesis.

Feature #1 and #3 are closely tied together: without medicine, Old Man Coyote would not have been able to make the world. But how do we know that Old Man Coyote had medicine? The answer is somewhat circular: we recognize that Old Man Coyote must have had medicine *because* he was able to create the world — Old Man Coyote must have used his medicine in the creation of the world.

Feature #2 shows off the uniform treatment of all beings that exists in Crow literature. At the beginning of the story, Old Man Coyote speaks with some ducks to enlist their help in creating the world. As the story goes on, Old Man Coyote encounters Cirape, a coyote, and has a great deal of discussion with him. These discussions lead to the creation of many things that we see today, including dance, language, war, and the tradition of wife-stealing among the Crow tribe. The discussion is far from one-sided: Cirape suggests ideas just as often as Old Man Coyote does, if not more, criticizing the design of the world and adding ideas to it. Such discussion shows that it isn't a superficial similarity to people that is attributed to non-human beings.

Feature #4 is the precise part of Crow literature that lead to my formulation of the Unknowable Events hypothesis — while many instances of this hypothesis are implicit, including in this story itself, this story is unique in the explicitness of its unknowable events.

3.3.2 Difficulties

The primary difficulty in getting this story to work was directly related to the Unknowable Events hypothesis. An early version of the story (in particular, one part with an unknowable event) was represented as follows:

VV is an entity.

...

If VV breathes onto the soil, then an unknown event happens.

...

"Old Man Coyote" combines the mud with the root.

"Old Man Coyote" breathes onto the soil because "Old Man Coyote" combines the mud with the root.

The soil turns into land because "Old Man Coyote" breathed onto the soil and an unknown event happened.

"Old Man Coyote" created the world because the soil turned into land.

Within this representation, the idea of inserting an “unknown event” was necessary because otherwise, it leads to the implication that anyone breathing on soil creates the world. The full story, in stating that “no-one knows” how Old Man Coyote created the world, indicates that there is something more to breathing on soil that leads to the creation of the world.

3.3.3 Genesis Mechanism: The Leads-To Relation and Strange Occurrences

Discussions about this story and the need to indicate that there was some unknown element in the story lead to the development of a new mechanism in Genesis called the “leads-to” relation. The mechanism does exactly what it sounds like it does: it describes a relation between two events such that the first event leads to the second event through some undescribed chain of events.

The mechanism can be used in three ways. The first is present in Old Man Coyote:

Old Man Coyote’s taking the root leads to Old Man Coyote’s making a ball.
Old Man Coyote’s taking the mud leads to Old Man Coyote’s making a ball.
Old Man Coyote’s trying to get rid of emptiness leads to Old Man Coyote’s creating the world.

This is an explicit, in-story way of using leads-to. This mechanism can be used any time that details are purposefully omitted from a story (e.g., “Bob’s being hungry leads to Bob’s going to McDonald’s.”) — such examples might occur any time that we feel the details are unimportant to the story as a whole. Figure 3.1 shows the result of running Genesis on “Old Man Coyote Makes The World” using only this form of leads-to.

However, after discussion, it become obvious that there is an important semantic differ-

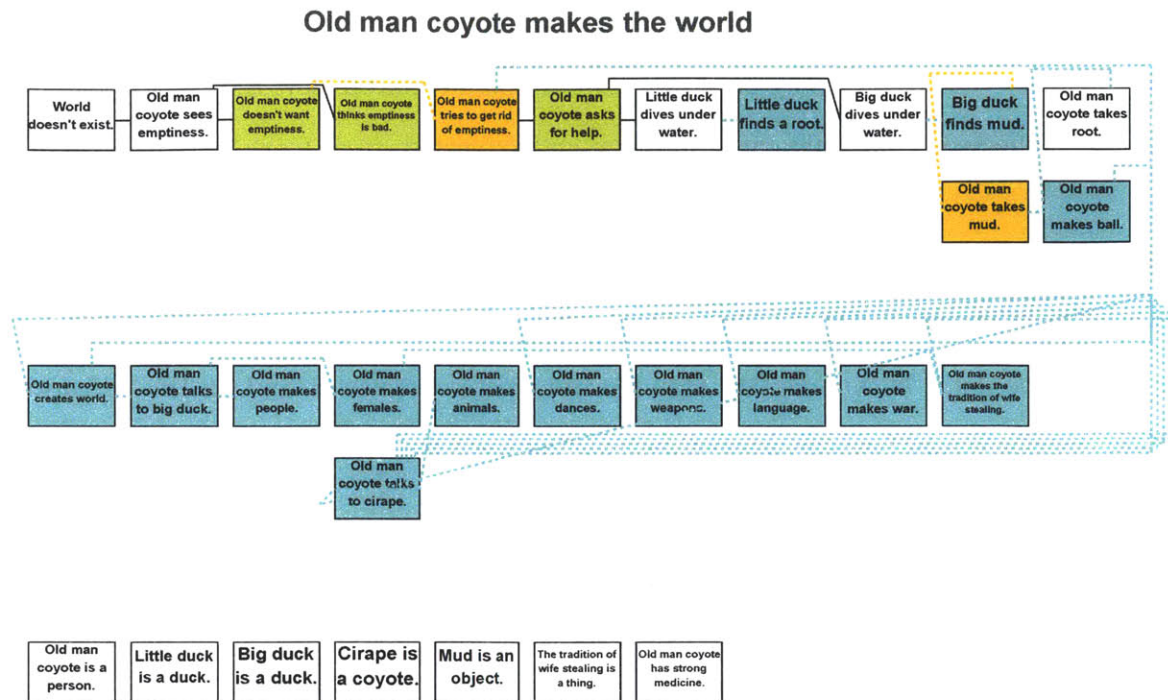


Figure 3.1: Result from running Genesis on “Old Man Coyote Makes The World” using the explicit, non-unknowable events leads-to mechanism.

ence between a leads-to where we don’t care what the details are and a leads-to where we can’t know what the details are. This lead to the development of the “Strangely,” syntax:

Strangely, Old Man Coyote’s making a ball leads to Old Man Coyote’s creating the world.

This syntax manifests itself as grey boxes and are intended to illustrate that we cannot know the events that lead to that event. Additionally, there is another way to use the mechanism, in concept patterns:

```

Start description of "Creation".
XX and YY are entities.
YY's not existing leads to XX's creating YY.
The end.
  
```

This concept pattern will be recognized if there is any unbroken chain of events leading

from the first event (“YY’s not existing”) to the second event (“XX’s creating YY”). Using leads-to in this manner is a way of saying that it doesn’t matter how the first and second event are connected — we only care that they *are* connected.

I used all three methods of using leads-to when summarizing “Old Man Coyote Makes The World” for Genesis. For example: we don’t *care what* Little Duck did underwater to find a root, we don’t *know how* Old Man Coyote creates the world, and, in the “Creation” pattern, we don’t *care how* the world’s not existing leads to the world being created.

3.3.4 Final Result

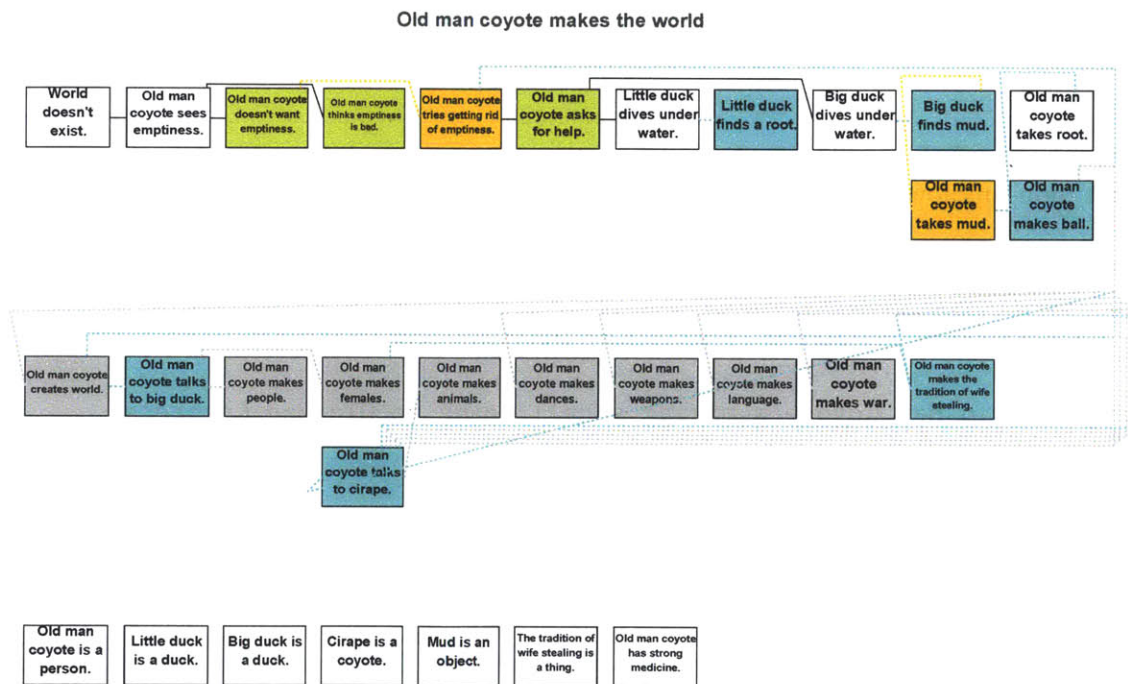


Figure 3.2: Result from running Genesis on “Old Man Coyote Makes The World”.

Figure 3.2 shows the resulting elaboration graph from Genesis reading “Old Man Coyote Makes The World.” The leads-to relation (represented by blue dashed lines and blue

boxes) was used extensively, not only in the case where the “unknown event” occurred in previous iterations of the stories, but also where it is handy for removing unnecessary detail to understanding the story. For example, one part of the story goes as such:

“Younger brother, are you satisfied now?”

“No, not at all. There’s only one language, and you can’t fight somebody who speaks your language. There should be enmity; there should be war.”

“What are wars good for?”

“Oh, my respected elder brother, sometimes you’re just not thinking. War is a good thing. Say you’re a young warrior. You paint yourself with vermillion. You wear a fine war shirt. You start. You sing wars songs. You have war honors. You look at the good-looking young girls. You look at the young women whose husbands have no war honors. They look back at you. You go on the warpath. You steal the enemy’s horses. You steal his women and maidens. You count coup, do brave deeds. You are rich. You have gifts to give away. They sing songs honoring you. You have many loves. And by and by you become a chief.”

“Ah, Cirape, my younger brother, you’ve hit upon something.”

Old Man Coyote divided the people into tribes, giving them different languages. Then there was war, then there was horse stealing, then there was counting coup, then there was singing of honoring songs.

While all of that dialogue could be included in the story passed to Genesis, it does not add anything particularly useful in understanding the details of the story. Instead, I chose to model it more simply as:

Old Man Coyote’s talking to “Cirape” leads to Old Man Coyote’s making language.

Old Man Coyote’s talking to “Cirape” leads to Old Man Coyote’s making war.

The omission of details makes this a prime location to use the leads-to relation, as it models the fact that additional events occurred between those, but they were not included

in this telling of the story. One important note is that this concept pattern has no qualms about the fact that Cirape is a coyote — allowing the story to continue treating Cirape as if he were no different from people. Genesis is capable of this because it possesses the concept of an entity as a higher-order way to classify anything that can act. Cirape is a coyote, but a coyote is an entity, and so Cirape can act in the same ways that we expect a human to.

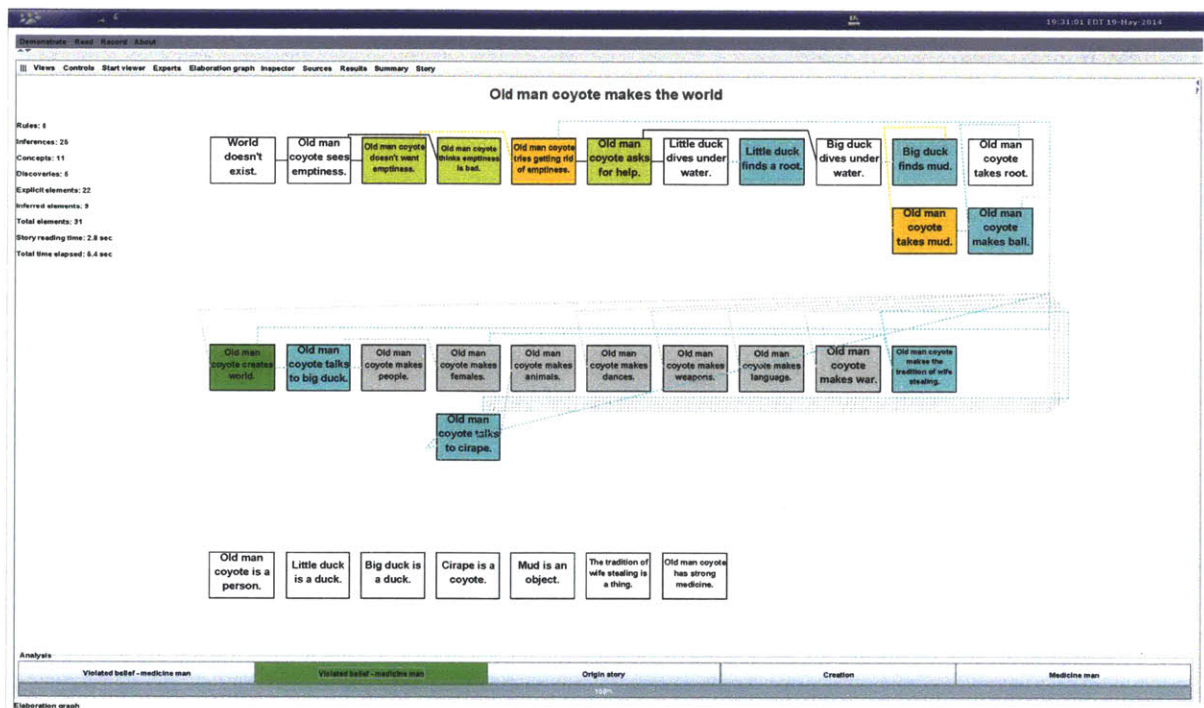


Figure 3.3: “Violated Belief - medicine man” concept pattern in “Old Man Coyote Makes The World”.

Figure 3.3 shows the recognition of medicine because of Old Man Coyote’s creating of the world. The concept pattern that triggers here is:

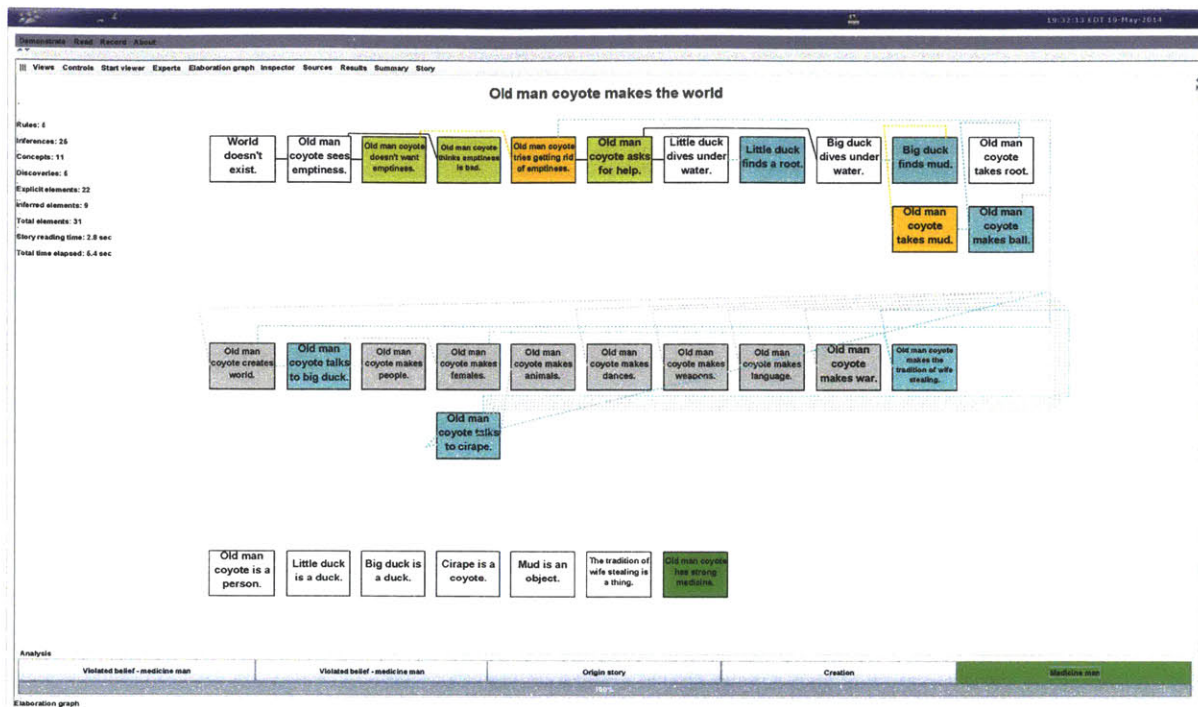


Figure 3.4: "Medicine man" concept pattern in "Old Man Coyote Makes The World".

Start description of "Violated Belief - Medicine Man".

AA is a person.

BB is an entity.

AA creates BB.

Consequently, AA has strong medicine.

The end.

Figure 3.4 shows a basic form of the recursive triggering that can happen thanks to the new ability for concept patterns to insert elements back into the story. In this case, the following simple concept pattern is triggered:

Start description of "Medicine Man".

AA is a person.

AA has strong medicine.

The end.

This concept pattern is triggered despite the fact that we do not explicitly say that Old

Man Coyote has strong medicine anywhere in the story.

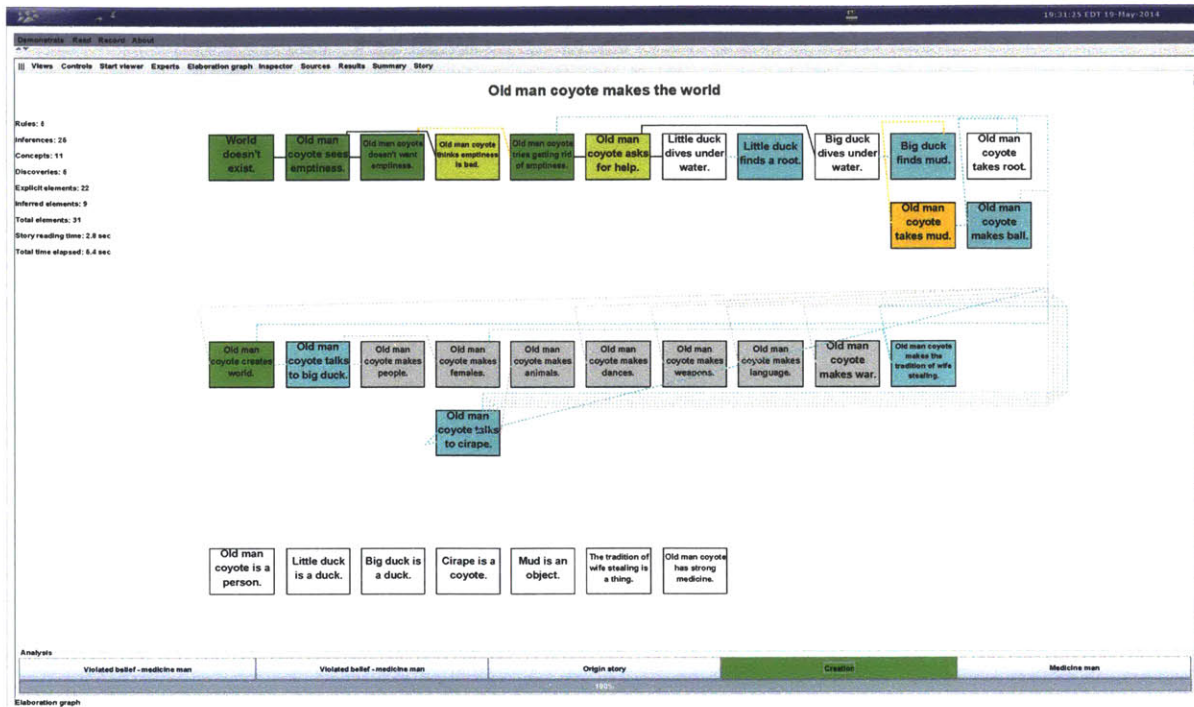


Figure 3.5: “Creation” concept pattern in “Old Man Coyote Makes The World”.

Figure 3.5 shows off the other usage of the leads-to relation — searching for two events connected by an arbitrary chain of events. In particular, this instance is the same concept pattern that was mentioned early in this section:

Start description of "Creation".

XX and YY are entities.

YY's not existing leads to XX's creating YY.

The end.

Although not without difficulty, “Old Man Coyote Makes The World” was successfully read by Genesis. As “Old Man Coyote Makes The World” was the first story to be fully inserted into Genesis, this result was very enheartening with regards to the capabilities of Genesis.

3.4 Old Man Coyote's Visit to the Crow Indians

Some time after the creation of the world, the Crow camp had increased to a considerable size. Seeing that the camp had grown large, Old Man Coyote decides to visit the Crow Indians. He transforms a mountain goat into a horse, bark into feather trappings for his horse, and various other things into what he needed to look fine. When the sun was low, he traveled into the camp, going where all could see him. However, as a ring game ended, a loud cheer went up and his horse was startled. It shied and Old Man Coyote fell off and his fine things transform back into their original state. Realizing the mysterious man was Old Man Coyote, the Crows all chase him for advice, but Old Man Coyote transforms into a wolf and runs away.

3.4.1 Important Plot Features

“Old Man Coyote's Visit to the Crow Indians” has one major feature: medicine. Old Man Coyote shows off his medicine powers in multiple ways, transforming items and himself in his attempts to fool the Crow tribe. Although not present in the abridged version, Old Man Coyote also takes a moment to speak with the mountain goat he has transformed into a horse, when it asks him how it should behave.

With the groundwork laid by “Old Man Coyote Makes The World”, “Old Man Coyote's Visit to the Crow Indians” was relatively easy to insert into Genesis, with one minor snag: the Trickster personality type.

3.4.2 Difficulties, Issues, and Tricksters

“Old Man Coyote's Visit to the Crow Indians” is a story meant to define the character of Old Man Coyote. Old Man Coyote wants to be well-respected by the Crow Indians. He

wants the Crows to follow his lead, to imitate him. He doesn't want to actually have to do anything besides ride into camp and look impressive.

This is a problem for Old Man Coyote, because he is the creator of world — he is often referred to as “First-Worker”. As the creator of the world, the Crows yearn for his advice and so, if they recognize him, they will do whatever they can to pin him down and get his wisdom. So, Old Man Coyote has to fool the Crows so that they can't recognize him — not to mention that he enjoys playing a trick every now and then. As such, I thought that introducing the Trickster personality was a good idea.

As described in the general difficulties section, however, there were minor issues with this that were quickly resolved. Although the issues were first noted here, they are described in detail in the general difficulties section because they also factored into the work done on the story titled “The Bungling Host.”

3.4.3 Final Result

Figure 3.6 shows the resulting elaboration graph from Genesis reading “Old Man Coyote's Visit to the Crow Indians.” This story has significantly less usage of the leads-to mechanism in comparison to the previous story due in part to the length of the story (it is much shorter than “Old Man Coyote Makes The World”) as well as the increased number of direct causal links. One notable feature is the presence of an orange box in the graph, which is a may-rule triggered from the mental model of the “trickster” personality trait.

Figure 3.7 shows the sequence of events that are identified as being part of the mental model for the “trickster” personality. In the personality model itself, those events are represented as:

Old man coyote's visit to the crow indians

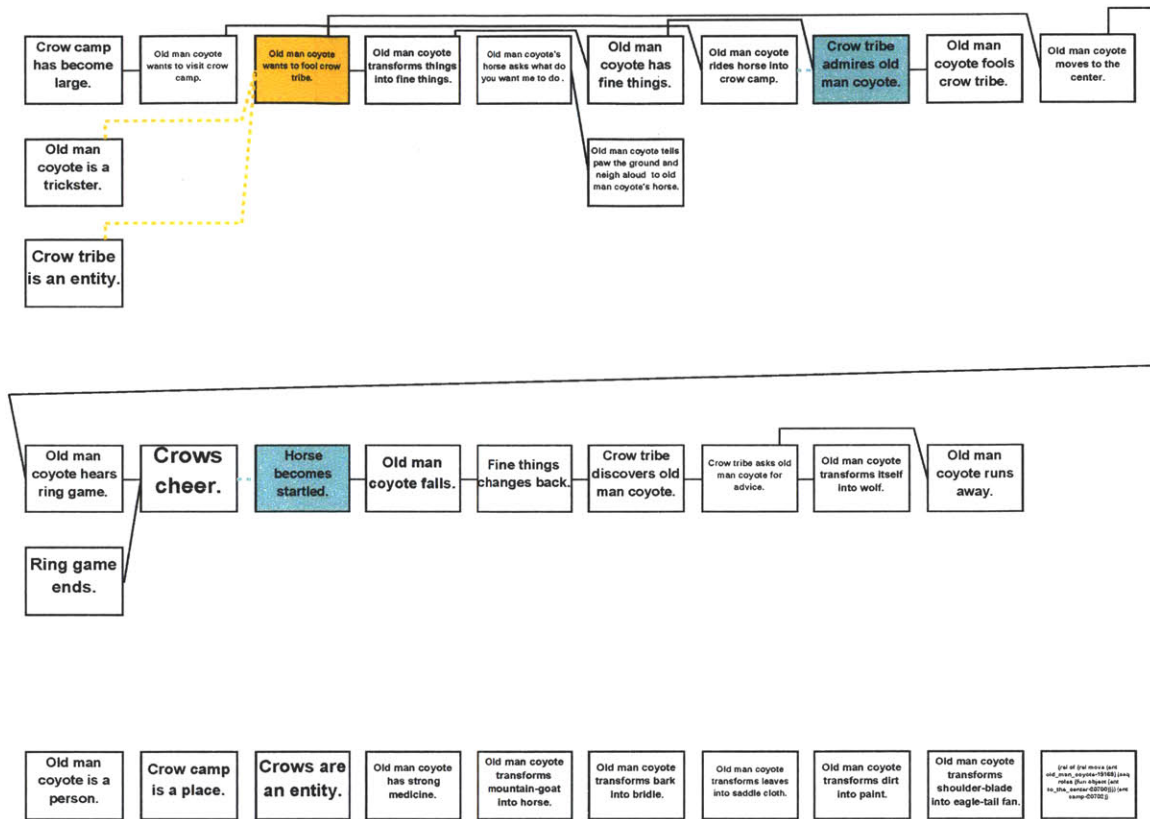


Figure 3.6: Result from running Genesis on “Old Man Coyote’s Visit to the Crow Indians”.

xx is a person.

yy is an entity.

If xx is trickster and yy is an entity, then xx may want to fool yy.

The “trickster” personality also encompasses two important concept patterns: what it means to be a successful trickster and what it means to fail as a trickster.

Start description of "Successful trickster".

xx is a person.

yy is an entity.

xx’s wanting to fool yy leads to xx’s fooling yy.

The end.

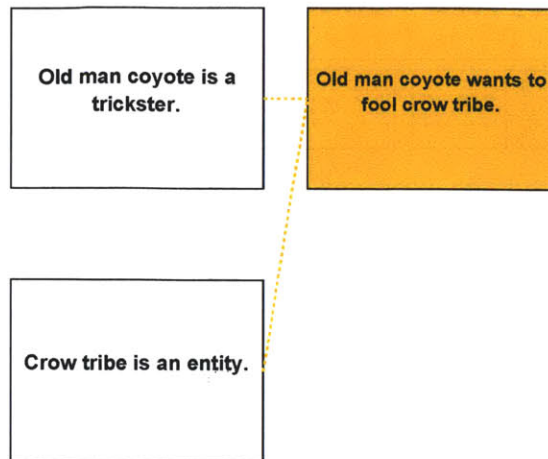


Figure 3.7: Mental Model result from Genesis reading “Old Man Coyote’s Visit to the Crow Indians.”

Start description of "Failed trickster".

xx is a person.

yy is an entity.

zz is an entity.

xx’s wanting to fool yy leads to yy’s discovering xx.

The end.

Here again we see the usage of the leads-to mechanism. Figure 3.8 demonstrates the “Successful trickster” concept pattern being recognized in the story, while Figure 3.9 shows the “Failed trickster” concept pattern.

With the “trickster” personality working and building on top of the work from “Old Man Coyote Makes The World”, “Old Man Coyote’s Visit to the Crow Indians” was also successfully read by Genesis.

3.5 The Bungling Host

Old Man Coyote was very, very hungry. As were his wife and his children. Old Man Coyote comes up with a plan to get food — coming up to a lodge, he calls in. Inside was Owl

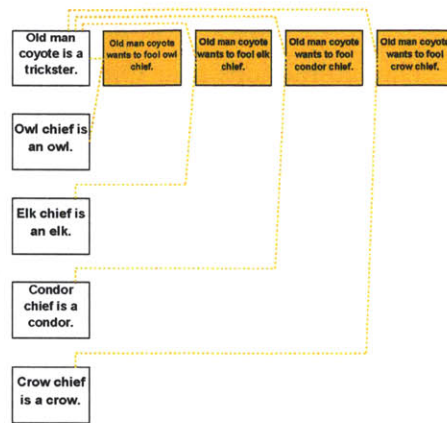


Figure 3.11: Mental Model result from Genesis reading “The Bungling Host”.

captures all four instances of Old Man Coyote wanting to fool someone. Figures 3.12 and 3.13 show two of the four instances of the “successful trickster” concept patterns in the story.

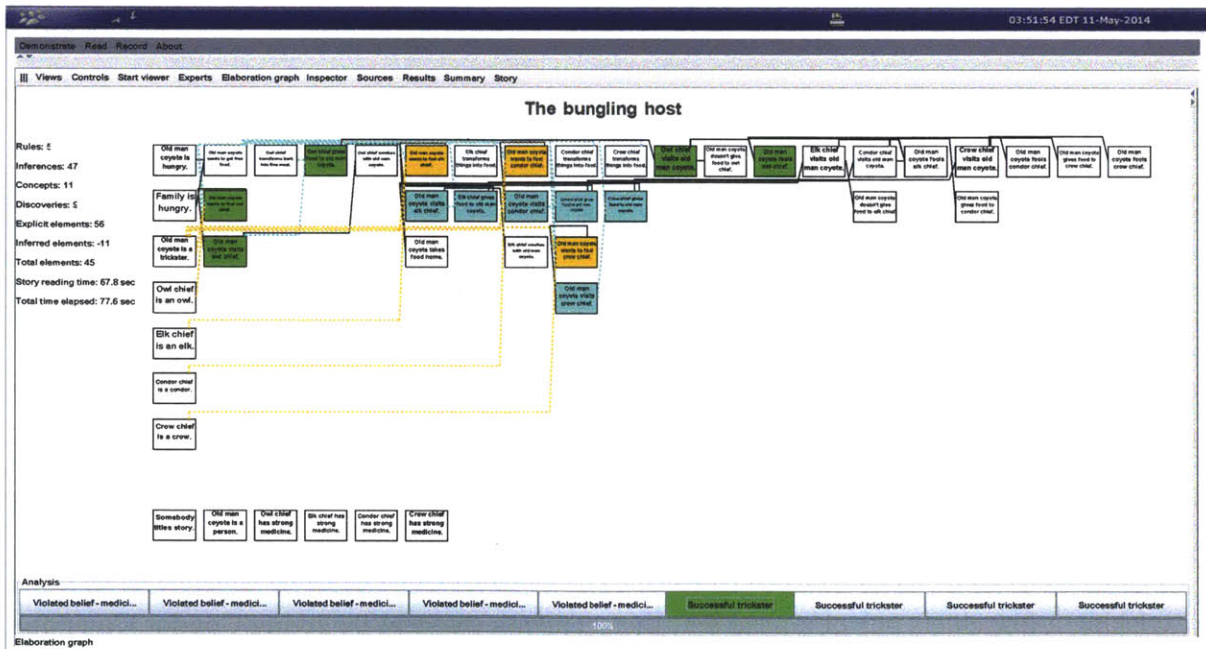


Figure 3.12: One of the “Successful Trickster” concept patterns in “The Bungling Host”.

3.6.1 Important Plot Features

“Adventures with Buffalo” is a strange story that claims to be a true tale, passed on to the teller by someone who was alive until only recently. There are two major features: the first is medicine, which is readily apparent in the way the buffalo is able to transform itself. The second is the cultural idea that something that is different has some inherent special strength. The strange behaviour of the buffalo indicates that there is something special about it, which manifests itself in the buffalo’s inability to be hurt and ability to transform.

3.6.2 Final Result

Figure 3.14 shows the resulting elaboration graph from Genesis reading “Adventures with Buffalo”. Genesis immediately discovers that the Strange Buffalo has strong medicine because later on in the story, it is shown transforming itself in various ways. There is another event that leads to the Strange Buffalo being determined to have strong medicine besides the transformations, however: a leads-to event that says “Strange buffalo is being extraordinary.”

This event is from the following statements placed into the story:

The Strange Buffalo is being extraordinary because The Strange Buffalo was not hurt by the young man.

The Strange Buffalo’s standing still leads to The Strange Buffalo’s being extraordinary.

I use these statements to represent the fact that our narrator picks up on some difference in the buffalo: I note that the buffalo is “extraordinary” because of its strange behaviour and immunity to wounds. In this story, the difference is meant to be evidence of the strange buffalo having strong medicine, which I capture with the following concept pattern:

Adventures with buffalo

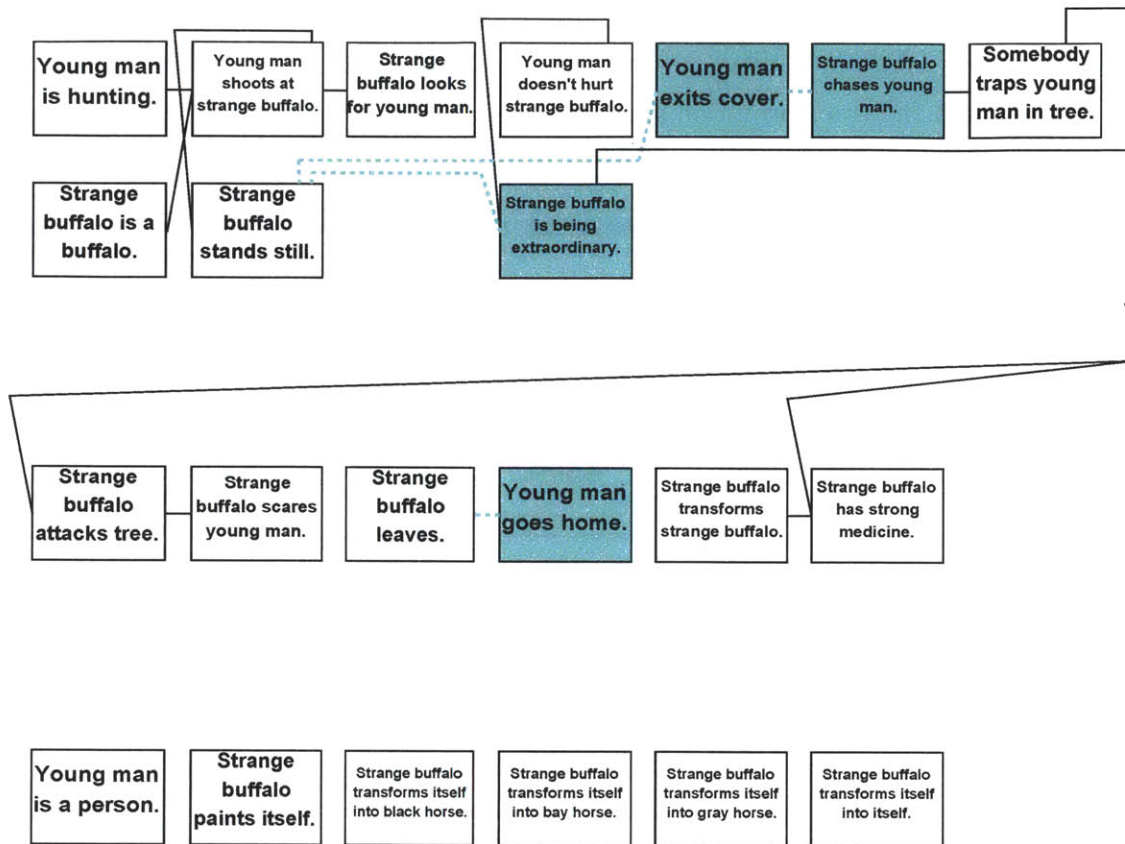


Figure 3.14: Result from running Genesis on “Adventures with Buffalo”

Start description of "Inherent Medicine".

xx is an entity.

xx is extraordinary.

Consequently, xx has strong medicine because xx is extraordinary.

The end.

This concept pattern demonstrates the fact that Genesis already has the mechanisms in place for something to be named as different and be tagged as having inherent strength (in most Crow folklore, this manifests as strong medicine). One important note about the concept pattern is the use of “because” in the “Consequently,” statement: when Genesis inserts

this new element back into the story, it will link it to the fact that some entity (in this case, the Strange Buffalo) is extraordinary. Figure 3.15 shows this concept pattern being highlighted in Genesis. Note how the box with the text “Strange buffalo has strong medicine” is connected to both the transformation story element and the extraordinary story element.

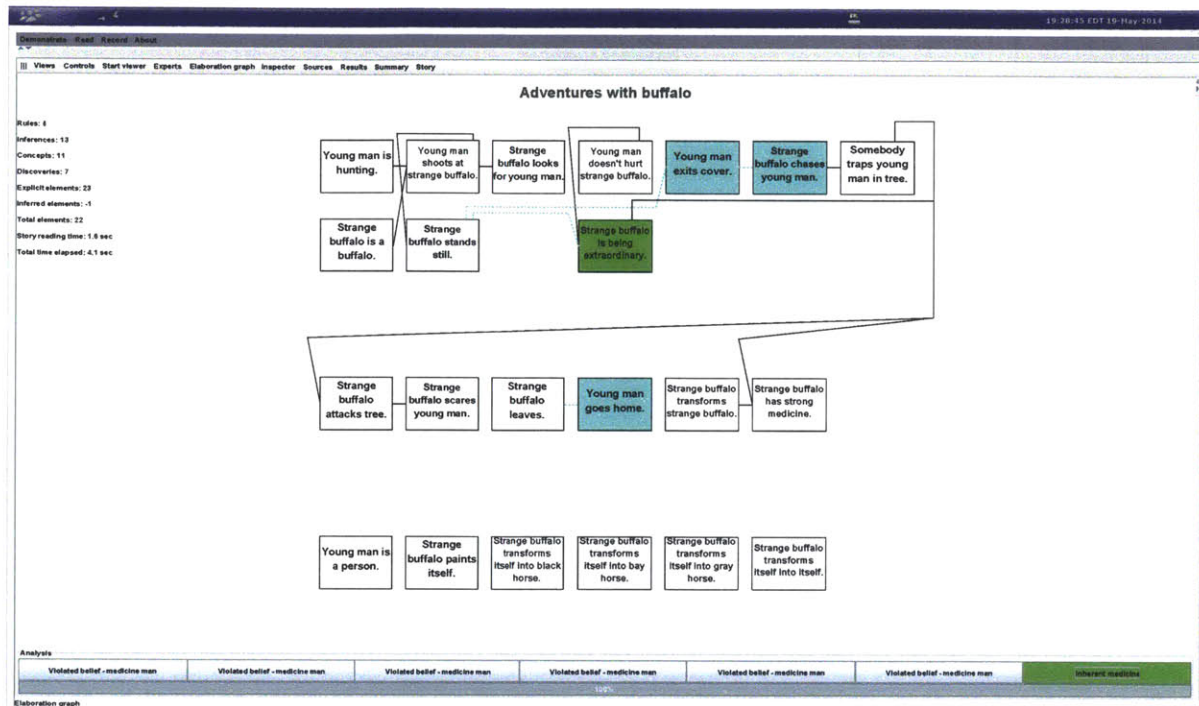


Figure 3.15: “Inherent Medicine” concept pattern in “Adventures with Buffalo”

Adventures with Buffalo is notable because its primary focus is on this strange buffalo, which squarely targets the one unique feature of Crow literature that has not been touched on yet — that differences are treated as strengths. Genesis’ success with this story, as well as with the prior stories, demonstrates that Genesis has the capability to understand the unique features within Crow folklore.

3.7 Plenty Coups' Adoption by the Little People

When Plenty Coups was young, he decided that he wanted to go out on a vision quest. His village was moving towards the Little Rockies and he took some extra moccasins and a robe and headed out to be alone and seek a vision. Wearing himself out, he eventually lay down for the night and slept.

Plenty Coups was awoken by a voice calling him and felt that a person was nearby. Plenty Coups is told he has been summoned and follows the mysterious person by a strange light ahead, feeling as though neither of them are truly touching the ground. They are encircled by coyotes, who bark as if talking to the person, before entering a lodge.

Inside the lodge, there are many warriors, and someone from the south side of the lodge asks, "Why have you brought this young man here?" Looking, Plenty Coups sees that all the great forces of nature are seated on the south side of the lodge. From the north side, a kind voice invites Plenty Coups to sit with them.

At the north side, Plenty Coups finds that the person who had called him was Dwarf Chief, the chief of the Little People. The Dwarf Chief honors Plenty Coups by counting coup for him and then adopts him. The Dwarf Chief says that Plenty Coups already has powerful medicine and that he has nothing to give him but advice, saying, "You have the power to become a great chief." Plenty Coups wakes up, emboldened by his vision, and, in time, goes on to become a great chief.

3.7.1 Important Plot Features

“Plenty Coups’ Adoption by the Little People” hits two of the four concepts that are unique features of Crow literature: medicine and differences being strengths. The manner in which medicine comes into play is a bit strange: while the mysterious person who visits Plenty Coups definitely has medicine, most of the medicine in the story is assumed based on the extraordinary properties of the entities that Plenty Coups meets or it is explicitly stated, such as when Plenty Coups is told he already has strong medicine.

Differences being strengths is again highlighted, in part by the great forces of nature, who are radically different from humans, but also in the dwarfs, or little people, that Plenty Coups encounters. In particular, the notes in the full version of the story describes the dwarfs as being sort of legendary beings to a lot of tribes, believed to have been given amazing powers. These dwarfs are thought by many plains tribes to have dwelled in the mountains and were the ones to make the stone arrowheads that are scattered across the United States.

Additionally, however, there is a bonus feature that I did not mark as a unique Crow feature due to its scarcity in the collections available to me and its similarity to prophetic dreams in other cultures: visions.

A vision quest is a journey that one typically takes alone, lasting for several days without food or water, with the intent of receiving a vision and being granted Helpers, who aid you with their medicine throughout life. Visions can result in many things: advice, power, or prophecy. In one story, a young man wishes to find his brother-in-law and learns of his location in a vision. In a different Plenty Coups story, Plenty Coups has a vision that is interpreted to foresee the destruction of all of the tribes but one — that one tribe being the Crow tribe, which must learn to adapt to the arrival of the whites in order to survive.

This particular story fits into the category of both advice and power — Plenty Coups is originally seeking a Helper, whom he wishes to receive power from, but instead receives advice.

3.7.2 Final Result

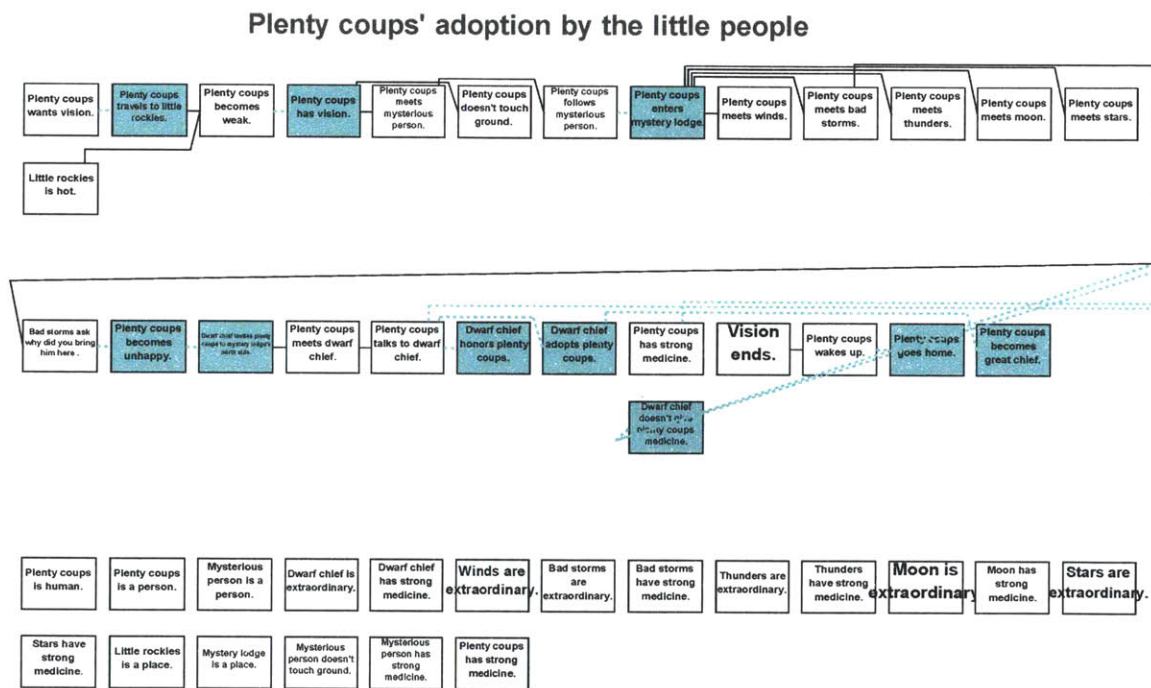


Figure 3.16: Result from running Genesis on “Plenty Coups’ Adoption by the Little People”.

Figure 3.16 shows the resulting elaboration graph from Genesis reading “Plenty Coups’ Adoption by the Little People.” This story has many entities which are described as being “extraordinary” in order to signify their difference from average humans.

Unique for this story are two concept patterns that allow Genesis to recognize both the vision quest and the prophetic nature of vision quests. The first uses the leads-to relation

The end.

That description of a vision quest is almost identical to the one given in the previous subsection. The results of this concept pattern can be found in Figure 3.17. The second concept pattern is a description of a fulfilled prophecy in relation to visions:

The end.

The results of this concept pattern can be found in Figure 3.18.

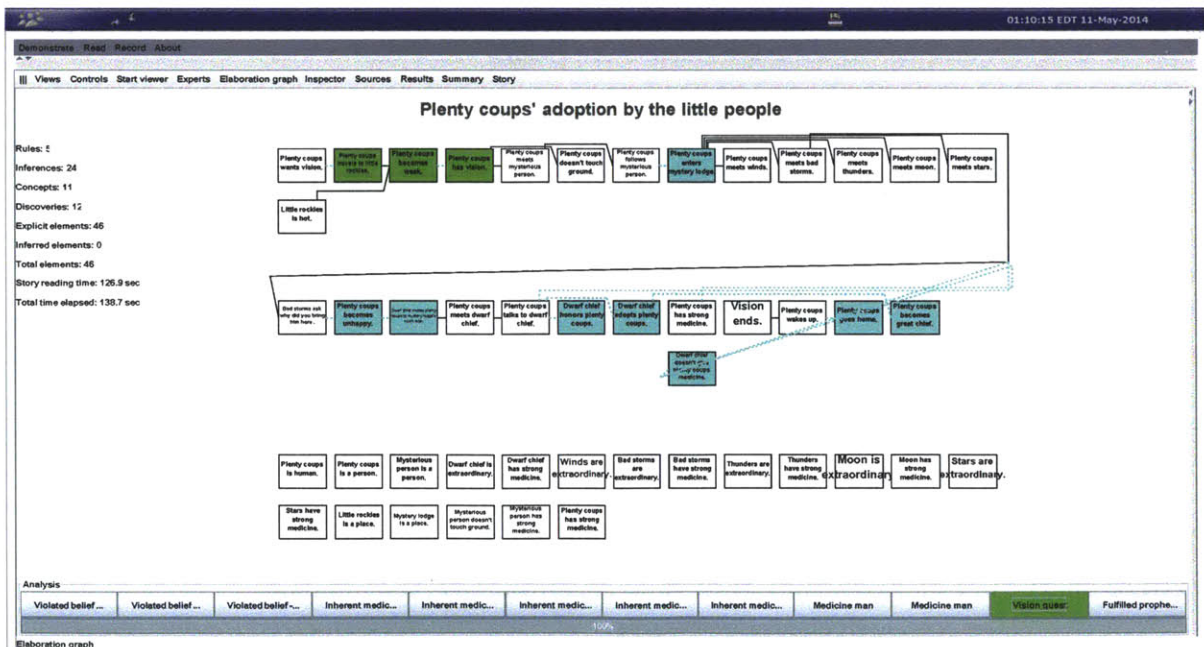


Figure 3.17: The “Vision Quest” concept pattern in “Plenty Coups’ Adoption by the Little People”.

the culture the stories come from.

Chapter 4

Contributions

In my research, I have made the following contributions:

- I analyzed a body of 100+ stories from Crow literature.
- I created a set of 57 features that, through generalization and combination of redundant features, was reduced down to a set of 16 features. The results of this analysis are present in Appendix D. These 16 features were further reduced to four features that I believe are the most important differentiators of Crow folklore:
 - **Unknowable Events** – It is possible for two events to be causally connected by events that we cannot know. In Crow folklore, this most explicitly appears in “Old Man Coyote Makes The World” when Old Man Coyote creates people out of mud. The story then goes “How he did this, no-one can imagine.”
 - **Medicine** – Medicine is something akin to magic that appears throughout Crow folklore. Medicine can be explicitly identified within the story or it can be represented as a subversion of the reader’s belief state.
 - **Differences as Strengths** – In Crow culture, differences are treated as strengths. The most obvious example in Crow folklore is story about dwarfs, or little-people,

who are believed to have immense power.

- **Uniform Treatment of Entities** – Crow folklore does not draw a substantial distinction between animals and humans, instead treating them almost identically.

This set of features proved useful for testing Genesis and will hopefully continue to be useful for anyone examining Crow folklore.

- I identified areas in which Genesis was unable to handle the stories from Crow folklore, leading to the development and enhancement of mechanisms that improved Genesis's capabilities to the point that it was able to handle Crow folklore. The following mechanisms were either developed or enhanced as a result:
 - The “Consequently” mechanism was developed, which allows concept patterns to insert elements back into a story.
 - The “leads-to” and “Strangely, ... leads-to” mechanisms were developed, which allow for the handling of events connected by arbitrary events that we either don't care about or can't know.
 - Genesis's personality trait mechanism was expanded to allow personality traits to be recognized not just by characterization (e.g., “vicious”) but also by classification (e.g., “a trickster”).
- I compiled a corpus of five Crow stories, all of which are fully functional in Genesis. The compilation of this functional corpus is of great use not only in demonstrating the Genesis system's capabilities as a cross-cultural story understanding system, but as a case-study for examining stories on the basis of cultural features.
- I tested Genesis's capabilities as a universal story understanding system, showing that Genesis is capable of handling not only European stories such as Shakespeare, which

is Genesis's bread-and-butter, but also stories from very different cultures, such as the Crow tribe.

Appendix A

Full Stories

A.1 Old Man Coyote Makes The World

How water came to be, nobody knows. Where Old Man Coyote came from, nobody knows. But he was, he lived. Old Man Coyote spoke: "It is bad that I am alone. I should have someone to talk to. It is bad that there is only water and nothing else." Old Man Coyote walked around. Then he saw some who were living - two ducks with red eyes.

"Younger brothers," he said, "is there anything in this world but water and still more water? What do you think?"

"Why," said the ducks, "we think there might be something deep down below the water. In our hearts we believe this."

"Well, younger brothers, go and dive. Find out if there is something. Go!"

One of the ducks dove down. He stayed under water for a long, long time. "How sad!" Old Man Coyote said. "Our younger brother must have drowned."

"No way has he drowned," said the other duck. "We can live underwater for a long time. Just wait."

At last the first duck came to the surface. "What our hearts told us was right," he said. "There is something down there, because my head bumped into it."

"Well, my younger brother, whatever it may be, bring it up."

The duck dived again. A long time he stayed down there. when he came up, he had something in his beak. "Why, what can this be?" Old Man Coyote took it. "Why, this is a root," he said. "Where there are roots, there must be earth. My younger brother, dive

again. If you find something soft, bring it up.”

The duck went down a third time. This time he came up with a small lump of soft earth in his bill. Old Man Coyote examined it. “Ah, my younger brother, this is what I wanted. This I will make big. This I will spread around. This little handful of mud shall be our home.”

Old Man Coyote blew on the little lump, which began to grow and spread all over. “What a surprise, elder brother!” said the ducks. “this is wonderful! We are pleased.” Old Man Coyote took the little root.

In the soft mud he planted it. Then things started to grow. Grasses, plants, trees, all manner of food Old Man Coyote made in this way.

“Isn’t this pretty?” he asked. “What do you think?”

“Elder brother,” answered the ducks, “this is indeed very pretty. But it’s too flat. why don’t you hollow some places out, and here and there make some hills and mountains. Wouldn’t that be a fine thing?”

“Yes, my younger brothers. I’ll do as you say. While I’m about it, I will also make some rivers, ponds, and springs so that wherever we go, we can have cool, fresh water to drink.”

“Ah, that’s fine, elder brother,” said the ducks after Old Man Coyote had made all these things. “How very clever you are.”

“Well, is something still missing, younger brothers? What do your hearts believe?”

“Everything is so beautiful, elder brother. What could be missing?”

“Companions are missing,” Old Man Coyote said. “We are alone. It’s boring.”

He took up a handful of mud, and out of it made people. How he did this, no-one can imagine. The people walked about. Watching them, Old Man Coyote was pleased, but the ducks were not so happy.

“Elder brother,” they said, “you have made companions for yourself, but none for us.”

“Why, that’s true. I forgot it.” Right away he made all kinds of ducks. “There, my younger brothers, now you can be happy.”

After a while Old Man Coyote remarked: “Something’s wrong here.” “But everything is good. We’re no longer bored. What could be wrong?”

"Why, don't you see, I've made all these people men, and all the ducks I made are male. How can they be happy? How can they increase?" Forthwith he made women. Forthwith he made female ducks. Then there was joy. Then there was contentment. Then there was increase. That's the way it happened.

Old Man Coyote walked about on the earth he had made. Suddenly he encountered Cirape, the coyote.

"Why, younger brother, what a wonderful surprise! Where did you come from?"

"Well, my elder brother, I don't know. I exist. That's all. Here I am. Cirape, I call myself. What's your name?"

"Old Man Coyote, they call me." He waved his hand: "All that you see around you, I made."

"You did well. But there should be some animals besides ducks."

"Yes, you're right, come to think of it. Now, I'll pronounce some animal names. As soon as I say one, that animal will be made."

Old Man Coyote named buffalo, deer, elk, antelopes, and bear. And all these came into being. After some time the bear said to Old Man Coyote: "Why did you make me? There's nothing to do. We're all bored."

"I have made females for you. this should keep everybody busy."

"Well, elder brother, one can't do that all the time."

"Yes, you're right; it's true. Well, I'll think of something. I'll make a special bird."

From one of the bear's claws he made wings. From a caterpillar's hair he made feet. From a bit of buffalo sinew he made a beak. From leaves he made a tail. He put all these things together and formed a prairie chicken. Old Man Coyote instructed it: "There are many pretty birds. You I haven't made pretty, but I gave you a special power. Every dawn as the sun rises, you shall dance. You will hop and strut with your head down. You will raise your tail and shake it. Spreading your wings, you shall dance - thus!"

At once the prairie chicken danced. All the animals watched, and soon they began to dance too. Now there was something to keep them amused. But the bear still wasn't satisfied. "I gave you a claw to make part of this prairie chicken," he told Old Man Coyote. "why

didn't you give me my own dance? I don't want to dance like a chicken."

"Well, all right, cousin. I'll give you a dance of your own. Thus and thus, this way and that, you shall dance."

"Old Man Coyote," the bear kept complaining, "how can I dance? Something is missing."

"How can something be missing? I've made everything."

"There should be some kind of sound to dance to."

"Why, you're right. There should be." Forthwith Old Man Coyote made a little grouse and gave him a song. Then he made a drum - how, no man can imagine. The little grouse sang and drummed, and everybody danced.

"Why should this no-account prairie chicken dance?" asked the bear.

"Why should all those little, no-account animals dance? I alone should have this dance power."

"Why, they're happy. The chokecherries are ripe, the sun is shining. All of them feel like dancing. Why should you be the only one?"

"I am big and important. So I alone should dance."

"Why, listen to him, how he talks! Be polite to me who made you."

"Ho! You didn't make me. I made myself."

"How impolite!" said Old Man Coyote. "He is threatening the little animals with his big claws." He told the bear: "You're not fit to live among us. You will stay in a den by yourself and eat decayed, rotten things. In winter you will sleep, because the less we see of you, the better." So it was.

One day Old Man Coyote and Cirape were walking and talking. "Something you forgot," Cirape said to Old Man Coyote. "How could I have forgotten something?" "Why, those people you made. They live poorly. They should have tools, tipi's to live in, a fire to cook by and warm themselves." "You're right. Why didn't I think of that?" Forthwith he made a fire with lightning and the people rejoiced. "Now everything is finished. What do you think?"

"Oh, elder brother, the people should have bows and arrows and spears for better hunting. Often they starve."

"That's so, I'll give out weapons."

"Elder brother, give weapons, but only to the people, not to the animals."

"Why shouldn't the animals have bows and arrows too?"

"Don't you see? The animals are swift; they already have big claws, teeth, and powerful horns. The people are slow. Their teeth and nails are not very strong. If animals had weapons, how could the people survive?"

"Why, my younger brother, you think of everything." Forthwith he gave the people bows and spears. "Younger brother, are you satisfied now?"

"No, not at all. There's only one language, and you can't fight somebody who speaks your language. There should be enmity; there should be war."

"What are wars good for?"

"Oh, my respected elder brother, sometimes you're just not thinking. War is a good thing. Say you're a young warrior. You paint yourself with vermilion. You wear a fine war shirt. You start. You sing wars songs. You have war honors. You look at the good-looking young girls. You look at the young women whose husbands have no war honors. They look back at you. You go on the warpath. You steal the enemy's horses. You steal his women and maidens. You count coup, do brave deeds. You are rich. You have gifts to give away. They sing songs honoring you. You have many loves. And by and by you become a chief."

"Ah, Cirape, my younger brother, you've hit upon something."

Old Man Coyote divided the people into tribes, giving them different languages. Then there was war, then there was horse stealing, then there was counting coup, then there was singing of honoring songs. After a long time, Old Man coyote was walking with Cirape again.

"You are very clever, my younger brother, but there are some things you don't know. Let me tell you: When we marry a young woman, when we take her to wife secretly, how satisfying it is! What pleasure it gives us!"

"Yes, my elder brother, just so. That's how it is with me."

"Ah, but after some years, after you have lived with one woman for awhile, you lose interest. You are yearning for someone new. So you steal someone else's wife. In this back-and-forth wife stealing that goes on in our tribe, has some fellow ever made off with your wife? A proud young warrior, maybe?"

“Why yes, my elder brother. It was such a man who took a plump, pleasing young wife away from me. It would have been better if an enemy from another tribe had done it. It would have been easier to bear if she were far away where I couldn’t see them together.”

“Well, younger brother, if she would come back, would you take her?”

“What, take her back? Never! I have honor, I respect myself. How could I do such a thing?”

“Ah, Cirape, how foolish you are. You know nothing. Three times my wife has been abducted, and three times I have taken her back. Now when I say ‘come’, she comes. When I say ‘go’, she goes. Whenever I tell her to do something, she remembers that she has been stolen. I never have to remind her. She is eager to please. She fulfills my every desire. Under the blanket she’s a hot one - she has learned things. This is the best wife, the best kind of loving.”

“That’s how you feel. But people mock you. They look at you sideways and laugh behind your back. They say: ‘He has taken what another one threw away.’ ”

“Ah, younger brother of mine, what do I care if they laugh behind my back when, under our buffalo robe, I am laughing for my own reasons? Let me tell you, there’s nothing more satisfying than having a wife who has been stolen once or twice. Tell me: Do they steal ugly old wives, or young and pretty ones?”

So because of Old Man Coyote’s sensible advice, there was mutual wife stealing among the Crows in the old days. And that’s why Crow men ever since have taken back wives they had already divorced. In one way or another, everything that exists or that is happening goes back to Old Man Coyote.

A.2 Old Man Coyote’s Visit to the Crow Indians

When the Crow camp had increased to a considerable size, Old Man Coyote paid his first visit there. The women were busy getting bark from the cottonwoods and were drinking the sap. Old Man Coyote said, “I’ll visit the Crow Indians whom I made.” A mountain-goat was eating before him, he made a white horse out of it and painted it so that it appeared as a pinto with red ears; it was a pretty horse with a yellow rump. He rode it, bidding it prance in lively fashion. He put his legs up tight. The horse said, “What do you want me to do?” “Paw the ground and neigh aloud.” After a while he bade his horse stand quiet. He took the bark used by women and from it made feather trappings for his horse. He fashioned a fancy bridle out of bark; he took the biggest leaves to be found and stretched them together for a mountain-lion skin saddlecloth. He made red and green flannel out of leaves for his

horse, also some fancy breast ornament. He stood a little ways from his horse and thought its decoration was fine. Then he took dirt and painted himself. He made a switch decorated with porcupine work. He looked at himself in a glass and thought he looked fine. His leggings and other garments were fine. He had prettily beaded moccasins. He had wire braids down to his waist, with bells on them. He saw his outfit was complete. He took an old buffalo shoulder-blade and made an eagle-tail fan out of it.

When the sun was low, he said, "I'll go into camp." He was so fully decorated that he could hardly move. "I'll have the Crow imitate me." He went a little ways, then tightened his hold on the horse which would then paw and neigh. The Crow were playing the hoop game. Old Man Coyote approached. He appeared, not noticing anyone. All stopped and looked. "Who is this Crow? There's no one like him." The women ran out to look at the handsome man. The women were having a plum-seed game. He would watch them, then he would tighten his hold on the horse, which acted according to his instructions. He was also holding a coupstick. He went to where they could all watch him. All gathered round to see his dress. He would make his horse paw and neigh. The horse was shy. When he came up and they cheered the winner in the ring game, the noise frightened the horse. It shied and Old Man Coyote tumbled off with his finery. All shouted. His horse ran away and turned back into a brush-deer again, and escaped to the brush. All recognized him then. They cried, "Catch him." All tried to hold him in order to get his advice. All ran for him. His finery fell off. He turned into a wolf, and ran off barking. His decorations were strung along the road. They looked at all his finery, but when they picked it up, it was nothing but bark.

Hereafter all adopted the kind of dress then seen on Old Man Coyote. Even the old shoulder-blade resumed its own form. The wire turned back into "Spanish bayonets." It took all night before these things turned back to their old form. That is how Old Man Coyote came to visit the Crow Indians.

A.3 The Bungling Host

Old Man Coyote was very hungry - he and his wife and children. He was wondering how he could get something to eat. He went searching for food. He came to a yellow tent, the Owl chief's tent, stood outside and called in. The owl told him to come in. He entered and sat down. He told the owl he wanted something to eat. The owl told his wife to fix something for Old Man Coyote. She got some bark and pounded it fine. When she was done pounding the bark, the owl stooped over the bark. His wife pierced his eyes, and grease came flowing down on the bark. When he had greased this, it was transformed into fine meat. He gave it to Old Man Coyote, who ate some of it and kept some for his wife and children. When he had done eating, the owl smoked with him. He told the owl to come and visit him some time, then he went home.

When his family had eaten the food brought home and were hungry again, Old Man

Coyote started off for something to eat and came to a big yellow tipi again. It was the Elk chief's lodge. He called in to the elk, who told him to enter. Old Man Coyote told the elk he was very hungry. The elk told his wife to bring some bark. She brought some bark; some of it changed into fat, some into meat. The elk told his wife to shave off some of his neck. When she did so, pieces of skin fell off in shavings. She cooked these shavings into a pudding, and gave it all to Old Man Coyote. He ate it and what was left he saved. He smoked for a while, and when he was going to leave, he told the elk to come and visit him some time. Then he went home.

When Old Man Coyote's wife and child had eaten what he brought home, he went out again. He came to another tent, which was yellow and had a black top. He was standing outside the tent. It belonged to the condor. He called in. The condor told him to come in and sit down. When he came in, he told the condor he had been looking for him a long time and was tired. The condor told his wife to bring in some big pieces of bark. When she brought them, the condor covered himself and the bark with a blanket. When the blanket was taken away, the bark had turned into fresh meat. They cooked it over a fire. The condor bade his wife pierce his nose. She did so. Then grease came out and it was put into a bowl. He gave the cooked meat to Old Man Coyote and he ate it. Old Man Coyote told him he was very glad he came there and when he had done eating they smoked together and told stories. When he went home, they gave him more meat and grease from the bird's nose. He told the condor to visit him some time. The bird was called nu'ptako ictse. He told the condor to come to him any time he wished.

When his children and wife had eaten all the food he had brought from the condor he went out again. He came to a black tent, which belonged to the crow. He stood outside and called to the crow, who bade him enter. He came in and sat down. They gave him water to drink. He told the crow he was very hungry and tired and had been looking for him for a very long time. The crow told his wife to bring some bark. When she had brought it the crow covered himself and the bark with his blanket. He took the blanket away and the bark had turned into meat and fat. He cooked the meat over the fire. The crow told his wife to fix something in his hill, and when she had done so, grease came from it. She put the grease into a bowl and gave Old Man Coyote the meat with the grease. He ate some and saved some for his family. The crow and Old Man Coyote smoked. They told each other stories. When they had done, they gave him water to drink. He asked the crow to visit him some time, and took the uneaten food to his wife and children.

Some time after this the owl came to Old Man Coyote's tent and called in to him. He bade the owl enter. The owl entered. He told him to sit down in the rear of the lodge. He bade his wife bring some bark. When she had brought the bark, he told them to pound it fine. It changed into fine meat. He asked the owl what kind of berries should be mixed. "Chokecherries." So his wife mixed chokecherries with the meat. Old Man Coyote stooped over the meat and told his wife to pierce his eye. She did so and his eye fell out. The owl

doctored his eye and made it well. The owl then told Old Man Coyote's wife to pierce his own eye. She did so and grease came out, with which she greased the meat. She gave the owl some and he ate, but did not eat all of it. Some of it he left untouched. Old Man Coyote filled his pipe and smoked. When the owl went home, Old Man Coyote told him to take meat, but he did not do so. When the owl had gone, Old Man Coyote's wife scolded him. "Why did you do that?" He told his wife he had done it on purpose because he knew the owl would not eat the rest of the meat and so they would eat it themselves. When the owl got home, he was in bad spirits and his wife asked what was the matter. He told her Old Man Coyote had tried to do like himself, but his eye had fallen out, that was why he felt badly.

Next the elk came to Old Man Coyote's tent. He called in to Old Man Coyote, who told him to enter. When he came in, he smoked with him and told him stories, then he asked his wife to bring some bark. She brought the bark. He told her to pound it fine. She did so. He told her to scrape his neck. When she scraped it, the blood came flowing. Then the elk told the woman to scrape his neck. When she did so, shavings fell from it. She made a pudding out of them. She gave the pudding and meat to the elk. The elk did not eat the pudding but ate the meat. He told Old Man Coyote to eat the pudding himself, that he felt sorry for him. When he had done, they smoked and the elk went home.

Some time the condor came to Old Man Coyote's tent. He called him not Old Man Coyote but First-worker. He bade him come in. They smoked and told stories. Old Man Coyote told his wife to bring bark. She did. He covered himself and the bark. He took the blanket away and the bark had turned into fresh meat which his wife cooked over the fire. Old Man Coyote told his wife to stick something in his nose. Grease came out. He gave the grease and the meat to the condor. When the condor had done eating, he told Old Man Coyote that what he had heard was not true for he had given him good things to eat. Old Man Coyote told the condor the others had merely played a joke on him. The condor went home and took some of the meat. The elk and the owl came to the condor's tent and asked what Old Man Coyote had done. He told them that he had fed him well.

Next came the crow. He came outside the tipi and called Old Man Coyote, who bade him come in. They smoked and told stories. He told his wife to bring some bark. She brought bark, and he covered himself and the bark with the blanket. When it was taken off, the bark had turned into fresh meat. She cooked it over her fire. Then he told his wife to pierce his nose. When she did so grease came from his nose. He gave the grease and meat to the crow. When he had done eating, Old Man Coyote gave him some of the meat left for his-wife and children. The crow told him what he had heard was not true. Old Man Coyote told him the elk and the owl had told him a lie. He took the meat home.

A.4 Adventures with Buffalo

A young man was hunting deer and buffalo. He saw a bull standing up. He sneaked up in a coulee and when he got close he shot at him. The buffalo raised his tail and looked for him without running away. He shot him again. Again he shot him. The fourth time he shot him. Then the bull got furious. None of the shots hurt him. The Crow got out of his hiding-place and was going to shoot him again. The buffalo saw it and came towards him. The Indian ran to his horse, got on, and fled, pursued by the buffalo. He came to a cliff, got off, and went into a cleft in the rocks. The buffalo came and drove his horse away. Then he got to the cliff and thought the buffalo could not follow, so he ran to a creek, turned, and saw the buffalo. It went to the end of the cliff and came towards him. When he saw the buffalo coming for him, he got to the river, but the bank was too high to jump. There was a tree hanging over. He climbed the tree and sat there. The buffalo came to the tree, looked up and saw him, got back, rolled in the dirt, and came to the tree, which was a big one. He hooked it and knocked off its bark. He hooked off the bark four times. Then he rolled in the dirt again and red paint flew up from where he had wallowed. Now the man was ready for him with his arrows. The buffalo came to the tree, hooked it twice, and at the same time the Crow shot him in the side, but the arrow glanced off as if he had shot at a stone. He did not shoot any more, seeing he could not do anything. The buffalo hooked the tree several times and rolled in the dirt. Then red paint did not fly any more, but dirt flew. He came towards the tree, walked up, hooked the tree, then went back and came faster toward the tree than before. The man kept crying and begging. The fourth time he rolled in the dust, and white clay flew up. He hooked the tree. Bigger chips flew off now. The Indian kept on begging and crying. He cried till he was hoarse. He wondered how he could get away. The place where the buffalo hooked the tree was getting worn away. All this time the man kept begging for mercy the buffalo was rolling on the ground and lay there. After a while he came under the tree. When he got there he did not hook it, but looked at the man, and went away to his wallow. He looked back and saw the man on the tree, went way off, turned, and looked back. The man saw that the buffalo had painted his eyes white and had a buffalo tail round its neck and its eyes painted white. The roan rolled on the ground, got up and turned into a black horse painted in the same way and with a tail round the neck. This black horse rolled and changed into a bay horse. It had eyes painted white and a buffalo tail round the neck. This bay stood and rolled in the dust and turned into a gray horse, which stood still, then went the other way. When it was far off it turned into a buffalo again. It stood on the hilltop. The Indian climbed down the tree and stealthily went home.

This man died recently; he lived on the Big Horn.

A.5 Plenty Coups' Adoption by the Little People

"The village was preparing to move to the Little Rockies, a good place for me, and before the women began to take down the lodges I started out alone. Besides extra moccasins, I had

a good buffalo robe, and as soon as I reached the mountains I covered a sweat-lodge with the robe and again cleansed my body. I was near the Two Buttes and chose the south one, which I climbed, and there I made a bed of sweet-sage and ground-cedar. I was determined that no smell of man should be on me and burned some *e-say* [a root that grows in the mountains] and sweet-sage, standing in their smoke and rubbing my body with the sage.

"The day was hot; and naked I began walking about the top of the mountain crying for Helpers, but got no answer, no offer of assistance. I grew more tired as the sun began to go toward the west, and finally I went to my bed, lying down so my feet would face the rising sun when he came gain. Weakened by my walking and the days of fasting, I slept, remembering only the last rays of the sun as he went to his lodge. When I wakened, looking into the sky, I saw that The-seven-stars [the Big Dipper] had turned round The-star-that-does-not-move [North Star]. The night was westward. Morning was not far away, and wolves were howling on the plains far below me. I wondered if the village would reach the Little Rockies before night came again.

" 'Plenty-coups.'

"My name was spoken! The voice came from behind me, back of my head. My heart leaped like a deer struck by an arrow. 'Yes,' I answered, without moving.

" 'They want you, Plenty-coups. I have been sent to fetch you,' said the voice yet behind me, back of my head.

" 'I am ready,' I answered, and stood up, my head clear and light as air.

"The night had grown darker, and I felt rather than saw some Person go by me on my right side. I could not tell what Person it was, but thought he beckoned me.

" 'I am coming,' I said, but the Person made no answer and slipped away in a queer light that told me where he was. I followed over the same places I had traveled in the afternoon, not once feeling my feet touch a stone. They touched nothing at all where the way was rough, and without moccasins I walked in the Person's tracks as though the mountain were as smooth as the plains. My body was naked, and the winds cool and very pleasant, but I looked to see which way I was traveling. The stars told me that I was going east, and I could see that I was following the Person downhill. I could not actually see him, but I knew I was on his trail by the queer light ahead. His feet stirred no stone, nothing on the way, made no sound of walking, nor did mine.

"A coyote yelped on my right, and then another answered on my left. A little farther on I heard many coyotes yelping in a circle around us, and as we traveled they moved their circle along with us, as though they were all going to the same place as we. When the coyotes

ahead stopped on a flat and sat down to yelp together, the ones behind closed in to make their circle smaller, all yelping loudly, as though they wished to tell the Person something. I knew now that our destination was not far off.

"The person stopped, and I saw a lodge by his side. It seemed to rise up out of the ground. I saw that he came to it at its back, that it faced east, and that the Person reached its door by going around it to the right. But I did not know him, even when he coughed to let someone inside the lodge know he was there. He spoke no words to me but lifted the lodge door and stepped inside. 'Come, Plenty-coups,' he said gently. And I too stepped into the lodge.

"There was no fire burning, and yet there was light in the lodge. I saw that it was filled with Persons I did not know. There were four rows of them in half-circles, two rows on each side of the center, and each Person was an old warrior. I could tell this by their faces and bearing. They had been counting coup. I knew this because before each, sticking in the ground, was a white coup-stick bearing the breath-feathers of a war-eagle. Some, however, used no stick at all, but only heavy first-feathers whose quills were strong enough to stick in the ground. These first-feathers were very fine, the handsomest I had ever seen, and I could not count them, they were so many.

" 'Why have you brought this young man into our lodge? We do not want him. He is not our kind and therefore has no place among us.' The words came from the south side, and my heart began to fall down.

"I looked to see what Persons sat on the south side, and my eyes made me afraid. They were the Winds, the Bad Storms, the Thunders, the Moon, and many Stars, all powerful, and each of them braver and much stronger than men."

I believe the Persons on the south side of the lodge, the Winds, Bad Storms, the Moon, and many Stars, were recognized by Plenty-coups as the great forces of nature, and that this is what he wished to convey to me.

" 'Come, Plenty-coups, and sit with us.' This voice was kind. It came from the north side.

" 'Sit,' said the Person who had brought me there, and then he was gone. I saw him no more.

"They, on the north side of the lodge, made a place for me. It was third from the head on the left, and I sat down there. The two parties of Persons were separated at the door, which faced the east, and again in the west, which was the head of the lodge, so that the Spirit-trail from east to west was open, if any wished to travel that way. On neither side were the Persons the same as I. All were different, but I knew now that they had rights in the

world, as I had, that Ah-badt-dadt-deah had created them, as He had me and other men. Nobody there told me this, but I felt it in the lodge as I felt the presence of the Persons. I knew that to live on the world I must concede that those Persons across the lodge who had not wished me to sit with them had work to do, and that I could not prevent them from doing it. I felt a little afraid but was glad I was there.

“ ‘Take these, Plenty-coups.’ The Person at the head of the lodge on the north side handed me several beautiful first-feathers of a war-eagle.

“I looked into his eyes. He was a Dwarf-person, chief of the Little-people who live in the Medicine-rock, which you can almost see from here, and who made the stone arrow points. I now saw that all on my side were the same as he, that all were Dwarfs not tall as my knee.”

The Dwarfs or Little-people are legendary beings, supposed to possess great physical strength. In the story of “Lost Boy,” a Crow saw one of the Dwarfs shoulder a full-grown bull elk and walk with it on his shoulder. They dwell in Medicine-rock, near Pryor, Montana. The Little-people made the stone arrow heads, the Crows believe.

All the Indian tribes of the Northwestern plains, with whom I am acquainted, possess legends that deal with the makers of the stone arrow points which are scattered so plentifully over North America. These legends, together with the knowledge that identical stone arrow points are found in Europe, led me, long ago, to the belief that our plains Indians neither made nor used them—that some other people made them. Careful inquiry among very old Indians, beginning in 1886, has not discovered a single tribesman who had ever heard of his own people making stone arrow points. These old men have told me that before the white man came their arrow points were of bone.

“ ‘Stick one of your feathers in the ground before you and count coup,’ said the Dwarf-chief.

“I hesitated. I had never yet counted coup, and here in this lodge with old warriors was no place to lie.

“ ‘Count coup!’ commanded the Dwarf-chief.

“I stuck a first-feather into the ground before me, fearing a dispute.

“ ‘That,’ said the Dwarf-chief, ‘is the rider of the *white* horse! I first struck him with my coup-stick, and then, while he was unharmed and fighting, I took his bow from him.’

“The Thunders, who sat at the head of the lodge on the south side, said, ‘Nothing can be better than that.’

“ ‘Stick another feather before you, Plenty-coups,’ said the Dwarf-chief.

“I stuck another first-feather in the ground, wondering what the Dwarf-chief would say for it. But this time I was not afraid.

“ ‘That,’ he said, ‘is the rider of the *black* horse. I first struck him with my bow. Then, while he was with a knife and fighting me, I took his bow from him, also his shield.’

“ ‘Enough!’ said the Persons on the south side. ‘No Person can do better than that.’

“ ‘Let us leave off counting coups. We are glad you have admitted this young man to our lodge,’ said the Bad Storms, ‘and we think you should give him something to take back with him, some strong medicine that will help him.’ ”

Plenty-coups had been speaking rapidly, his hands following his spoken words with signs, acting parts, while his facial expressions gave tremendous emphasis to his story. He was perspiring and stopped to brush his face with his hand.

“I had not spoken,” he went on, “and could not understand why the Dwarf-chief had ordered me to stick the feathers, nor why he had counted coups in my name before such powerful Persons.

“ ‘He will be a Chief,’ said the Dwarf-chief. ‘I can give him nothing. He already possesses the power to become great if he will use it. Let him cultivate his senses, let him use the powers which Ah-badt-dadt-deah has given him, and he will go far. The difference between men grows out of the use, or non-use, of what was given them by Ah-badt-dadt-deah in the first place.’

“Then he said to me, ‘Plenty-coups, we, the Dwarfs, the Little-people, have adopted you and will be your Helpers throughout your life on this world. We have no medicine-bundle to give you. They are cumbersome things at best and are often in a warrior’s way. Instead, we will offer you advice. Listen!

“ ‘In you, as in all men, are natural powers. You have a will. Learn to use it. Make it work for you. Sharpen your senses as you sharpen your knife. Remember that the wolf smells better than you do because he has learned to depend on his nose. It tells him every secret the winds carry because he uses it all the time, makes it work for him. We can give you nothing. You already possess everything necessary to become great. Use your powers. Make them work for you, and you will become a Chief.’ ”

A medicine-bundle contains the medicine or talisman of its possessor. Often the skin

and stuffed head of an animal as large as a wolf is used. Sometimes, however, the bundles are small, containing the skin, claws, teeth, or heads of lesser creatures, depending wholly upon what animal or bird offered "help" to the dreamer. The medicine-bundle is of first importance, the possessor believing implicitly that the superlative power of the animal or bird that offered aid in his dream is always at hand and at his service when he is in need. The contents of these bundles are secret and sacred to the Indian.

"When I wakened, I was perspiring. Looking into the early morning sky that was growing light in the north, I went over it all in my mind. I saw and understood that whatever I accomplished must be by my own efforts, that I must myself do the things I wished to do. And I knew I could accomplish them if I used the powers that Ah-badt-dadt-deah had given me. I *had* a will and I would use it, make it work for me, as the Dwarf-chief had advised. I became very happy, lying there looking up into the sky. My heart began to sing like a bird, and I went back to the village, needing no man to tell me the meaning of my dream. I took a sweat-bath and rested in my father's lodge. I *knew* myself now."

Appendix B

Genesis Stories

B.1 Old Man Coyote Makes The World

Start experiment.

Note that "Old Man Coyote" is a name.

Note that "Little_Duck" is a name.

Note that "Big_Duck" is a name.

Note that "Cirape" is a name.

Insert file Crow commonsense knowledge.

Insert file Crow reflective knowledge.

"Trickster" is a kind of personality trait.

Start story titled "Old Man Coyote Makes the World".

Old Man Coyote is a person.

Little_Duck is a duck.

Big_Duck is a duck.

Cirape is a coyote.

Mud is an object.

"the tradition of wife stealing" is a thing.

Old Man Coyote saw emptiness because the world didn't exist.

Old Man Coyote doesn't want emptiness.

Old Man Coyote tries to get rid of emptiness.

Little_Duck dives under water because Old Man Coyote asks for help.

Little_Duck's diving under water leads to Little_Duck's finding a root.
Old Man Coyote takes the root.

Big_Duck dives under water because Old Man Coyote asks for help.
Big_Duck's diving under water leads to Big_Duck's finding mud.
Old Man Coyote takes the mud.

Old Man Coyote's taking the root leads to Old Man Coyote's making a ball.
Old Man Coyote's taking the mud leads to Old Man Coyote's making a ball.
Old Man Coyote's trying to get rid of emptiness leads to Old Man Coyote's creating the world.
Strangely, Old Man Coyote's making a ball leads to Old Man Coyote's creating the world.

Old Man Coyote's creating the world leads to Old Man Coyote's talking to Big_Duck.
Strangely, Old Man Coyote's talking to Big_Duck leads to Old Man Coyote's making people.
Strangely, Old Man Coyote's talking to Big_Duck leads to Old Man Coyote's making females.

Old Man Coyote's creating the world leads to Old Man Coyote's talking to "Cirape".
Strangely, Old Man Coyote's talking to "Cirape" leads to Old Man Coyote's making animals.
Strangely, Old Man Coyote's talking to "Cirape" leads to Old Man Coyote's making dances.
Strangely, Old Man Coyote's talking to "Cirape" leads to Old Man Coyote's making weapons.
Strangely, Old Man Coyote's talking to "Cirape" leads to Old Man Coyote's making language.
Strangely, Old Man Coyote's talking to "Cirape" leads to Old Man Coyote's making war.

Old Man Coyote's making females leads to Old Man Coyote's making "the tradition of wife stealing".
Old Man Coyote's talking to "Cirape" leads to Old Man Coyote's making "the tradition of wife stealing".

The end.

B.2 Old Man Coyote's Visit to the Crow Indians

Start experiment.

Note that "Old_Man_Coyote" is a name.

Insert file Crow commonsense knowledge.

Insert file Crow reflective knowledge.

"Trickster" is a kind of personality trait.

Start story titled "Old Man Coyote's Visit to the Crow Indians".

Old_Man_Coyote is a person.

Old_Man_Coyote is a trickster.

The Crow camp is a place.

The Crows are an entity.

The Crow tribe is an entity.

Old_Man_Coyote wants to visit the Crow camp because the Crow camp had become large.

Old_Man_Coyote wants to fool the Crow tribe.

Old_Man_Coyote transforms things into fine things because Old_Man_Coyote wants to fool the Crow tribe.

Old_Man_Coyote transforms a mountain-goat into a horse.

Old_Man_Coyote transforms bark into a bridle.

Old_Man_Coyote transforms leaves into a saddle cloth.

Old_Man_Coyote transforms dirt into paint.

Old_Man_Coyote transforms a buffalo's shoulder-blade into an eagle-tail fan.

Old_Man_Coyote's horse asks "What do you want me to do?".

Old_Man_Coyote tells Old_Man_Coyote's horse "Paw the ground and neigh aloud." because Old_Man_Coyote's horse asks "What do you want me to do?".

Old_Man_Coyote has fine things because Old_Man_Coyote transforms things into fine things.

Old_Man_Coyote rides Old_Man_Coyote's horse into the Crow camp because Old_Man_Coyote wants to visit the Crow camp.

Old_Man_Coyote's riding Old_Man_Coyote's horse into the Crow camp leads to the Crow tribe's admiring Old_Man_Coyote.

The Crow tribe admires Old_Man_Coyote because Old_Man_Coyote has fine things.

Old_Man_Coyote fools the Crow tribe because the Crow tribe admires Old_Man_Coyote.

Old_Man_Coyote moves to the center of camp because Old_Man_coyote wants to fool the Crow tribe.

Old_Man_Coyote can hear the ring game because Old_Man_Coyote moves to the center of camp.

The Crows cheer because a ring game ends and Old_Man_Coyote can hear the ring game.

The Crows's cheering leads to Old_Man_Coyote's horse's becoming startled.

Old_Man_Coyote falls because Old_Man_Coyote's horse becomes startled.

The fine things change back because Old_Man_Coyote falls.

Old_Man_Coyote is discovered by the Crow tribe because the fine things change back.

The Crow tribe asks Old_Man_Coyote for advice because Old_Man_Coyote is discovered by the Crow tribe.

Old_Man_Coyote transforms Old_Man_Coyote into a wolf because the Crow tribe asks Old_Man_Coyote for advice.

Old_Man_Coyote runs away because the Crow tribe asks Old_Man_Coyote for advice.

The end.

B.3 The Bungling Host

Start experiment.

Note the "Old Man Coyote" is a name.

Note that "Owl Chief" is a name.

Note that "Elk Chief" is a name.

Note that "Condor Chief" is a name.

Note that "Crow Chief" is a name.

Insert file Crow commonsense knowledge.

Insert file Crow reflective knowledge.

"Trickster" is a kind of personality trait.

Start story titled "The Bungling Host".

Old Man Coyote is a person.
Old Man Coyote is a trickster.
Owl Chief is an owl.
Elk Chief is an elk.
Condor Chief is a condor.
Crow Chief is a crow.

Old Man Coyote was hungry.
Old Man Coyote's family was hungry.
Old Man Coyote wanted to get free food because Old Man Coyote was hungry
and Old Man Coyote's family was hungry.

Old Man Coyote's wanting to get free food leads to Old Man Coyote's
wanting to fool Owl Chief.
Old Man Coyote's wanting to get free food leads to Old Man Coyote's
visiting Owl Chief.
Old Man Coyote visits Owl Chief because Old Man Coyote wants to fool Owl
Chief.
Owl Chief's transforming bark into fine meat leads to Owl Chief's giving
food to Old_Man_Coyote.
Old Man Coyote's visiting Owl Chief leads to Owl Chief's giving food to
Old_Man_Coyote.
Owl Chief smokes with Old Man Coyote because Old Man Coyote visits Owl
Chief.
Old Man Coyote takes food home because Owl Chief gave food to
Old_Man_Coyote.

Old Man Coyote's wanting to get free food leads to Old Man Coyote's
wanting to fool Elk Chief.
Old Man Coyote's wanting to get free food leads to Old Man Coyote's
visiting Elk Chief.
Old Man Coyote visits Elk Chief because Old Man Coyote wants to fool Elk
Chief.
Elk Chief's transforming things into food leads to Elk Chief's giving
food to Old_Man_Coyote.
Old Man Coyote's visiting Elk Chief leads to Elk Chief's giving food to
Old_Man_Coyote.
Elk Chief smokes with Old Man Coyote because Old Man Coyote visits Elk
Chief.
Old Man Coyote takes food home because Elk Chief gave food to

Old_Man_Coyote.

Old Man Coyote's wanting to get free food leads to Old Man Coyote's wanting to fool Condor Chief.

Old Man Coyote's wanting to get free food leads to Old Man Coyote's visiting Condor Chief.

Old Man Coyote visits Condor Chief because Old Man Coyote wants to fool Condor Chief.

Condor Chief's transforming things into food leads to Condor Chief's giving food to Old_Man_Coyote.

Old Man Coyote's visiting Condor Chief leads to Condor Chief's giving food to Old_Man_Coyote.

Old Man Coyote takes food home because Condor Chief gave food to Old_Man_Coyote.

Old Man Coyote's wanting to get free food leads to Old Man Coyote's wanting to fool Crow Chief.

Old Man Coyote's wanting to get free food leads to Old Man Coyote's visiting Crow Chief.

Old Man Coyote visits Crow Chief because Old Man Coyote wants to fool Crow Chief.

Crow Chief's transforming things into food leads to Crow Chief's giving food to Old_Man_Coyote.

Old Man Coyote's visiting Crow Chief leads to Crow Chief's giving food to Old_Man_Coyote.

Old Man Coyote takes food home because Crow Chief gave food to Old_Man_Coyote.

Owl Chief visits Old Man Coyote because Owl Chief gave food to Old_Man_Coyote.

Old Man Coyote doesn't give Owl Chief food because Owl Chief visits Old_Man_Coyote.

Old Man Coyote fools Owl Chief because Owl Chief visits Old_Man_Coyote.

Elk Chief visits Old Man Coyote because Elk Chief gave food to Old_Man_Coyote.

Old Man Coyote doesn't give Elk Chief food because Elk Chief visits Old_Man_Coyote.

Old Man Coyote fools Elk Chief because Elk Chief visits Old_Man_Coyote.

Condor Chief visits Old Man Coyote because Condor Chief gave food to Old_Man_Coyote.

Old Man Coyote gives Condor Chief food because Condor Chief visits
Old_Man_Coyote.
Old Man Coyote fools Owl Chief because Condor Chief visits
Old_Man_Coyote.
Old Man Coyote fools Elk Chief because Condor Chief visits
Old_Man_Coyote.
Old Man Coyote fools Condor Chief because Condor Chief visits
Old_Man_Coyote.

Crow Chief visits Old Man Coyote because Crow Chief gave food to
Old_Man_Coyote.
Old Man Coyote gives Crow Chief food because Crow Chief visits
Old_Man_Coyote.
Old Man Coyote fools Owl Chief because Crow Chief visits Old_Man_Coyote.
Old Man Coyote fools Elk Chief because Crow Chief visits Old_Man_Coyote.
Old Man Coyote fools Crow Chief because Crow Chief visits Old_Man_Coyote.

The end.

B.4 Adventures with Buffalo

Start experiment.

Note that "The Strange Buffalo" is a name.

Insert file Crow commonsense knowledge.
Insert file Crow reflective knowledge.

"Trickster" is a kind of personality trait.

Start story titled "Adventures with Buffalo".

The Strange Buffalo is a buffalo.
The young man is a person.

A young man was hunting.
The young man shoots at The Strange Buffalo because the young man was
hunting and The Strange Buffalo is a buffalo.
The Strange Buffalo stands still because the young man shot at The
Strange Buffalo.
The Strange Buffalo looks for the young man because the young man shot at
The Strange Buffalo.

The Strange Buffalo was not hurt by the young man.
The Strange Buffalo is being extraordinary because The Strange Buffalo was not hurt by the young man.
The Strange Buffalo's standing still leads to The Strange Buffalo's being extraordinary.

The Strange Buffalo's standing still leads to the young man's exiting cover.
The young man's exiting cover leads to The Strange Buffalo's chasing the man.
The young man is trapped in a tree because The Strange Buffalo chased the young man.
The Strange Buffalo attacked the tree because the young man was trapped in a tree.
The young man is scared by The Strange Buffalo because The Strange Buffalo attacks the tree.

The Strange Buffalo painted itself.
The Strange Buffalo transforms itself into a black horse.
The Strange Buffalo transforms itself into a bay horse.
The Strange Buffalo transforms itself into a gray horse.
The Strange Buffalo transforms itself into a buffalo.
The Strange Buffalo leaves.
The Strange Buffalo's leaving leads to the young man's going home.

The end.

B.5 Plenty Coups' Adoption by the Little People

Start experiment.

Note that "Plenty Coups" is a name.
Note that "Winds" is a name.
Note that "Bad Storms" is a name.
Note that "Thunders" is a name.
Note that "Moon" is a name.
Note that "Stars" is a name.
Note that "Dwarf Chief" is a name.

Insert file Crow commonsense knowledge.
Insert file Crow reflective knowledge.

"Trickster" is a kind of personality trait.

Start story titled "Plenty Coups' Adoption by the Little People".

Plenty Coups is a human.

Plenty Coups is a person.

Mysterious person is a person.

Dwarf Chief is extraordinary.

Winds is extraordinary.

Bad Storms is extraordinary.

Thunders is extraordinary.

Moon is extraordinary.

Stars is extraordinary.

Little Rockies is a place.

The mystery lodge is a place.

Plenty Coups wanted a vision.

Plenty Coups's wanting a vision leads to Plenty Coups's traveling to Little Rockies.

Little Rockies is hot.

Plenty Coups becomes weak because Plenty Coups traveled to Little Rockies and Little Rockies is hot.

Plenty Coups's becoming weak leads to Plenty Coups's having a vision.

Plenty Coups meets a mysterious person because Plenty Coups is having a vision.

The mysterious person does not touch the ground.

Plenty Coups does not touch the ground because Plenty Coups is having a vision.

Plenty Coups follows the mysterious person because Plenty Coups meets a mysterious person.

Plenty Coups's following the mysterious person leads to Plenty Coups's entering mystery lodge.

Plenty Coups meets Winds because Plenty Coups enters mystery lodge.

Plenty Coups meets Bad Storms because Plenty Coups enters mystery lodge.

Plenty Coups meets Thunders because Plenty Coups enters mystery lodge.
Plenty Coups meets Moon because Plenty Coups enters mystery lodge.
Plenty Coups meets Stars because Plenty Coups enters mystery lodge.

Bad Storms asks "Why did you bring him here?" because Plenty Coups meets Bad Storms.

Bad Storms's asking "Why did you bring him here?" leads to Plenty_Coups's becoming sad.

Plenty Coups's becoming sad leads to Dwarf Chief's inviting Plenty Coups to the north side of the mystery lodge.

Plenty Coups meets Dwarf Chief because Dwarf Chief invites Plenty Coups to the north side of the mystery lodge.

Plenty Coups talks to Dwarf Chief because Plenty Coups meets Dwarf Chief.

Plenty Coups's talking to Dwarf Chief leads to Dwarf Chief's honoring Plenty Coups.

Plenty Coups's talking to Dwarf Chief leads to Dwarf Chief's adopting Plenty Coups.

Plenty Coups's talking to Dwarf Chief leads to Dwarf Chief's not giving Plenty Coups medicine.

Plenty Coups's having strong medicine leads to Dwarf Chief's not giving Plenty Coups medicine.

Plenty Coups's vision ends.

Plenty Coups wakes up because Plenty Coups's vision ends.

Plenty Coups's waking up leads to Plenty Coups's going home.

Dwarf Chief's adopting Plenty Coups leads to Plenty Coups's becoming a great chief.

The end.

B.6 Crow commonsense knowledge

Start commonsense knowledge.

VV, UU, and YY are entities.

AA is an object.

If VV sees YY and VV doesn't want YY, VV thinks YY is bad.

If VV doesn't want YY, VV may try to get rid of YY.

If VV tries to get rid of YY, then VV asks for help.
If UU finds AA, then VV may take AA.

B.7 Crow reflective knowledge

Start description of "Peace between enemies".
XX is a tribe.
YY is a tribe.
XX and YY are enemies.
XX makes peace with YY.
The end.

Start description of "Violated belief - Medicine Man".
xx is an entity.
yy is a thing.
xx transforms yy.
Consequently, xx has strong medicine because xx transforms yy.
The end.

Start description of "Violated belief - Medicine Man".
xx is an entity.
yy is a thing.
xx transforms into yy.
Consequently, xx has strong medicine because xx transforms into yy.
The end.

Start description of "Violated Belief - Medicine Man".
AA is a person.
BB is an entity.
AA creates BB.
Consequently, AA has strong medicine.
The end.

Start description of "Violated Belief - Medicine Man".
xx is a person.
xx is not touching the ground.
Consequently, xx has strong medicine.
The end.

Start description of "Inherent Medicine".
xx is an entity.
xx is extraordinary.

Consequently, xx has strong medicine because xx is extraordinary.
The end.

Start description of "Origin Story".
XX and YY are entities.
XX creates YY.
The end.

Start description of "Creation".
XX and YY are entities.
YY's not existing leads to XX's creating YY.
The end.

Start description of "Medicine Man".
AA is a person.
AA has strong medicine.
The end.

Start description of "Vision Quest".
xx is a person.
yy is a place.
xx's travelling to yy leads to xx's having a vision.
The end.

Start description of "Fulfilled Prophecy".
xx is a person.
xx's having a vision leads to xx's becoming a great chief.
The end.

B.8 Trickster personality

xx is a person.
yy is an entity.

If xx is trickster and yy is an entity, then xx may want to fool yy.

Start description of "Successful trickster".
xx is a person.
yy is an entity.
xx's wanting to fool yy leads to xx's fooling yy.
The end.

Start description of "Failed trickster".
xx is a person.
yy is an entity.
zz is an entity.
xx's wanting to fool yy leads to yy's discovering xx.
The end.

Appendix C

List of All Stories

Note: the stories contained in “Plenty-coups: Chief of the Crows” are not listed here, as there is no clear separation between stories in that collection.

C.1 American Museum of Natural History Collection

C.1.1 Old-Man-Coyote Cycle

The Origin of the Earth and Man
Old-Man-Coyote and Cirape
Day and Night
Red-Woman and Old-Man-Coyote’s Wife
The Origin of the Joking-Relationship
Old-Man-Coyote’s Visit to the Crow Indians
Old-Man-Coyote and the Whirlwind
The Hoodwinked Birds
Old-Man-Coyote and Porcupine
Old-Man-Coyote and Rabbit
Old-Man-Coyote Tries to Fly
The Bungling Host
Old-Man-Coyote and his Daughters
Old-Man-Coyote and the Mouse
Old-Man-Coyote and the Berrying Girls
Old-Man-Coyote and the Box-Elder
Old-Man-Coyote as the False Suitor
Old-Man-Coyote, the Turnip, and the Beavers
Old-Man-Coyote and his Mother-in-law

C.1.2 Hero Tales

Old-Woman's-Grandchild
Lodge-Boy and Thrown-Away
The Orphan's Contest with the Sun
Yellow-Dog and the Morningstar
Corn-Silk and Her Son
The Buffalo-Wife
The Woman who married Worms-in-his-face
Red-Woman and Flint-like-young-man
Camp-Boy
The Reformed Idler
Red-Hair's Hair
The Thunderbirds
The Son-in-law's Tests

C.1.3 Tales of Supernatural Patrons

Burnt-Face
A Visit to the Sun
The Crow who went to the Birds' Country
The Bulls' Ward
The Dwarf's Ward
Dwarf Tracks
The Tyrant and the Poor Young Man
One-eye
Raven-face
The Poor Couple befriended by the Moon
The Compassionate Brother-in-law
The Spurned Lover
Hu'ara'wic
The Gambler befriended by Birds
The Eagle-catcher

C.1.4 Miscellaneous Tales

Red-woman
The Bear-woman
The Dipper
Splinter-foot
Sharpened-leg
The Snake-Man

The Giants and their Buffalo
The Offended Turtle
The Deserted Children
The Wolf and the Dog
Mentula loquens
Black-elk
The Shaman who looked for the Drowned Crow
The Woman-Snatcher
The Wicked Brother-in-law
The Faithful Mistress
The Man who rescued his Brother-in-law
The Sweater, the Sun-worshiper, the Feastgiver, and the Faster
The Skeptical Husband
Cunning-Man
The Woman who escaped from the Enemy
Adventures with Buffalo

C.1.5 Historical Traditions

The Separation of the Crow and Hidatsa
Origin of the U'wutace Clan
How the Sioux and Crow made Peace
The Peace between the Nez Perce and the Hidatsa
The Flathead adopted by Hidatsa
Little-head and Bull-snake
The Crow and the Shoshoni Shamans
Holds-the-tail's Sun Dance
The Hidatsa Warrior feared by the Sioux
Big-iron
Batco's-ana'pua
Spotted-rabbit

C.2 Little Big Horn College Collection

Lodge-Boy and Thrown-Away
Old Man at the Beginning
Old Man Coyote Makes The World
Red Shield and Running Wolf
The Origin of Tobacco

Appendix D

Preliminary Feature Analysis

This appendix shows the results of a preliminary feature analysis on the AMNH and LBHC collections. As demonstrated in my thesis, the majority of these features were discarded because I felt they were not substantially unique to Crow culture to warrant being part of the focus of this thesis. Of the features that follow, three were preserved:

- **Medicine** – Medicine is preserved in the current thesis, but is split into two parts. The first part, recognizing medicine by way of unknowable events happening, became generalized into discussing unknowable events in general. The second part, the which discusses subversions of belief, became the part of the thesis revolving around medicine.
- **Sapient Non-human Entity** – This feature remained in the current thesis, but the focus shifted towards analyzing how non-human entities were treated the same as humans.
- **Meeting the Powerful** – “Meeting the Powerful” was an umbrella feature comprised of encounters with truly supernatural beings (Old Man Coyote), humans who exhibited differences and were thus considered powerful (Dwarfs), and various others in between (such as particularly powerful animals within a story).

D.1 Features of Crow Literature

The following set of 16 features are the result of trimming down a collection of 57 features pulled from the corpus. This trimming was accomplished by combining multiple features into a broader feature (raising the dead can be seen as a subcategory of medicine) or by pruning any features that were deemed as being uninteresting from a narratological perspective (features such as explanatory tales).

Feature	Description
Adoption	Adoption is a common feature in Crow Literature - characters might find themselves adopted by relatives, clan members, other tribes, traditionally powerful people (among this set are dwarfs, who are believed to have powerful medicine), animals, and supernatural beings. Adoption might happen because a child gets lost or stolen or because the person doing the adopting has taken a shine on their adoptive child. Adoption is an important feature of Crow Literature because it often signifies that a person will be granted some form of greatness (being adopted by an animal, for example, would grant you their medicine) or that you already possess some form of greatness (you had done some deed that made someone want to adopt you).
Delivery from Disaster	Delivery from disaster is a general heroic action - in Crow Literature, it often manifests as someone who does a great and risky deed or uses strong medicine to save their group from some horrible fate, such as starving to death.
Descendant of a Non-human Entity	Any individual who is a descendant from a non-human, whether it be an animal or a supernatural being. These individuals are often marked as having unique traits; they may be able to transform into an animal, they might be outstanding in battle because they have the assistance and favor of their non-human parent, or many other traits.
Destruction of Evil	Destruction of evil is a general heroic action. Generally speaking, this only shows up in Crow Legends - stories such as Old-Woman's-Grandchild and Lodge-boy and Thrown-away feature their protagonists destroying evil entities such as Red-Woman and Long-Otters.

Honor	Honor is a broad feature that encompasses a lot of actions: stealing horses from the enemy might bring honor to yourself and your family. So might doing well in battle, being a good hunter, sneaking into the enemy camp, giving gifts, being loyal, going out on the warpath, or many, many other actions. Doing actions that bring honor is the sign of a well-respected individual in the tribe. In Crow Literature, heroes are often shown doing such deeds.
Intervention	Intervention is often related to adoption and being a descendant of a non-human entity - it is when someone gives assistance to one side in a conflict or helps someone who is in a predicament. Specifically, this feature refers to intervention by non-human entities or traditionally powerful people, whose assistance is more significant than a regular human. In Crow Literature, this might be an animal that has adopted a character granting them assistance in overcoming some task.
Inversion of Circumstances	An inversion of circumstances happens when the expected state of the world is reversed in some way - it demonstrates to the reader (and often to the characters of the story) that they "aren't in Kansas anymore" - that they are now in a situation with a different set of rules that govern it. In Crow Literature, this manifests in examples where a giant might ride buffalo instead of hunting them for food.

Medicine

Medicine is, in many ways, Crow Folklore's analogue to magic that appears in literature from many other cultures. Examples of a person having medicine are resurrecting oneself, raising the dead, or being able to transform. Items themselves can also be medicine: for example, a stick that can be thrown and tells you where to go, or a pouch that contains an army of ants that can be used for hunting. There are other times, however, when it isn't clear that there is anything supernatural at work (as is the case with magic) - for example, someone may never be hit by bullets in battle.

One way to tell if medicine is at work is in the case of Unknowable Events. For example, in "Old Man Coyote Makes the World" from the LBHC collection, Old Man Coyote creates people out of mud. The story then explicitly states "How he did this, no-one can imagine." This is an indicator that there is some power at work that humans cannot understand.

In general, the way to tell if medicine is at work in a story is if there is a subversion of expectations - if something that we would never expect to happen happens, it is very possible that the reason is medicine. In many stories, this manifests itself obviously - someone might be able to shoot an arrow and then travel along with it. In others, it is less clear - someone might run with the swiftness of a rabbit, which might mean they have a rabbit as their medicine, or it might mean that they are just particularly quick on their feet.

Meeting the Powerful	Meeting powerful individuals, such as supernatural beings or traditionally powerful entities (such as dwarfs), is often a part of stories where a character receives some assistance from the entity they meet. In some stories, a character ends up camping with the entity for some period of time. In others, they receive some favor or do a task for the entity.
Peace between Enemies	Creating peace between enemy tribes or warring clans is considered a great feat in Crow Literature. The story "Red Shield and Running Wolf" perhaps exemplifies this best with its first line: "In years past the Sioux and the Crows were enemies, and only through heroic action could a young person of one tribe become the friend or lover of a young person of the other tribe." Many stories with this feature also have a heroic character.
Recklessness	Recklessness is an unwillingness to listen to warnings and a constant seeking of danger. Recklessness often appears in hero stories, especially heroic legends, in Crow Literature. This can either be a positive or negative trait - ignoring warnings might result in a negative outcome such as injury or death, but it (along with seeking danger) can also be a sign of a positive trait, bravery. Recklessness is a trait possessed by Old-Woman's-Grandchild, Lodge-boy, and Thrown-away, all of whom ignoring warnings to go out and destroy the evil in the world.
Reversal of Fortune	It is common in Crow stories for a character described as "poor," either in material status or in terms of their abilities and standing (often both), to experience an event that reverse their fortune. This might be gaining medicine from meeting a powerful entity or by befriend- ing a powerful entity who intervenes on their behalf.
Sapient Non-human Entity	This feature encompasses anything that acts with human intelligence despite not being expected to - this is most often animals, but can also apply to inanimate objects.

Supernatural Being	Many Crow stories feature a supernatural being - Old-Man-Coyote, the Sun, the Moon, Red-Woman, and others. These beings interact with the mundane world in a number of ways, including but not limited to granting medicine or acting as a powerful antagonist that must be overcome by a hero.
Trial	Trials are a way for characters in a story to prove their worth in a situation - this might be the need to escape from a predicament, or the requirement of doing a challenging task before being allowed to marry one's sweetheart.
Vision Quest	Although not featuring strongly in the collection of stories used for this work, vision quests are a way for characters to gain some insight into what needs to be done. Examples of what a vision can do are point a character to the path that allows them to triumph over an enemy's medicine or direct a character on what needs to be done to rescue their brother from the enemy's camp.

D.2 Results

Story	Adoption	Delivery from Disaster	Descendant of a Non-human Entity	Destruction of Evil	Honor	Intervention	Inversion of Circumstances	Medicine	Meeting the Powerful	Peace between Enemies	Recklessness	Reversal of Fortune	Sapient Non-human Entity	Supernatural Being	Trial	Vision Quest
AMNH Collection																
Old-Man-Coyote Cycle																
The Origin of the Earth and Man																
<i>Variant 1</i>	✓	-	-	-	-	✓	-	✓	-	-	-	✓	✓	✓	-	-
<i>Variant 2</i>	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-
<i>Variant 3</i>	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-
<i>Variant 4</i>	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-
Old-Man-Coyote and Ci'rape'																
<i>Variant 1</i>	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-
<i>Variant 2</i>	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-
<i>Variant 3</i>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-
<i>Variant 4</i>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-
<i>Variant 5</i>	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-
<i>Variant 6</i>	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
<i>Variant 7</i>	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-
<i>Variant 7a</i>	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-
Day and Night	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-
Red-Woman and Old-Man-Coyote's Wife	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The Origin of the Joking-Relationship	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-

Old-Man-Coyote's Visit to the Crow Indians	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-
Old-Man-Coyote and the Whirlwind	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-
The Hoodwinked Birds	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-
Old-Man-Coyote and Porcupine	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
Old-Man-Coyote and Rabbit	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
Old-Man-Coyote Tries to Fly	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-
The Bungling Host	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-
Old-Man-Coyote and his Daughters	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Old-Man-Coyote and the Mouse	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Old-Man-Coyote and the Berrying Girls	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Old-Man-Coyote and the Box-Elder	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-
Old-Man-Coyote as the False Suitor	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Old-Man-Coyote, the Turnip, and the Beavers	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
Old-Man-Coyote and his Mother-in-law																
<i>Variant 1</i>	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
<i>Variant 2</i>	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
Hero Tales																
Old-Woman's-Grandchild																
<i>Variant 1</i>	✓	-	✓	✓	-	-	-	✓	-	-	✓	-	✓	✓	-	-
<i>Variant 2</i>	✓	-	✓	✓	-	✓	-	✓	-	-	✓	-	✓	✓	-	-
<i>Variant 3</i>	✓	-	✓	✓	-	✓	-	✓	-	-	✓	-	✓	✓	-	-
Lodge-Boy and Thrown-Away																
<i>Variant 1</i>	✓	-	-	✓	-	✓	-	✓	-	-	✓	-	✓	✓	-	-
<i>Variant 2</i>	✓	-	-	✓	-	✓	-	✓	-	-	✓	-	✓	✓	-	-

<i>Variant 3</i>	✓	-	-	✓	-	✓	-	✓	-	-	✓	-	✓	-	-	-
The Orphan's Contest with the Sun	-	✓	-	-	-	-	-	✓	-	-	-	✓	-	✓	-	-
Yellow-Dog and the Morningstar	✓	✓	-	-	-	-	-	✓	-	-	-	✓	✓	✓	-	-
Corn-Silk and her Son	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	-
The Buffalo-Wife																
<i>Variant 1</i>	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	-
<i>Variant 2</i>	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	-
The Woman who married Worms-in-his-face	-	-	-	✓	-	✓	-	✓	-	-	-	-	✓	✓	-	-
Red-Woman and Flint-like-young-man	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-
Camp-Boy	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-
The Reformed Idler	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-
Red-Hair's Hair	-	-	-	-	-	✓	✓	-	✓	-	-	-	✓	-	-	-
The Thunderbirds																
<i>Variant 1</i>	✓	-	-	✓	-	-	-	✓	-	-	-	-	✓	-	-	-
<i>Variant 2</i>	✓	-	-	✓	-	-	-	✓	-	-	-	-	✓	-	-	-
The Son-in-law's Tests	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-
Tales of Supernatural Patrons																
Burnt-Face	-	-	-	✓	-	✓	-	✓	✓	-	-	-	✓	✓	-	-
A Visit to the Sun	-	-	-	-	-	-	-	✓	✓	-	-	-	-	✓	-	-
The Crow who went to the Birds' Country	-	-	-	-	✓	-	-	✓	✓	-	-	-	✓	-	-	-
The Bulls' Ward	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-
The Dwarf's Ward																
<i>Variant 1</i>	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-
<i>Variant 2</i>	✓	-	-	✓	-	-	-	✓	✓	-	-	-	-	-	-	-
Dwarf Tracks	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-
The Tyrant and the Poor Young Man	✓	-	-	-	-	-	-	✓	✓	-	-	✓	-	-	-	-
One-eye																
<i>Variant 1</i>	✓	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	✓

<i>Variant 2</i>	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	✓
Raven-face	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
The Poor Couple befriended by the Moon	-	-	-	-	-	✓	-	✓	✓	-	-	✓	-	✓	-	-
The Compassionate Brother-in-law	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-
The Spurned Lover	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-
Hu'ara'wic	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-
The Gambler befriended by Birds	✓	-	✓	-	-	-	-	✓	-	-	-	-	✓	✓	-	-
The Eagle-catcher	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-
Miscellaneous Tales																
Red-woman	-	-	-	✓	-	✓	-	✓	-	-	-	-	-	✓	-	-
The Bear-woman	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
The Dipper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Splinter-foot	-	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	-
Sharpened-leg	-	-	-	-	✓	✓	-	✓	-	-	-	-	✓	-	-	-
The Snake-Man	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-
The Giants and their Buffalo																
<i>Variant 1</i>	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-
<i>Variant 2</i>	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-
The Offended Turtle																
<i>Variant 1</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Variant 2</i>	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-
The Deserted Children	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	✓	-
The Wolf and the Dog	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
Mentula loquens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Black-elk	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
The Shaman who looked for the Drowned Crow	-	-	-	-	✓	-	-	✓	-	-	-	-	✓	-	-	-
The Woman-Snatcher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The Wicked Brother-in-law	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The Faithful Mistress	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-

The Man who Rescued his Brother-in-Law																
<i>Variant 1</i>	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-
<i>Variant 2</i>	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓
The Sweater, the Sun-worshipper, the Feast-giver, and the Faster																
<i>Variant 1</i>	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-
<i>Variant 2</i>	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
The Skeptical Husband	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cunning-Man																
<i>Variant 1</i>	-	-	-	-	-	-	-	✓	✓	-	-	✓	-	-	-	-
<i>Variant 1a</i>	-	-	-	-	-	-	-	✓	✓	-	-	✓	-	-	-	-
<i>Variant 2</i>	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
<i>Variant 3</i>	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
<i>Variant 4</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Variant 5</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Variant 6</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The Woman who escaped from the Enemy	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Adventures with Buffalo																
<i>Variant 1</i>	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-
<i>Variant 2</i>	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-
Historical Traditions																
The Separation of the Crow and Hidatsa																
<i>Variant 1</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Variant 2</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Origin of the U'wutace Clan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
How the Sioux and Crow made Peace	✓	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-
The Flathead adopted by Hidatsa	✓	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-
Little-head and Bull-snake	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-

The Crow and the Shoshoni Shamans	✓	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-
Holds-the-tail's Sun Dance	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
The Hidatsa Warrior feared by the Sioux	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Big-iron																
<i>Variant 1</i>	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-
<i>Variant 2</i>	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-
Batco's-ana'pua	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Spotted-rabbit	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
LBHC Collection																
Lodge-Boy and Thrown-Away	-	-	-	✓	-	-	-	✓	-	-	✓	-	✓	✓	-	-
Old Man at the Beginning	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-
Old Man Coyote Makes the World	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-
Red Shield and Running Wolf	-	-	-	-	✓	-	-	✓	-	✓	-	-	-	-	-	-
The Origin of Tobacco	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-

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