

# **Children's Story Authoring with Propp's Morphology**

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# **Abstract**

This thesis applies concepts from Vladimir Propp's model of the narrative structure of fairy tales (Propp's morphology) to a story authoring tool for children. A computer story authoring application based on Propp's morphology is developed and evaluated through empirical studies with children. Propp's morphology is a promising model of narrative for a children's story authoring tool, with the potential to give children a powerful mental model with which to construct stories. Recent research has argued for the use of computer-based *interactive narrative* authoring tools (which enable the construction of interactive narrative computer games in which the player can affect or change the plot) to support children's narrative development, and a number of interactive narrative systems use Propp's morphology as their underlying model of narrative. These interactive narrative tools have many potential learning benefits and a powerful motivational effect for children, who enjoy using them to create narrative games. The potential of an interactive narrative system based on Propp's morphology to support children's construction of narratives seems great, combining Propp's rich narrative model with the motivational benefits of interactive narrative.

Before the application of Propp's morphology in an interactive narrative game creation tool to support children's writing could be pursued, it was necessary to study children's story writing with Propp's morphology. How can Propp's morphology be represented in a story authoring tool for children? Can children apply Propp's abstract narrative concepts to the task of creating their own original stories? How does using Propp's morphology affect the stories written by children? Using the Propp-based authoring tool that is presented in this thesis children were able to grasp Propp's abstract concepts and apply them to their own story writing. The use of a story authoring tool based on Propp's morphology improved some aspects of the narrative structure of the stories written by children, and children reported that they enjoyed using the tool and felt it was helpful to their story writing. This thesis lays the foundation and identifies the methods for further study of children's appropriation of narrative structure by constructing stories using a story authoring tool based on Propp's morphology.

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Shannon, Shannon, Shannon. Thanks for all your companionship and support, for being so patient, for cheering me up and helping me through all my freak outs.

## **Declaration**

I declare that this thesis was composed by myself, that the work contained herein is my own except where explicitly stated otherwise in the text, and that this work has not been submitted for any other degree or professional qualification except as specified.

*(Sean Hammond)*

To Shannon.

# **Published Papers and Software**

## **Children's Story Authoring with Propp's Morphology: An Exploratory Study**

Sean Hammond, Tim J. Smith and Helen Pain

5th International Conference on Narrative and Interactive Learning Environments  
Edinburgh, 6th-8th August 2008.

## **Player Agency in Interactive Narrative: Audience, Actor & Author**

Sean Hammond, Helen Pain and Tim J. Smith

Artificial and Ambient Intelligence, AISB Annual Convention  
Culture Lab, Newcastle University, 2-4 April 2007

## **The Story Maps Application**

The Story Maps application (see chapter 5) and source code can be downloaded from  
<http://seanh.github.com/storymaps>.



# Table of Contents

<b>1</b>	<b>Introduction</b>	<b>15</b>
1.1	Thesis Questions . . . . .	17
1.2	Thesis Outline . . . . .	17
<b>2</b>	<b>Related Work</b>	<b>21</b>
2.1	Teaching About Narrative Structure . . . . .	22
2.2	Propp's Morphology: A Narrative Construction Kit . . . . .	28
2.2.1	The Functions of Dramatis Personae and their Sequence . . . . .	28
2.2.2	The Dramatis Personae . . . . .	38
2.2.3	Connectives . . . . .	42
2.2.4	Trebling . . . . .	43
2.2.5	Transformations . . . . .	44
2.2.6	Criticism of Propp's Morphology . . . . .	47
2.2.7	The Potential of Propp's Morphology for Learning . . . . .	53
2.3	A Brief Introduction to Interactive Narrative . . . . .	56
2.4	Children's Construction of Interactive Narratives . . . . .	60
2.4.1	The Game Maker Workshops and the Neverwinter Nights Toolset	61
2.4.2	Adventure Author . . . . .	62
2.4.3	Script Cards . . . . .	64
2.4.4	Conclusion . . . . .	65
2.5	Propp's Morphology in Interactive Narrative . . . . .	65
2.5.1	GEIST . . . . .	65
2.5.2	OPIATE . . . . .	68
2.5.3	TEATRIX . . . . .	71
2.5.4	Eudaemon . . . . .	73
2.5.5	Conclusion . . . . .	75
2.6	Children's Story Writing with Propp's Morphology . . . . .	76

<b>3 Analysis of Children’s Stories using Propp’s Morphology</b>	<b>81</b>
3.1 Difficulties of Analysing Children’s Stories using Propp’s Morphology	82
3.2 Development of an Improved Formal Interpretation of Propp’s Morphology . . . . .	84
3.3 Procedure for the Analysis of a Story . . . . .	109
3.3.1 Concepts . . . . .	109
3.3.2 An Example Analysis . . . . .	112
3.4 Conclusion . . . . .	118
<b>4 Exploratory Study</b>	<b>119</b>
4.1 Research Design . . . . .	120
4.2 Research Questions & Hypotheses . . . . .	120
4.3 Participants . . . . .	120
4.4 Materials . . . . .	120
4.4.1 Sample Stories . . . . .	120
4.4.2 Propp Cards . . . . .	121
4.4.3 Story Maps . . . . .	122
4.5 Procedure . . . . .	123
4.5.1 Week One, Recasting Stories . . . . .	124
4.5.2 Week Two, Constructing Stories . . . . .	125
4.5.3 Data Collection . . . . .	126
4.6 Results & Analysis . . . . .	126
4.6.1 Upper and Lower-bound Measures of Accuracy . . . . .	127
4.6.2 Results from Week One: Recasting Stories . . . . .	128
4.6.3 Results from Week Two: Constructing Stories . . . . .	129
4.6.4 Analysis of the Difference Between the Lower and Upper-bound Measures . . . . .	132
4.7 Discussion & Further Work . . . . .	133
4.7.1 Limitations of the Quantitative Results . . . . .	134
4.7.2 Observations . . . . .	137
4.7.3 Limitations of a Paper Interface . . . . .	140
4.8 Conclusion . . . . .	141
<b>5 The Story Maps Application</b>	<b>143</b>
5.1 Foundations for Design . . . . .	143
5.1.1 The Zooming Interface Paradigm . . . . .	144

5.1.2	Propp Cards . . . . .	145
5.1.3	The Card Store . . . . .	147
5.1.4	The Story Map . . . . .	147
5.2	Requirements & Constraints . . . . .	147
5.2.1	Functional Requirements . . . . .	148
5.2.2	Data Requirements . . . . .	150
5.2.3	Usability Requirements . . . . .	151
5.3	Prototype Implementation & Evaluation . . . . .	153
5.3.1	Implementation . . . . .	153
5.3.2	Evaluation . . . . .	160
5.4	Final Implementation . . . . .	164
5.4.1	Propp Cards . . . . .	165
5.4.2	The Planning View . . . . .	166
5.4.3	The Story Editor . . . . .	171
5.4.4	The Preview Window . . . . .	173
5.4.5	The File Menu . . . . .	174
5.4.6	Saving and Loading . . . . .	174
5.5	Conclusion . . . . .	175
<b>6</b>	<b>Analysis of Narrative Structure in Children’s Writing</b>	<b>177</b>
6.1	Requirements for a Story Analysis Tool . . . . .	178
6.1.1	Narrative Structure . . . . .	179
6.2	Procedures for the Analysis of Children’s Writing . . . . .	183
6.2.1	Assessment of Children’s Narrative Writing in Scottish and English Schools . . . . .	183
6.2.2	Qualitative Analysis using Models of Narrative . . . . .	186
6.2.3	Holistic Rating Scales . . . . .	189
6.2.4	Primary Trait Scoring . . . . .	191
6.2.5	Analytic Rating Scales . . . . .	192
6.2.6	A More Detailed Analytic Scale . . . . .	193
6.3	Development of the Quantitative Measure of Narrative Structure . . . . .	195
6.3.1	Modifications made to Harris & Graham’s measure . . . . .	197
6.3.2	Inter-Rater Reliability Test . . . . .	214
6.4	Conclusion . . . . .	216

<b>7 Experimental Study</b>	<b>217</b>
7.1 Research Design . . . . .	217
7.2 Research Questions and Hypotheses . . . . .	218
7.2.1 Hypothesis for the ‘Protagonist’ Criterion . . . . .	218
7.2.2 Hypothesis for the ‘Antagonist’ Criterion . . . . .	219
7.2.3 Hypothesis for the ‘Locale’ Criterion . . . . .	220
7.2.4 Hypothesis for the ‘Time’ Criterion . . . . .	220
7.2.5 Hypothesis for the ‘Starter event, causal complexity’ Criterion	221
7.2.6 Hypothesis for the ‘Starter event, descriptive detail’ Criterion	222
7.2.7 Hypothesis for the ‘Goal’ Criterion . . . . .	222
7.2.8 Hypothesis for the ‘Action’ Criterion . . . . .	223
7.2.9 Hypothesis for the ‘Ending’ Criterion . . . . .	224
7.2.10 Hypothesis for the ‘Reaction’ Criterion . . . . .	224
7.2.11 Hypothesis for the ‘Coherence’ Criterion . . . . .	224
7.3 Pilot Study . . . . .	225
7.3.1 Pilot Study Participants . . . . .	225
7.3.2 Pilot Study Procedures and Materials . . . . .	225
7.3.3 Pilot Study Results . . . . .	227
7.3.4 Discussion of the Pilot Study . . . . .	228
7.4 Methods . . . . .	231
7.4.1 Participants . . . . .	231
7.4.2 Procedures and Materials . . . . .	231
7.5 Results . . . . .	241
7.5.1 Missing Data . . . . .	242
7.5.2 Results for the ‘Protagonist’ Criterion . . . . .	243
7.5.3 Results for the ‘Antagonist’ Criterion . . . . .	246
7.5.4 Results for the ‘Locale’ Criterion . . . . .	251
7.5.5 Results for the ‘Time’ Criterion . . . . .	252
7.5.6 Results for the ‘Causal Complexity’ Criterion . . . . .	254
7.5.7 Results for the ‘Descriptive Detail’ Criterion . . . . .	259
7.5.8 Results for the ‘Goal’ Criterion . . . . .	263
7.5.9 Results for the ‘Action’ Criterion . . . . .	265
7.5.10 Results for the ‘Ending’ Criterion . . . . .	266
7.5.11 Results for the ‘Reaction’ Criterion . . . . .	268
7.5.12 Results for the ‘Coherence’ Criterion . . . . .	269

7.6	Discussion and Further Work . . . . .	269
7.6.1	Plot Structure and Character Roles . . . . .	269
7.6.2	Representation of Characters and Their Attributes . . . . .	273
7.6.3	Representation of Settings and Their Attributes . . . . .	274
7.6.4	Representation of Details of The Action . . . . .	275
7.6.5	The Goals of the Protagonist . . . . .	276
7.6.6	The Resolution and Conclusion of the Story . . . . .	277
7.6.7	The Emotional Feelings and Reactions of the Characters . . .	278
7.6.8	The Coherence of the Stories . . . . .	279
7.6.9	Feedback from the Participants . . . . .	279
7.6.10	Further Study of the Acquisition of Fairy Tale Structure . . .	281
7.6.11	Methodological Problems and Unanticipated Difficulties . .	282
7.7	Conclusion . . . . .	288

<b>8</b>	<b>Conclusions and Further Work</b>	<b>293</b>
8.1	Thesis Questions . . . . .	293
8.2	Further Work . . . . .	296
8.2.1	Qualitative Analysis of Children’s Stories Using Propp’s Morphology . . . . .	296
8.2.2	Further Formalisation of Propp’s Morphology . . . . .	296
8.2.3	A Digital Library of Proppian Fairy Tales . . . . .	298
8.2.4	Further Development of the Story Maps Application . . . . .	299
8.2.5	Integration of the Story Maps Application with an Interactive Narrative System . . . . .	299
8.2.6	Investigation of Children’s Appropriation of Formal Narrative Concepts through Story Construction using Propp’s Morphology	300
8.3	Contributions . . . . .	302
8.4	Conclusion . . . . .	302

<b>A</b>	<b>Planning Frameworks Used to Teach Narrative Structure in Primary Schools</b>	<b>305</b>
<b>B</b>	<b>Improved formal definitions of Propp’s functions and species</b>	<b>315</b>
<b>C</b>	<b>Propp Cards from the Story Maps Application</b>	<b>327</b>
<b>D</b>	<b>Quantitative Measure of Narrative Structure</b>	<b>331</b>

<b>E Rating Guide for the Quantitative Measure of Narrative Structure</b>	<b>339</b>
<b>F Experimental Study: Certificate of Participation</b>	<b>347</b>
<b>G Feedback from Participants</b>	<b>349</b>
G.1 Treatment Group Feedback Questions . . . . .	349
G.2 Control Group Feedback Questions . . . . .	355
<b>Bibliography</b>	<b>357</b>

# Chapter 1

## Introduction

Narrative is a psychological necessity for all human beings (Meek, 1996; Wells, 1987; Hardy, 1977), a centrally important mode of thought (Bruner, 1987). We use narrative thinking to make sense of the world and our place in it, and come to terms with events by telling and retelling stories about them (Good and Robertson, 2006, p.43). “Storying is the human way of making sense, and the better we are at making stories, the more equipped we are to understand and make experience meaningful . . . We, therefore, as teachers need to support children in order that they construct their own narratives” (Riley and Reedy, 2000, p.67).

Narrative structure is a crucial aspect in the development of children’s narratives (see section 2.1). The overall structure of a narrative is what brings together the events, settings, characters, motivations, causes, effects and other components into a coherent whole. The tools currently used to teach about narrative structure in primary schools are limited and restrictive, and a more constructionist tool might overcome these limitations. A formal model of narrative is needed as the basis of a tool for constructing narrative structures, and this thesis will argue that Propp’s *Morphology of the Folktale* is a very promising model. Propp’s morphology embodies formal concepts of narrative structure, it breaks down narrative structure into building blocks that children are able to use to construct their own narratives, it concretises a very rich model of narrative and it can scale from the simplest to advanced, highly interwoven narrative structures.

A number of computer-based *interactive narrative* systems (computer games in which the player can affect or change the plot) use Propp’s morphology as their underlying model of narrative, and in recent research Robertson & Good *et al* have argued for the construction of interactive narratives as a learning activity. Children have many story ideas and enjoy sharing them with other people. However, many children find

writing to be a “difficult chore,” and suffer from writing apprehension: “some pupils dread writing assignments because they find them so difficult and have had negative feedback during writing experiences in the past” (Good and Robertson, 2006, p.43). Some children suffer from anxiety, self-deprecating thoughts, and concern about how their writing will be received (Robertson, 2000, p.4). It is therefore particularly important to improve children’s motivation for writing (Good and Robertson, 2006, p.43). Playing computer games is an “extremely popular” and motivational activity among children, who are willing devote many hours to playing games (Good and Robertson, 2006, p.43). The medium of computer games is “greatly valued” by children, who “particularly enjoy expressing their story ideas” in this format. (Robertson and Good, 2006, p.2). Robertson & Good’s research (see section 2.4) found that children aged 7-15 are able to learn to use interactive narrative construction tools surprisingly quickly, and can successfully create their own interactive narrative games. The construction of interactive narrative games has many potential learning benefits, as it requires a number of complex and difficult narrative and non-narrative skills. Additionally, Robertson & Good found that interactive narrative game creation has a powerful motivational effect and that young people enjoy the activity

The potential of a Propp-based interactive narrative system to support children’s construction of narratives seems great, combining the rich narrative model of Propp’s morphology with the motivational benefits of computer-based interactive narratives. Before such a combination can be pursued it is first necessary to study children’s story writing with Propp’s morphology. Research must discover how Propp’s morphology can be represented in a story authoring tool for children, whether children can apply Propp’s abstract narrative concepts to story writing, and how using Propp’s morphology affects children’s stories. For this thesis a children’s story authoring tool based on Propp’s morphology was developed and evaluated through empirical studies with children, beginning with a paper version of the tool and from this developing a computer application.

## 1.1 Thesis Questions

Three general questions are addressed:

1. How can Propp's morphology be represented in a story authoring tool for children?
2. Can children apply Propp's morphology to story writing?
3. Does using Propp's morphology affect the quality of the stories written? If so, in what ways?

## 1.2 Thesis Outline

Chapter 2 discusses the related work that is the background to this thesis. The chapter begins by discussing the importance of narrative structure in children's narrative development, and the ways in which narrative structure is taught in primary schools. Existing tools for teaching children to write stories using narrative structure are limited and restrictive, and a more constructionist tool might be more productive. A tool for constructing narratives would require a formal model of narrative as its basis, and this thesis will argue that Propp's *Morphology of the Folktale* (Propp, 1968) is a promising model. Propp's morphology is described in detail, criticisms of Propp's morphology are reviewed, and the potential of the morphology as a learning tool is discussed.

The key concepts of computer-based interactive narrative and the forms that it takes are then introduced, and applications of interactive narrative to children's story writing are reviewed. Previous work demonstrates that children can tackle the difficult and complex task of creating an interactive narrative, and suggests some of the benefits of the activity. Creating interactive narratives gives children a chance to tell their own stories in a novel storytelling medium. It helps to develop children's narrative skills, such as the creation of coherent plots, well-motivated characters and convincing dialogue. Children also learn new storytelling skills specific to the medium of interactive narrative, experimenting with branching plots and dialogue, and player agency and interactivity. Creating interactive narrative computer games has a powerful motivational effect and children enjoy the experience. Finally, children's self-esteem may be bolstered by the chance to show their games to peers, parents and the general public. Previous applications demonstrate that Propp's morphology can be used as the formal

model of narrative for an interactive narrative system, suggesting a promising application of Propp's model in an interactive narrative construction activity for children.

Finally, previous studies of children's story writing with Propp's morphology are reviewed. The work of Rodari (1996) and Charles (2006) suggests that Propp's morphology is a promising model for children's story making. In these two studies, the abstract narrative components of Propp's morphology are represented as illustrated *Propp cards*, and the Proppian narrative structure of a given tale is represented as a sequence of Propp cards called a *story map*. These studies are promising but have certain limitations. There is a lack of empirical confirmation of whether children can apply Propp's concepts to story making and produce original stories that display Proppian narrative structure. There has been no study of children's construction of plots by combining components of Propp's morphology. There has been no comparison of the quality of stories written by children with and without using Propp's morphology. The work presented in this thesis builds on Rodari (1996) and Charles (2006) by addressing these limitations.

Chapter 3 describes the need for and development of a formal interpretation of Propp's morphology, and a procedure for using this formal interpretation to derive the sequence of Propp functions that a story contains. To ask whether stories written by children display Proppian narrative structure, it was necessary to derive the sequence of Propp functions that each story contains. Propp's morphology as described in Propp (1968) was found to be inadequate for this purpose. A formal interpretation of Propp's morphology was developed to overcome these difficulties, significantly clarifying the definition of Propp's morphology. The interpretation is given in full in appendix B. The interpretation was used to analyse children's stories in the exploratory study reported in chapter 4, and was used as the narrative model for the development of a computational story authoring tool (see chapter 5).

Chapter 4 reports an exploratory study that was carried out in an English primary school, in which 42 participants aged 7-11 wrote stories using paper Propp cards and story maps. The study tested the representation of Propp's morphology in Propp cards and story maps, as suggested by Rodari (1996) and Charles (2006), and children's use of Propp cards and story maps to create stories. The research question for the study was: *can children use Propp cards and story maps to write stories that display the Proppian narrative structures represented by the story maps?* The formal interpretation of Propp's morphology developed in the previous chapter was used to derive the sequences of Propp functions contained in the children's stories and these were

compared to the sequences of Propp functions represented by the story maps that the children were using. The quantitative results of these comparisons confirmed that children can use story maps to write stories that display Proppian narrative structure with a high degree of accuracy.

Chapter 5 describes the design and development of a computer story authoring application. The application uses the formal interpretation of Propp's morphology developed in chapter 3 as the narrative model. The design of the application is based on the paper Propp cards and story maps used in the exploratory study, and on the researcher's observations of participant's interactions with these objects during the processes of constructing story maps and using story maps to write stories. Requirements for the application were specified, a prototype design was implemented and user evaluations carried out. The application was then redesigned and re-evaluated, and judged to meet the requirements specified. The story maps application was used in the experimental study reported in chapter 7. The design and implementation of the story maps application can be used as the basis for further work, exploring the integration of new features into the application.

Chapter 6 describes the development of a quantitative measure of narrative structure to be used to compare stories written with and without using the story maps application in an experimental study. The requirements for such a story analysis tool are presented and the construct of narrative structure that is to be measured is defined. The available tools and procedures are reviewed, and an analytic rating scale from Harris and Graham (1996) is selected. Harris and Graham (1996)'s rating scale was trialled using a set of stories written by children, shortcomings were identified, and the scale was significantly modified based on the trial data. The modified scale is given in appendix D. An inter-rater reliability test of the modified scale was carried out with good results. The modified scale was used in the experimental study reported in chapter 7.

Chapter 7 reports an experimental study that was carried out in an English primary school. 40 participants aged 8-11 took part in a three week, pretest-posttest with control group study. Stories written using the story maps application developed in chapter 5 were compared to stories written using a typical classroom story planning worksheet. The comparison was made using the quantitative measure of narrative structure developed in the previous chapter. The study asked: *Does the story maps application improve the structure or quality of the stories written? If so, in what ways does the story maps application improve the structure or quality of the stories written?* Based on the results of the study, we argue that using the story maps application as a story

planning exercise improved some aspects of the narrative structure of the stories written. Participant feedback suggests that children enjoyed using the application, that they appreciated the freedom to construct a story plan using their own ideas, that the application helped participants to feel confident about the quality of the stories they had written, and that participants felt that the application was helpful to their story writing.

Finally, chapter 8 discusses the thesis questions in light of the work presented, suggests directions for further work, and concludes by summarising the contributions of this thesis.

# **Chapter 2**

## **Related Work**

This chapter discusses the related work that is the background to this thesis. Section 2.1 discusses the importance of narrative structure in the development of children’s narratives, and surveys some of the tools that are used to teach about narrative structure in primary schools. Tools currently used in schools for learning about narrative structure are limited and restrictive, and a more constructionist tool might overcome these limitations. A model of narrative is needed to form the basis of a tool for constructing narratives, and this thesis will argue that Propp’s *Morphology of the Folktale* is a suitable model. Section 2.2 describes Propp’s morphology in detail, reviews criticisms of the morphology, and describes the potential of the morphology for learning.

A number of computer-based interactive narrative systems use Propp’s morphology as their underlying model of narrative, and recent research has argued for the use of interactive narrative computer games in education. Section 2.3 introduces the key concepts of interactive narrative and discusses the forms that it takes. Section 2.4 reviews applications of interactive narrative to children’s story writing: the *Game Maker* workshops series, and the interactive narrative authoring tools *Adventure Author* and *Script Cards*. Section 2.5 discusses previous applications of Propp’s morphology in interactive narrative, showing that the morphology is compatible with different approaches to interactive narrative and illustrating some of these approaches.

Before pursuing a children’s interactive narrative authoring tool based on Propp’s morphology, it is first necessary to study children’s story writing with Propp’s morphology. How can Propp’s morphology be represented in a story authoring tool for children? Are children able to grasp the abstract concepts that Propp’s morphology contains, and can they apply Propp’s model of narrative to the task of creating their own, original stories? Does using Propp’s morphology affect the stories written by

children and if so, in what ways? Section 2.6 discusses previous studies of the use of Propp's morphology for children's story writing by Rodari (1996) and Charles (2006), and points the way for the empirical work presented in this thesis. Rodari (1996) and Charles (2006)'s studies suggest that Propp's morphology can be an effective tool for children's story writing, but leave important questions unanswered. This thesis builds on the work of Rodari (1996) and Charles (2006), by studying children's story authoring with Propp's morphology.

## 2.1 Teaching About Narrative Structure

The *structure* of a narrative is a fundamental aspect that brings together the events, settings, characters, motivations, causes, effects, and other components into a coherent whole. The overall structure describes the logical and artistic role of each event, character and other component with respect to the narrative as a whole, and describes how the various components are combined in a simple or complex way to form the whole. Without a coherent overall structure a narrative is not fully formed, it can feel incomplete, logically flawed, or emotionally unsatisfying. A sound narrative structure can form the foundation on which other aspects of good narrative writing, such as character, setting and vocabulary, can be developed.

Riley and Reedy (2000, p.63-65), citing Martin and Rothery (1980, 1981, 1986), explain that the structures of children's narratives develop from simple observation/comment: "I went to McDonalds and I liked it," through recounts: chronologically-ordered sequences of events connected with 'and then,' to true narrative structures as defined by Labov and Waletzky (1967): an initial orientation, a disruption in the sequence of events, a complication, a resolution, and sometimes a final moral or coda. Foggin (1993, p.14), also cited in Riley and Reedy (2000, p.69-70), gives a more detailed seven-stage checklist for developing narrative complexity:

1. A main clause plus a list of objects: "It is my birthday and I got..."
2. A chronologically ordered sequence of events connected with words like *and*, *so*, *then*, *but*. What Forster (1927, p.93) calls *story*: "The king died and then the queen died."
3. Events causally linked with words like *because*, *although*, *when*, *where*, *since*. What Forster (1927, p.93) calls *plot*: "The king died and then the queen died of

grief.” Describing the causes of events often requires describing the motives of characters, and tests the internal consistency and credibility of the narrative.

4. Story or plot events dramatised with landscape or context, dialogue, description of character’s appearances, or precise and appropriate vocabulary.
5. Combination of the inner thoughts and feelings of characters with outer events.
6. Dramatising the inner thoughts and feelings of characters.
7. Reflectiveness and commentary, the writer commenting on the characters’ motivations and actions or on her own feelings about the characters.

In the early stages of this developmental process the aim is to develop narrative structure. It is only once the use of narrative structure has been established that development can progress to the later stages, in which events begin to be dramatised and character, setting and use of vocabulary are developed. These later stages are “built on a firm grasp of narrative structure” (Riley and Reedy, 2000, p.70). Riley and Reedy conclude that teaching primary school children to write using narrative plot structure should be central, so as to become the foundation for more advanced continuing developments in secondary school.

Riley and Reedy (2000, p.72-83) suggest several ways in which narrative structure can be made explicit to children in primary school classrooms:

- Children might be asked to retell oral stories to other children. The teacher telling the story to the children first and sign-posting the main structural elements while doing so, then asking children to retell the story to their peers.
- Creating pictorial representations of stories. The teacher first reads the story to the class, and then asks the children to recall the story part by part. As each part of the story is recalled by the class, the teacher draws a picture of the setting and characters involved in that part of the story. The children can then be asked to retell the story part by part following the pictures.
- Children might be asked to write a new story using the same characters, setting and basic structure as a story that the class has just read and discussed.
- Shared writing, in which the teacher elicits and selects from ideas for the parts of a story from the class and then the class split into groups and each group writes the text for one part of the story.

- *Planning frameworks*, paper planning worksheets which children fill out before writing the first draft of a story, such as the one shown in figure 2.1 on the facing page.

A planning framework consists of a number of prompt questions such as “Where does your story begin? What happens to create a problem? How does it end?” etc., and a box next to each question where the author is required to answer the question by writing in the details of the corresponding part of their story. The particular questions used vary, but usually follow a beginning-middle-end, conflict-resolution story structure. Children are asked to fill in planning frameworks before they begin writing their stories, and to refer to their completed plans while writing.

A survey of teaching materials gathered from the schools visited during the empirical work conducted for this study and from online teacher’s resources<sup>1</sup> confirms that planning frameworks are the story planning tools most commonly used by teachers in British primary schools. Riley and Reedy (2000, p.80) describe planning frameworks as a ““strategy for helping pupils develop an explicit awareness of the components of narrative . . . a powerful way of focusing attention on the elements needed when composing a story.” The worksheets surveyed are either variations of the abstract planning form shown in figure 2.1 on the next page or are customised versions with some concrete story content added, like the *Little Flower Person* planning framework shown in figure 2.2 on page 26, with questions that specify specific story content such as: “Where were you when you found the flower? What did the little person say?” etc. The layout of the forms varies, as does the extent to which the framework specifies the concrete content of the story, but the question-and-answer, filling-in-boxes worksheet format is constant. Appendix A contains further examples of abstract and concrete planning frameworks collected from a number of sources.

Planning frameworks have a number of drawbacks as tools for learning to use narrative structure. Planning frameworks embody a very simple, minimal, beginning-middle-end construct of narrative structure. At the same time, the frameworks dictate the structure of the story, and many partially dictate the content of the story as well. Using planning frameworks, children are not allowed to choose what the component

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<sup>1</sup> The resources surveyed included Read Write Think <http://www.readwritethink.org/>, Spartacus Educational <http://www.spartacus.schoolnet.co.uk/>, PrimarySchool.com.au <http://www.primaryschool.com.au/>, VirtualTeacher.com <http://virtualteacher.com/>, Learning and Teaching Scotland <http://www.ltscotland.org.uk>, National Grid for Learning Cymru <http://www.ngfl-cymru.org.uk/>, TES Connect <http://www.tes.co.uk/>, iChild <http://www.ichild.co.uk/>, Teaching Ideas <http://www.teachingideas.co.uk/>, Super Teacher Worksheets <http://superteacherworksheets.com/> and Purple Mash <http://www.purplemash.com/>.

Figure 2.1: “Planning framework for standard narrative plot,” reproduced from Riley and Reedy (2000, p.82).

Figure 2.2: *The Little Flower Person* planning framework, collected from Maddiston Primary School, Falkirk.



parts of their story will be and how they will be sequenced, these decisions are made for them in advance. If the construct of narrative structure that a planning framework represents is made richer, if the framework is extended with more questions to answer and more boxes to fill in, then the extent to which the framework dictates the structure and content of the story to be written is only increased, and the writer's creative freedom reduced. As a result, children may feel that they are not creating a story plan of their own but merely filling in the gaps in someone else's plan, that they are being made to write stories that are not their own, with topics, characters and plots that they may not want to write about.

An alternative, more constructionist story planning tool might overcome these drawbacks. Such a tool would present children with a set of narrative structure *building blocks*, and allow each child to select and combine blocks to construct her own narrative structure or plan for her story. By constructing their own story plans rather than merely filling them in, children may feel a greater sense of ownership over their stories. Nonetheless, by using a finite set of building blocks that can only be combined in a finite number of ways, the children's constructed story plans may still conform to a good narrative structure and the children may still learn about narrative structure by using them. If the model of narrative embodied by this tool is made richer, if more building blocks, more types of blocks and more ways of combining blocks into structures are added, then the writer's creative freedom is only increased by increasing the decision space of possible narrative structures that can be constructed.

To create such a constructionist story planning tool a model of narrative is needed from which the building blocks of narrative structure and the rules for combining them can be derived. To provide a suitably large and varied set of narrative building blocks the model must contain a richer set of components than just the beginning, middle and end, conflict and resolution. The model should embody abstract, formal knowledge about the overall structure of a narrative and the purpose of components such as characters, actions, and motivations within the whole. It should be capable of representing a variety of abstract story structures without necessarily determining the concrete content of those stories. The model should be able to be understood and applied by children. In the next section, Propp's *Morphology of the Folktale* will be suggested as a suitable model.

## 2.2 Propp's Morphology: A Narrative Construction Kit

Russian folklorist Vladimir Propp first published his *Morphology of the Folktale* (Propp, 1968) in 1928 although it was not translated into English until 1958.<sup>2</sup> In the *Morphology* Propp presented the results of a pioneering study of the plot structures of Russian fairy tales collected by Afanas'ev (1855). Propp aimed to decompose tales into their component parts and study the relationships of these component parts to each other and to the whole. The result can be thought of as a *compositional scheme* of the fairy tale. The same abstract composition underlies the plots of many concrete tales. The composition itself has no real existence outside of the mind, but it is a general concept with which we can explore the world of the tale, discover its laws, and learn to control it (Propp, 1984a, p.74).

### 2.2.1 The Functions of Dramatis Personae and their Sequence

Propp's key insight was that while the surface elements of fairy tales are variable, the actions of the characters if considered from the point of view of their significance for the plot are constant. At the core of the morphology is Propp's concept of *function*: “an act of a character, defined from the point of view of its significance for the course of action” (Propp, 1968, p.21). For example, “if an eagle takes the hero to the country of the princess, we do not have the function of flying on a bird but one of transfer to the place where the object of search is located” (Propp, 1984a, p.74). Many more examples of this single function can be found in tales (Propp, 1968, p.19):

1. A tsar gives an eagle to a hero. The eagle carries the hero away to another kingdom.
2. An old man gives Sucenko a horse. The horse carries Sucenko away to another kingdom.
3. A sorcerer gives Ivan a little boat. The boat takes Ivan to another kingdom.
4. A princess gives Ivan a ring. Young men appearing from the ring carry Ivan away into another kingdom.

In each case the significance of the act for the course of action, its function, is the same: the hero is transferred to the whereabouts of the object of search. The names

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<sup>2</sup>For this thesis the second, revised translation first published in 1968 was used.

and attributes of the *dramatis personae* change, as do the means of the realisation of the function, but the function itself remains the same. Because the functions are the constant elements Propp hypothesises that they are the components that can form the basis for a morphology of the tales. Propp's primary aim was to extract all of the functions, and he discovered 31 functions in total in his materials (figure 2.3). Propp remarked on the contrast between the very small number of functions and the very large numbers of ways in which the functions are realised: “This explains the two-fold quality of the tale: its amazing multiformity, picturesqueness, and color, and on the other hand, its no less striking uniformity, its repetition” (Propp, 1968, p.20).

Figure 2.3: Propp's functions of *dramatis personae* as given in Propp (1968, chapter 3). For each function the number assigned by Propp is given, Propp's “abbreviated definition in one word” is given in italics (these often consist of several words), and then Propp's brief summary of the essence of the function is given. The functions are described in more detail in Propp (1968, chapter 3) and in chapter 3.

- 0 *The initial situation.* The members of a family are enumerated, or the future hero (e.g., a soldier) is simply introduced by mention of his name or indication of his status. Although this situation is not a function, it is nevertheless an important morphological element.<sup>3</sup>
- 1 *Absentation.* One of the members of a family absents himself from home.
- 2 *Interdiction.* An interdiction is addressed to the hero.
- 3 *Violation.* The interdiction is violated.
- 4 *Reconnaissance.* The villain makes an attempt at reconnaissance.
- 5 *Delivery.* The villain receives information about his victim.
- 6 *Trickery.* The villain attempts to deceive his victim in order to take possession of him or of his belongings.
- 7 *Complicity.* The victim submits to deception and thereby unwittingly helps his enemy.
- 8 *Villainy.* The villain causes harm or injury to a member of a family.

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<sup>3</sup>The initial situation is not a function (it is not an act of a character) but is “nevertheless an important morphological element” that is placed before the first function in the telling of the tale (Propp, 1968, p.25).

- 8a *Lack*. One member of a family either lacks something or desires to have something.
- 9 *Mediation, the connective incident*. Misfortune or lack is made known; the hero is approached with a request or command; he is allowed to go or he is dispatched.
- 10 *Beginning counteraction*. The seeker hero agrees to or decides upon counteraction.
- 11 *Departure*. The hero leaves home.
- 12 *The first function of the donor*. The hero is tested, interrogated, attacked, etc., which prepares the way for his receiving either a magical agent or helper.
- 13 *The hero's reaction*. The hero reacts to the actions of the future donor.
- 14 *Provision or receipt of a magical agent*. The hero acquires the use of a magical agent.
- 15 *Spatial transference between two kingdoms, guidance*. The hero is transferred, delivered, or led to the whereabouts of an object of search.
- 16 *Struggle*. The hero and the villain join in direct combat.
- 17 *Branding*. The hero is branded.
- 18 *Victory*. The villain is defeated.
- 19 The initial misfortune or lack is liquidated.<sup>4</sup>
- 20 *Return*. The hero returns.
- 21 *Pursuit*. The hero is pursued.
- 22 *Rescue*. Rescue of the hero from pursuit.
- 23 *Unrecognised arrival*. The hero, unrecognised, arrives home or in another country.
- 24 *Unfounded claims*. A false hero presents unfounded claims.
- 25 *Difficult task*. A difficult task is proposed to the hero.

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<sup>4</sup>A name for this function is missing from Propp (1968).

26 *Solution*. The task is resolved.

27 *Recognition*. The hero is recognised.

28 *Exposure*. The false hero or villain is exposed.

29 *Transfiguration*. The hero is given a new appearance.

30 *Punishment*. The villain is punished.

31 *Wedding*. The hero is married and ascends the throne.

Propp's functions appear in the fairy tales that Propp studied according to the following basic principles:

1. Not every tale contains every function. Any function may be omitted from a tale. There is apparently only one exception to this rule: Propp states in a number of places that either a villainy (function 8) or a lack (8a) is probably necessary for a tale.
2. The order of the functions is always identical (see figure 2.3 on page 29). The absence of some functions from a given tale does not change the order of the rest.
3. No function excludes or contradicts another, there are no cases where if a function A is present in a given tale then certain other functions cannot be present in the same tale.<sup>5</sup> It is possible to imagine a tale containing all 31 functions.

### 2.2.1.1 Species and Varieties of Functions

Propp saw his task as analogous to the search for genera, species and varieties in nature (Propp, 1984b, p.82). He sees his functions as the genera, each genera contains a number of species, and each species in turn contains a number of varieties. The species and varieties are more concrete categories organised under the more abstract categories of the functions. For example, the function *transference* has four species:<sup>6</sup>

**Function** The hero arrives at the whereabouts of the object of search.

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<sup>5</sup>Propp was particularly astounded by this result which he claims means that all of the tales in his materials are of a single structural type, and each possible permutation of the functions is a subtype (Propp, 1968, p.23).

<sup>6</sup>This example is taken from our own formalised interpretation of Propp's morphology, see chapter 3.

**Species a** The hero uses a mobile means of transport: animal or vehicle, magical powers, etc.

**Variety** A tsar gives an eagle to a boy. The eagle carries the boy to the top of the highest mountain.

**Variety** A princess gives Ivan a ring. Young men appearing from out of the ring carry Ivan away to another kingdom.

**Species b** The hero is guided, another character shows or leads the way, the hero follows a trail left by another character, the hero follows a sign, etc

**Variety** Sucenko sees a magical animal in the forest and follows it. The animal leads Sucenko to the lake at the heart of the forest.

**Variety** A fish tells Kelandra the way. Following the fish's direction Kelandra arrives at the villain's castle.

**Species c** The hero uses a stationary means of transport: climbs a rope, descends a stairway, crosses a bridge, passes through a doorway, etc.

**Variety** A sorcerer makes a magic portal appear before Ivan. Ivan passes through the portal and emerges in another world.

**Variety** Dumpling discovers a trap door in the ground. Opening it, he finds a dark staircase inside. He descends the staircase, and emerges in an underground landscape.

**Species d** No special means of transfer, the hero simply arrives at the whereabouts of the object of search.

**Variety** After much travelling Baldred eventually arrived at the Firth of Forth.

Propp began to sketch the relationships between the species of different functions, but did not map them out in detail (Propp, 1968, p.46-50 and p.109-111):

- In some cases a species of one function is necessarily joined to a species of another function. A simple example is the functions of *struggle* between the hero and villain and *victory* of the hero over the villain. A fight between the hero and villain and a game of cards between the hero and villain are two species of struggle. The hero's victory in a fight and the hero's victory in a game of cards are two species of victory. If the species of fight occurs in a tale then the species of victory in a fight must occur, a tale in which a fight begins between the hero and villain and then the hero wins in a game of cards would not make sense.

- In some cases dependencies of this sort exist from all of the species of one function to all of the species of another function.
- In some cases dependencies exist between several species of two functions but not all.
- There are one-way dependencies, in which if species 1 of function A occurs it will always be with species 2 of function B, but species 2 of function B can occur with other species of function A.
- Finally, for many pairs of functions any combination of species can occur without any logical or artistic violation. If the villain abducts a person then the hero may find their way to the villain's lair by following bloody tracks, by flying on a magic carpet, etc., there is no logical dependency and the teller has complete freedom.

### 2.2.1.2 Composing New Tales with Propp's Morphology

Propp's functions, the rules for combining them into tales, and various auxiliary elements to be discussed below form the compositional scheme underlying all of the fairy tales that Propp studied. This scheme is the constant, stable basis or skeleton that underlies the many, varied plots of the tales. The scheme can be used to generate new plots which will each be different from each other while retaining the fairy tale form (Propp, 1968, p.111).

To construct a plot an author can simply choose a species of each desired function. They might take any species of *villainy*, then one of the species of *mediation* that can follow the chosen species of villainy, a *beginning counteraction* and any species of *departure* (this sequence represents the *complication* of the narrative), then a species of *the first function of the donor* and a species of *the hero's reaction* that can follow it, then any species of the *provision or receipt of a magical agent*, and so on (Propp, 1968, p.111). In doing this the author may skip over any function (except possibly villainy or lack) and may repeat any function or group of consecutive functions three times (see *trebling*, section 2.2.4 on page 43). Once functions have been selected the author chooses the characters who will carry them out. The necessary roles that must be filled and the actions that must be carried out by each character are determined by the chosen functions (the *villain* makes an attempt at reconnaissance, the *hero* leaves home, etc).

Finally, the author must keep in mind motivations, connections and other auxiliary elements (see sections 2.2.2 on page 38, 2.2.3 on page 42 and 2.2.4 on page 43).

Although a storyteller is constrained by the functions and *dramatis personae*, within this system the teller is free to create in a number of ways (Propp, 1968, 112). The teller chooses which functions to omit and which to use in a particular tale; within logical and artistic constraints they choose which species of each function to use; they choose or invent the particular means by which each species will be realised in the tale; they choose the nomenclature and attributes of the characters; and they choose the linguistic means with which the tale is presented, the style.

### 2.2.1.3 Assimilations

The concept of function is revealed to be more subtle than it first appears. As we have seen, in different tales the same function can be realised in many different ways, by many different characters. The opposite is also true: *identical acts in different tales may realise different functions* (Propp, 1968, p.66). Propp termed these instances *assimilations* (because a concrete form that normally belongs to one function has been assimilated into another function).

Functions are defined independently of the characters who fulfil them and independently of how and in what manner they are fulfilled, it is the meaning that a given function has in the course of action that defines the function. Identical acts can sometimes have different meanings. If the hero struggles with, defeats and takes a prize from an adversary this may instantiate functions 12-14: the hero is tested by the donor (in this case the donor is unfriendly and attacks the hero), the hero reacts to the test (defeats the donor in a fight) and the donor provides the hero with a magical agent (the hero takes the agent from the defeated donor). Exactly the same sequence of actions may instantiate functions 16, 18 and 19: the hero struggles with the villain, the hero defeats the villain, and the misfortune or lack is liquidated (e.g. the hero retrieves a stolen object or rescues a kidnapped person from the defeated villain). Which functions are instantiated in a given instance depends on the meaning of the acts for the course of action, and to determine this meaning their context given by the surrounding functions that make up the rest of the tale must be taken into account. Propp mentions several functions that are frequently realised by identical acts: the hero being tested by a donor (12, 13, 14) and the hero struggling with a villain (16, 18, 19); the hero being tested by a donor and the assignment of a difficult task to the hero (25, 26, 31); absentation (1) and departure (11); and villainy (8) and pursuit (21).

#### 2.2.1.4 Double Meanings

A single act may realise more than one function at once, the act has a double morphological meaning (Propp, 1968, p.69). Double meanings frequently occur when several of the first seven functions in the sequence (the preparatory functions: absention, interdiction, violation, reconnaissance, delivery, trickery and complicity) occur in the same tale. The purpose of all of these functions is to facilitate the function of villainy that follows them, and because of this overlapping purpose double meanings often occur. For example, a prince sets off on a journey and forbids the princess to leave the house (absention followed by interdiction); a sweet, little old lady comes to the house and tempts the princess to come out into the garden (trickery); the princess goes out to enjoy the garden (Propp, 1968, p.69). This last act of the princess simultaneously instantiates the functions of violation (the interdiction is violated) and complicity (the victim submits to deception and thereby unwittingly helps the villain).<sup>7</sup> Double-meanings can also occur with functions other than the preparatory functions, for examples see Propp (1968, p.69).

#### 2.2.1.5 Tales with Multiple Plots

Propp's claim that the order of the functions is always identical is considerably more complex than it first appears. The ordering of functions applies not to the tale as a whole but to *moves* within the tale. Any sequence of functions beginning with *villainy* (8) or *lack* (8a) (optionally preceded by some or all of the preparatory functions, 1-7) and proceeding to some ending function is termed by Propp a move (Propp, 1968, p.92). A move can end on any of several functions including the receipt of a magical agent, the liquidation of misfortune, the rescue from pursuit, wedding, etc. A tale may have just one or may contain several moves. Each new act of villainy or lack creates a new move.

The system of moves reveals how “the formulaic underpinning makes folktales more intricate; it allows storytellers to weave together multiple different story sequences without becoming confused” (Murray, 1998, p.196). By using a number of moves in a single tale, sometimes combined in artistic ways, complex tales can be created. Within a tale, moves can be combined in a number of ways:

1. Iteration, one move directly follows another:

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<sup>7</sup>Although this is the example given by Propp, in this example the functions do not quite occur in the order specified by Propp, trickery (7) occurs before violation (3)!

1. Villainy \_\_\_\_\_ Wedding
2. Villainy \_\_\_\_\_ Wedding
2. An episodic move. The action of the first move is interrupted by a second move, when the second move completes the first move continues where it left off:

1. \_\_\_\_\_ ..... \_\_\_\_\_  
 2. \_\_\_\_\_

3. Recursion, an episodic move may itself be interrupted by a further episodic move:

1. \_\_\_\_\_ ..... \_\_\_\_\_ .....  
 2. \_\_\_\_\_ ..... \_\_\_\_\_  
 3. \_\_\_\_\_

4. A tale may begin with two villainies at once, the first villainy is liquidated and then the second:

Villainy 1. \_\_\_\_\_ Liquidation  
 2. ..... \_\_\_\_\_ Liquidation

5. Two moves may have a common ending.
6. If a move has two heroes then what begins as a single move may split into two and then rejoin again later.

The method of combining moves has no influence on the structure of the moves themselves (Propp, 1968, p.94).

### 2.2.1.6 Exceptions to the Sequence of Functions

Much later Propp admits that (even after separating a tale into its constituent moves) “certain deviations” from the sequence of functions sometimes occur in his material (Propp, 1968, p.107-108):

**Inverted sequences** In some cases consecutive functions or groups of functions occur in an inverted sequence. For example, the three functions involving the donor (in which the donor tests the hero, the hero reacts to the test, and the donor provides the hero with a magical agent) normally follow the function of villainy, but in some tales this sequence of three functions occurs *before* the villainy. The departure of the hero from home normally follows the sequence of villainy, mediation (the misfortune or lack is made known to the hero) and beginning counteraction (the hero agrees to or decides upon counteraction). But in some cases the hero departs from home *before* the villainy. Propp claims that these instances do not break his rule that the order of the functions is always identical because “this is not a new, but rather an *inverted* sequence” (Propp, 1968, p.107).

**Fluctuations** In some tales functions that do not follow one another immediately in the sequence given by Propp change places. The hero’s struggle with the villain may occur after the pursuit of the hero by the villain rather than in its usual place, the hero’s receipt of a magical agent may occur before the hero departs from home, the function of transfiguration often occurs out of place, and recognition exposure, marriage and punishment may also exchange positions. Propp claims that these instances do not violate his rule that the order of functions is always identical because the order he has given is the most logically appropriate and that which occurs most often, and that deviations from it “are only fluctuations and not a new compositional system” (Propp, 1968, p.108).

**Direct violations** Propp briefly mentions that there are certain isolated cases of “direct violations” of the sequence that are “rather significant, but a closer examination will reveal these to be humorous tales” (Propp, 1968, p.108).

Although simple tales do manifest Propp’s functions in exactly the order given by Propp (according to the author’s own analyses of some of Afanas’ev 1855’s tales), after taking into account the possibility of multiple sequential or overlapping moves within a tale and inversions, fluctuations and violations of the sequence of functions, it is clear that a complex tale may not at first appear to manifest Propp’s functions in the order given by Propp at all. Trebling of functions (see section 2.2.4 on page 43 below) further complicates the sequence.

Propp likens the sequence of functions in a fairy tale to the sequence of events in the testimony of a witness: “The sequence of events has its own laws. The short story too has similar laws, as do organic formations. Theft cannot take place before

the door is forced” (Propp, 1968, p.22). Later he claims that “if we read through all of the functions, one after another, we observe that one function develops out of another with logical and artistic necessity” (Propp, 1968, p.64). A brief examination of the functions finds this argument to be quite plausible. The abstention, the violation of an interdiction, the villain’s attempt at reconnaissance, and the villain’s attempt to deceive the victim serve to facilitate the villainy and therefore must occur before it; the hero’s learning of the villainy and acceptance of a quest to resolve the misfortune created by the villainy must logically occur after the villainy itself; the resolution of the villainy must occur after all of these; the hero’s returning home must occur after his departing from home, and so on. To a large extent Propp’s ordering of the functions is required by logical dependencies between the functions. But these logical dependencies demand only a partial ordering of the functions, they leave some freedom of movement corresponding to the deviations that Propp discovered. The hero’s receipt of a magical agent may occur earlier in the tale, the pursuit of the hero by the villain may occur before the struggle between the hero and the villain, etc. without violating any logical necessity. Propp goes too far when he claims that the sequence of functions is always identical.

If the relationships between Propp’s functions were specified completely and precisely, then it would be possible to generate the set of logically permissible permutations of the functions. Afanas’ev (1855)’s collection of fairy tales could then be consulted to see how many of the permutations occur, and if any permutations outside of the set occur. The set of permutations might also be of use in a computer application designed to assist authors in constructing fairy tale plots. However, this task would require a much more complete and precise definition of the functions than given by Propp, one that formally models the effect of each function on the ongoing context of the narrative. Also, because of the level of abstractness of the functions, a definition of logical dependencies at the function level would be a minimal set of dependencies. The concrete manifestations of the functions in a particular tale would introduce further restrictions on the logical possibilities for reordering the functions within that tale.

### 2.2.2 The Dramatis Personae

Propp’s functions can be grouped into *spheres of action* according to the dramatis personae that perform them. For example, the sphere of action of the villain is villainy,

the struggle with the hero, and the pursuit of the hero.<sup>8</sup> In this way the seven dramatis personae of the fairy tale can be identified from Propp's functions:

1. The villain: villainy; struggle with the hero; pursuit of the hero.
2. The donor (provider): testing, interrogating, attacking, etc. the hero; the provision of the hero with the magical agent.
3. The helper: spatial transference of the hero between two kingdoms, guidance; liquidation of the misfortune or lack; rescue of the hero from pursuit; the solution of the difficult task; transfiguration of the hero.
4. The princess (sought-for person) and her father:<sup>9</sup> the assignment of difficult tasks; branding of the hero; exposure of the false hero or villain; recognition of the hero; punishment of the villain; marriage.
5. The dispatcher: mediation (the connective incident).
6. The hero: beginning counteraction; departure; reaction to the donor; wedding
7. The false hero: beginning counteraction; departure; reaction to the donor; presenting unfounded claims.

The spheres of action are abstract from particular characters in tales as the functions are abstract from particular actions (Propp, 1968, p.81):

- A single sphere of action may be fulfilled in many varied ways. The attributes, motivations and intentions of characters vary but the functions that they carry out remain constant. For example, the donor is often a friendly character who helps the hero by providing a magical agent. But the donor may also be an antagonistic character who tries to kill the hero, the hero defeats the donor and takes a magical agent from the donor. In some tales the donor is an innocent victim of the hero, the hero tricks the donor or steals from the donor to obtain the magical agent.

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<sup>8</sup>There are also the functions of *reconnaissance* ("the villain makes an attempt at reconnaissance") and *trickery* ("the villain attempts to deceive his victim") which appear to belong clearly to the villain, but Propp omitted the first seven functions (the preparatory section) from his distribution of the functions among the dramatis personae because "the distribution here is unequal, making the definition of the characters impossible by these functions" (Propp, 1968, p.80).

<sup>9</sup>Propp explains that "The princess and her father cannot be exactly delineated from each other according to functions" (Propp, 1968, p.79). Also, Propp's naming of this personae as the princess and her father clearly introduces concrete elements into the morphology. *Sought-for person* is a better name.

Spheres of action, particularly that of the helper, may also be fulfilled by animals, objects, or magical powers or qualities belonging to or acquired by the hero (Propp, 1968, p.82). The helper's function of transferring the hero from one domain to another may be carried out by a flying carpet or the magical ability (acquired by the hero) of transforming into an eagle, etc. In terms of their function these animals, objects or qualities are equivalent to characters that fulfil the same functions in other tales, and Propp considers them to be particular forms of the dramatis personae *magical helper*. Propp also mentions that "the hero often gets along without any helpers. He is his own helper, as it were," the hero takes on both the functions and the attributes (e.g. prophetic wisdom, etc.) of the magical helper.

- One sphere of action might correspond exactly to one character, or *a single character may fulfil more than one sphere of action* in the same tale. A common example is a character who plays both the donor and the helper, beginning as the donor by testing the hero, and when the hero passes the test placing himself at the disposal of the hero and becoming the helper (the character makes a gift of himself).
- The opposite is also possible: *multiple characters may combine to fulfil a single sphere of action* in the same tale. An example is when the villain is killed in the struggle with the hero and later another character is introduced to carry out the function of pursuing the hero, or when the magical helper carries out some of the functions of the hero for him.
- Finally, *a character may fulfil one sphere of action in one move and a different sphere of action in another move* in the same tale, and these moves may occur one after another or may overlap. For example, in the tale *The Enchanted Ring* (Afanas'ev and Jakobson, 1946, p.31), a young man impresses a princess by solving a difficult task and she agrees to marry him. This ends the first move of the tale, in which the princess was the sought-for person. The second move begins with the princess asking the young man how he was able to solve the difficult task, flattering him, exhorting him and getting him drunk (reconnaissance). When the young man reveals that he possesses a magic ring that enables him to accomplish difficult tasks (complicity) the princess steals the ring and disappears with it (villainy). The sought-for person has become the villain.<sup>10</sup>

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<sup>10</sup>This is the author's own Proppian analysis of the tale.

### 2.2.2.1 The Attributes of Characters

Propp gave special attention to the attributes, motivations and introductions of *dramatis personae*, devoting a chapter or section to each. Although Propp's *dramatis personae* are defined in terms of their function, ignoring the attributes of particular characters, the *dramatis personae* provide structural hooks to which attributes can be attached. The attributes of the characters are what “provide the tale with its brilliance, charm and beauty” (Propp, 1968, p.87). All of the different character attributes found in the tales can be grouped around the *dramatis personae* defined according to their functions. Propp identified four types of character attributes: external appearance and nomenclature, particularities of introduction into the narrative, dwelling place, and less significant, auxiliary elements. “Thus, characteristic peculiarities of Baba Jaga are: her name, her appearance (her bony leg, her “nose which has grown to the ceiling,” etc.), her hut turning on chicken legs, and the manner of her entrance: she flies down in a mortar accompanied by whistling and noise” (Propp, 1968, p.88).

### 2.2.2.2 The Motivations of Characters

The motivations of *dramatis personae* “often add to a tale a completely distinctive, vivid coloring, but nevertheless motivations belong to the most inconstant and unstable elements of the tale” (Propp, 1968, p.75). Most acts in the middle of a move are “naturally motivated by the course of the action” (Propp, 1968, p.75). No motivation need be explicitly mentioned by the teller. A quick examination of Propp's functions verifies this claim. For example, once a villainy has been committed it may then serve as motivation for the subsequent actions of the dispatcher, and then those of the hero and helper. But for certain actions an external motivation needs to be supplied. The function of villainy in particular is often supplied with an external motivation. Similar or identical acts are motivated in the most varied ways. To make the point Propp lists the following motivations from his material for the act of banishing a person (a form of villainy): a stepmother's hatred; a quarrel over an inheritance among brothers; envy; a fear of competition; an unequal marriage; suspicion of marital infidelity; a prophecy about a son's humiliation; the greedy, evil, envious, suspicious character of the villain; and the unsavoury character of the person exiled (the victim) (Propp, 1968, p.75).<sup>11</sup> Propp remarked that the forms of motivation for villainy and lack are so varied that

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<sup>11</sup>An example of such an unsavoury character is a miraculously powerful child who pulls off the arms and legs of whoever he plays with!

almost any element of a tale can form a motivation and cause or evolve into a new move. In some cases, however, no motivation is given for the act of villainy. Dragons and many other villains simply act.

Propp's treatment of motivations will be elaborated on a little. Compound motivations are possible, in which multiple factors serve to motivate the same action. External motivations are sometimes given for functions other than villainy. *Absentation*, for example, often has a motivation (parents leave *for work*, children go out *to gather berries*, etc.) but does not always have one ("the prince had to go on a distant journey," a parent dies, etc.).

*Internal* motivations, when one function motivates the next or a later function, are often quite interesting also and may combine with external motivations. As well as motivating the actions of characters, internal motivations serve to weave together functions very closely. For example, the victim is warned not to go outside (interdiction), the villain tempts the victim (trickery) by supplying the motivation that causes the victim to step outside (violation and complicity at once). In the story *The Miraculous Pipe* (Afanas'ev and Jakobson, 1946, p.425) a mother orders her daughter Alenushka to go out to the woods to gather berries and to take her brother Ivanushka with her. The mother promises a pair of red slippers to whichever of the siblings gathers the most berries. A number of functions including interdiction and mediation are often accompanied with either threats or enticements that strengthen the motivation for subsequent functions. Alenushka eats most of the berries that she finds while Ivanushka collects them. In the end Ivanushka has many more berries. Alenushka becomes jealous, tricks and murders Ivanushka and steals his berries. The motivation for the villainy is quite complex. The enticement given as part of a much earlier function is part of the motivation, as is Alenushka's jealousy at being outperformed by her little brother, and Alenushka's character (from her prior behaviour we can see that Alenushka dislikes her brother and that she is greedy).

### 2.2.3 Connectives

Sometimes functions that follow one another in a tale are performed by different characters and it is logically necessary to transfer some information, an object or another character to the character who is to perform the next function. Such connections are sometimes achieved by very brief, simple means and are sometimes achieved using entire episodes that can be quite elaborate. In studying the means by which these

connections are achieved, Propp found that “an entire system for the conveying of information has been developed in the tale, sometimes in very artistically striking forms” (Propp, 1968, p.71).

Sometimes connectives are simple, one character tells another character some necessary piece of information. A common form is a conversation between the hero and the helper when they meet on the road, the helper learns of the hero’s goal and then offers to help the hero. Often the hero’s bragging or laughing out loud serves to convey some information to the villain. Propp also gives some examples of artistically striking forms of connection: “a woman possessing magic apples has musical strings stretched on top of the wall. On his way back, Ivan jumps over the wall and brushes against the strings, thereby informing the witch of the theft, and a chase ensues” and “an abducted princess sends a little dog to her parents with a letter indicating that Kozemjaka can rescue her,” from this letter the tsar learns about the hero (Propp, 1968, p.72).

Special personages exist to perform connectives in some cases, and Propp considers these auxiliary to the *dramatis personae* who perform the functions. The additional personages are: slanderers, complainers, informers and betrayers. There are also special personages who sometimes perform the function of *reconnaissance* on behalf of the villain: a looking glass, a chisel, a broom, one-eye, two-eye and three-eye, etc. Sometimes to achieve a connective a character uses a spyglass, puts his ear to the ground, etc. and observes something, or special personages such as keen-ear and sharp-eye perform this function for the character.

#### 2.2.4 Trebling

Many elements of a fairy tale can be trebled or otherwise multiplied (Propp, 1968, p.74). Propp gives only a very brief treatment of the phenomenon of trebling, saying that he will not dwell on it as it has already been sufficiently elucidated in scholarly literature (Propp, 1968, p.74). An examination of some of Afanas’ev (1855)’s tales shows trebling to be a very significant structural feature of the tales. The use of trebling significantly alters the plot structure of the tales and it serves narrative purposes, such as to build up tension and expectations, or to illustrate the different character of the hero compared to others, etc.

The attributes of *dramatis personae* can be multiplied, a dragon with three heads, etc. Characters themselves may be multiplied, three princesses, three heroes, the three swan-geese, etc. Individual functions, pairs, groups or entire moves of functions can

be repeated, the hero is pursued and escapes three times consecutively, perhaps with three different pursuers. In some cases an attribute is also magnified as it is repeated, the hero is given three difficult tasks to solve and each task is more difficult than the previous. Or a trebled function may twice produce negative results and then finally a positive one, the hero meets three donors and is tested three times, failing twice with bad responses and on the third occasion giving a different kind of response and succeeding. Alternatively, three heroes are in turn sent on a quest, the first two meet the donor and fail the test (and are killed or return home), the third hero passes the donor's test and continues. Finally, special forms of connective are used to connect one repetition to the next (Propp, 1968, p.74).

The tale *Frolka Stay-at-Home* (Afanas'ev and Jakobson, 1946, p.229) is a simple, single move tale in which the plot is made longer and more complex by extensive use of trebling. Three beautiful princesses are kidnapped by a dragon. The victim is trebled, and so the single act of villainy is effectively a treble villainy. Three heroes respond to the king's call for help. The heroes travel to and enter a deep forest in which they come across three dragon's houses in turn. In each case the functions of struggle with the villain, victory over the villain, and resolution of the crisis (rescue of a princess) repeats. The heroes arrive at each house when the dragon is not home and enter, the dragon comes flying and the heroes defeat the dragon in battle, a princess is found inside the house. To connect each repetition to the next each rescued princess begs the heroes to rescue her sister(s) also, they agree, they depart and they travel to the next house. Each successive dragon's house is larger, more intimidating, and more difficult to enter, and each dragon is more fierce (having five, seven and twelve heads). The trebling serves to build up suspense. By the time the heroes have entered the final dragon's house the audience are expecting the sudden appearance of the most fierce dragon as happened at the previous two houses, and the teller delays the appearance of the final dragon as long as possible by changing the order of certain events in the final repetition of the functions.

### 2.2.5 Transformations

In a later work (Propp, 1984b) Propp used the abstract, structural categories of the *Morphology* to guide a comparative study of the concrete elements of fairy tales: the characters, their attributes and their actions etc. If Propp's functions and dramatis personae form a system for constructing fairy tale plots, then these further elements and

their transformations are a system for creating the content of a tale. A motif such as “Baba Jaga gives Ivan the horse” contains a function (the hero receives a magical agent) and three other elements that are not functions (Propp, 1984b, p.83): a donor (Baba Jaga), a recipient (Ivan) and a gift (the horse). These other elements can themselves be studied and compared across different tales. Propp began to map out the ways in which one element can be transformed into another as it passes from tale to tale, and the ways in which new elements are absorbed into the morphological structure of the tale. Propp identifies several forms of transformation and gives many examples. Rodari (1996, p.49) likens Propp’s system of transformations to the “terms in which Saint Augustine describes the work of the imagination that consists of “setting up, multiplying, reducing, extending, ordering, recomposing images in any way whatsoever.”

*Reduction:* the basic form is truncated, resulting in an incomplete form. Baba Yaga’s hut on chicken legs in the forest is one example of the attribute *the abode of the donor* (Baba Yaga is an example of a donor). Through reduction the hut on chicken legs in the forest appears in tales in the following forms (Propp, 1984b, p.89):

- **The hut on chicken legs in the forest**
- The hut on chicken legs
- The hut in the forest
- The hut
- The forest
- No mention of the abode of the donor

*Expansion:* the basic form is extended by adding extra details: the hut on chicken legs in the forest that rests on pancakes and is shingled with pies (Propp, 1984b, p.89).

*Contamination:* the hut on chicken legs in the forest that turns this way and that when it has reason to do so is transformed into the hut that turns continuously all of the time.<sup>12</sup>

*Inversion:* male characters are replaced with female characters and vice-versa, a closed and inaccessible hut becomes a hut with a wide open door, etc.

*Intensification* and *attenuation* of acts of characters: acts having the same function occur with varying levels of intensity in different tales. Propp gives the following

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<sup>12</sup>Propp gives only one example and does not elaborate on the meaning of “contamination.”

example of forms of the function *the hero departs from home* at varying levels of intensity (Propp, 1984b, p.90):

- The hero leaves of his or her own accord.
- The hero is asked to go and fetch some unusual thing.
- The hero is ordered to go and carry out some task.
- The order is accompanied with threats should the hero fail and/or promises should the hero succeed.
- A veiled form of exile, the hero is tricked into departing by being sent on a false task, etc.
- A hero is directly exiled (without trickery)

*Substitution:* one concrete element of a tale can be substituted for another element from various sources (another tale, everyday life, religion, the imagination of the teller, etc.). The hut on chicken legs (dwelling of the donor) is replaced by a palace (the dwelling of a princess, the *sought-for person*, from another tale) or a mountain alongside a fiery river (the dwelling of a dragon, the *villain*, from another tale). Or Baba Jaga (the donor) is replaced with a princess (the sought-for person from another tale). The hut becomes an inn or a two-storey house (substitutions from everyday life) or it becomes a hut on goat horns, a hut on ram legs, etc (substitutions of unclear origin).

*Assimilation:* two different concrete elements may be merged together to form a new element. A hut and a palace under a golden roof merge to become a hut under a golden roof. A hut and a mountain by a fiery river merge to become a hut by a fiery river. Elements from everyday life may be assimilated with fantastic elements, producing a hut on the edge of the village, a cave in the woods, etc.

Compound transformations can be constructed by applying multiple transformations to the same element:

- **The dragon abducts the king's daughter**
- Devils abduct the king's daughter (a substitution from religion)
- The devil abducts the priest's daughter (further substitution from religion)
- A witch abducts the son of an old couple (substitution from another tale and inversion of the sexes of the characters)

- The princess flies away from her husband (substitution and reduction)

Finally, Propp briefly mentions that other forms of transformation also occur (*specification, generalisation, rationalisation*) and that transformations that can be applied to individual elements can also be applied to the tale as a whole. Adding an extra element to the tale is amplification, removing an element from the tale is reduction, etc.

### 2.2.6 Criticism of Propp's Morphology

If Propp's morphology is to be used as a model from which to learn about narrative, we should first be satisfied that the morphology is a valid model, that it captures something of the true structure of the fairy tales. For this reason the critical reception of Propp's morphology will be reviewed.

Following its translation into English the *Morphology* had an “enormous impact” on “folklorists, linguists, anthropologists, and literary critics” and has inspired many studies (Dundes, 1968). Some studies attempted to apply Propp's method to folktales of other cultures, producing morphologies of those tales (Dundes, 1962, 1963, 1986; Colby, 1973), while other studies aimed to improve on Propp's morphology itself (Barthes and de Balzac, 1976; Greimas et al., 1983; Levi-Strauss, 1984). Propp's name had become a “household word” among folklorists by the mid '70s and as a result it is impossible to give a complete list of works based on or discussing the *Morphology* (Liberman, 1984, p.x). For a detailed summary of the discussion of the *Morphology* and a long list of references tracing the evolution of Propp's ideas in the West, see Liberman (1984, p.xi). The *Morphology* opened up many fruitful areas of investigation, including: to what extent does Propp's morphology apply to non-Russian tales? To what extent does it apply to forms of folktale other than the wonder tale? To what extent does it apply to other forms of narrative? How precisely is fairy-tale structure learned by children, and how is it acquired? And how can Propp's morphology be used to generate new tales? (Dundes, 1968).

There have also been critical responses to the *Morphology*. For a list of references to the most important critical remarks see Liberman (1984, p.xxxi). The critical reception is characterised by statements such as: “his result (the obtaining of wondertale morphology) is significant, but not all his conclusions and methods are correct” (Liberman, 1984, p.xxxi) and “obviously much can be done with Propp's approach, but it has certain deficiencies” (Fischer, 1963, p.288). Not all of the criticisms of the *Morphol-*

*ogy* are relevant to its application as a story authoring tool and not all of the criticisms are warranted, the *Morphology* is an often misunderstood work.

Propp's aim with the *Morphology* is misunderstood by some critics. Propp's aim was not classification of the tales as an end in itself, but classification as a means to the discovery of general laws. At the beginning of some chapters Propp inserted epigraphs to this effect from Goethe, but the English translator removed the epigraphs calling them “nonessential” (Propp 1968, preface, Propp 1984a, p.68).

Despite the long-term aim of discovering universal laws, in the *Morphology* Propp did not claim to have discovered those laws, nor to have discovered the single tale from which all tales once evolved. Rather, Propp saw his work as one piece of the puzzle. Some critics miss this point, they give Propp's morphology a universal character that it does not possess (for example, that it applies to all folktales), and then criticise it for failing to live up to this elevated standard, others try to apply Propp's morphology as-is to new, unrelated genres of narrative. In fact Propp insisted that his morphology applies only to a specific category of folktale, the folk wondertale or fairy tale.<sup>13</sup> Propp titled the book *Morphology of the Wondertale* but his editor changed the title to give it broader appeal (Propp, 1984a, p.70). Propp aimed to discover the compositional scheme underlying all wondertales, the basis or skeleton of the plots of wondertales (Propp, 1984a, p.74). Propp later regretted using the word *morphology* in his title: “I should have spoken not of morphology, but of a much more narrow and accurate concept, that of composition, and should have entitled the book *Composition of the Folk Wondertale*” (Propp, 1984a, p.73). But Propp did believe that “the analysis of narrative genres according to the functions of the characters can perhaps be applied to other tales and even to any narrative. If so, in each case the results will be different ... Thus, though several kinds of narrative occur, they can be analysed by the same methods ... The method is broad, but the conclusions are valid for the type of narrative that yielded them in the first place” (Propp, 1984a, p.70).

With the above misunderstandings clarified, the following sections will discuss some of the main criticisms of *Morphology of the Folktale*.

### 2.2.6.1 Criticism of Propp's Method

Propp's definition of the fairy tales as those tales that are built upon his functions (Propp, 1968, p.99) has been called circular (Liberman, 1984, p.xxi). Propp rejected

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<sup>13</sup>Specifically, tale types 300-749 in Aarne and Thompson (1961)'s classification (Propp, 1968, p.19).

previous classifications of tales, such as that of Aarne and Thompson (1961), which were based on the concrete content of the tales. Because the content of tales is highly variable and concrete elements are often transferred from one tale to another, categories based on these elements will always overlap. For example, Aarne and Thompson (1961) considered “tales about a supernatural adversary” and “tales about a magic object” as two categories of fairy tale, but tales may occur that contain both a magic object and a supernatural villain (Propp, 1968, p.10). But having rejected Aarne and Thompson (1961)’s classification, at the beginning of his investigation Propp defines his material, the fairy tales, as “those tales classified by Aarne under numbers 300 to 749,” a definition that Propp admits is “artificial” (Propp, 1968, p.19). Propp then deduced his functions and derived his morphological definition of the fairy tales from the content of the materials classified by Aarne. While Propp criticised Aarne and Thompson (1961)’s classification on scientific grounds he considered it to be important as a practical reference, and suggests that Aarne was not consistent in his classification according to themes but deviated from it in a way that “represents an instinctively chosen correct approach” Propp (1968, p.11). Aarne instinctively classified the tales on the basis of their structural features, even if he did not realise he was doing so.

Some critics complain that Propp’s morphology is incomplete or violates the rules of classification. Propp uses a catch-all category for “unclear elements” which do not fit under any of his functions and either cannot be understood without comparative material or have been transferred into the tale from tales of other classes (Propp, 1968, p.64), but such a category is inadmissible in a classification (Bordwell 1988, p.11, Nathhorst 1969, p.24). However these elements are rare (Propp, 1968, p.64). Levi-Strauss (1984, p.179) similarly criticises Propp’s use of catch-all categories at the level of species, “a drawer filled with unclassified forms does not constitute a species” (Levi-Strauss, 1984, p.179).

Lberman (1984, p.xxi)’s objection that the actions Propp terms connectives “find no place in his morphology” is also a criticism of the incompleteness of the morphology. Propp explains that actions that constitute connectives occur in-between actions that constitute functions, and appear when a connective is logically necessary to transfer some information, an object or a character to the character who is to perform the next function. But Propp considered connectives to be auxiliary to functions, and did not attempt to organise connectives into a system as he did with functions.

Propp did not sufficiently describe his procedure for the analysis of a tale. Propp does not explain in detail how a tale is segmented into its constituent actions and how

each action is assigned to a function (Nathhorst, 1969, p.20) (instead Propp gives just a few example analyses in a very terse form), and does not explain how a tale is split into its constituent moves (Nathhorst, 1969, p.27) (although Propp does explain that each new villainy or lack in a tale signifies a new move).

Propp is sometimes criticised for disregarding the concrete features of fairy tales and concentrating only on their abstract functions. The characters of the fairy tale: the king, the princess, the witch, the evil stepmother, etc. are essential elements of the tale (Liberman, 1984, p.xxi), but Propp's morphological description of the tale is entirely formal and abstract. Propp is certainly aware of this: “by such a definition the term “fairy” loses its sense, since it is a simple matter for one to imagine a wonderful, fantastic fairy tale constructed in a totally different way . . . On the other hand, non-fairy tales may also be constructed according to the scheme cited. Quite a large number of legends, individual tales about animals, and isolated novellas display the same structure” (Propp, 1968, p.99). From the point of view of story authoring, the ability of the morphology to work with any genre of content may be an advantage, authors are not restricted to the fairy tale setting and characters.

Propp believed that the advantage of his formal definition was the possibility of objective classification: “by employing structural features, a given class may be discerned from others absolutely accurately and objectively” (Propp, 1968, p.101). The formal nature of the morphology is a problem for Levi-Strauss (1984), who points out that while Propp's functions are defined in purely formal terms, many of his species contain elements of the concrete, so that the attempt at a purely formal classification has failed (Levi-Strauss, 1984, p.179). Nathhorst (1969, p.21) also criticises Propp for excluding concrete information that may be relevant to the analysis: “Thus, Propp makes things too easy for himself when he writes (Propp, 1968, p.103): “From the point of view of the composition, it is a matter of indifference whether the dragon kidnaps the princess or whether a devil makes off with either a priest's or a peasant's daughter.” This is of course correct, but what is our judgement to be if it is a prince who makes off with the girl?” Nathhorst (1969) apparently disagrees with Propp's formal interpretation, in which if a prince carries out the functions of the villain and a dragon carries out the functions of the hero, then in this tale the prince is the villain and the dragon the hero. Propp's interpretation may in fact illuminate an important aspect of the tale. However it is true that there is a circular relationship between function and character. Propp's functions are defined in terms of both the action and the role (hero, villain, etc.) of the character who carries it out. To identify the function of an act we

must first know the role of the character who acts, but to identify the role of a character we must consider their actions.

Similarly, Jacobs (1963) points out that Propp's morphology treats only one class of features and does not explore the expressive content or stylistic features of the genre, or its socio-cultural or psychological links. This lack of information about linguistic features identifies a limitation of the morphology if it is to be applied as a learning tool.

### 2.2.6.2 Criticism of Propp's Conclusions

As discussed above, Propp's observation that the order of the functions is always the same is unwarranted. Propp dismisses many exceptions to his total ordering too lightly (Liberman 1984, p.xxi, Nathhorst 1969, p.24 Bordwell 1988, p.11) and the functions have structural connections with each other besides merely their sequence (Fischer, 1963, p.288). The relationships between the functions are more complex than a simple, linear ordering.

Propp has also been criticised for claiming that all fairy tales are of a single structural type. According to Liberman (1984) Propp splits one function into two “unrelated” functions, 8 (villainy, the villain causes harm or injury to a member of a family) and 8a (lack, one member of a family either lacks something or desires to have something) (Liberman, 1984, p.xxi). Villainy and lack are in fact related because they have the same meaning for the course of the action, but lack does present some difficulty. Propp's reason for splitting villainy and lack into two separate functions rather than considering lack to be a species of villainy is unclear. Propp explains that lack “can be considered as the morphological equivalent of seizure” (Propp, 1968, p.34, seizure is a species of villainy). However if villainy is defined as an act of the villain then lack, which is not an act of a character at all and therefore not a function, cannot come under villainy, and this may be Propp's reason for singling out lack. Propp explains that in tales that do not have a villainy to provoke the hero's quest a lack is provided as a “ready-made insufficiency” (Propp, 1968, p.35).

Propp's later attempt to define subtypes within the one type of the fairy tales (Propp, 1968, p.99-113) has been called “strained” (Liberman, 1984, p.xxi).

### 2.2.6.3 Criticism of Propp's Definition of Function

A number of criticisms have been made of Propp's definition of his concept of *function*. Liberman & Nathhorst claims that a function is not, as Propp states, defined by its

consequences and its place in the sequence of functions, because as Propp admits some functions can sometimes occur in different locations in the sequence and their function remains the same (Liberman 1984, p.xxi, Nathhorst 1969, p.21). Furthermore, if the position of a function in the sequence of functions is what defines the function, then Propp's observation that the order of the functions is always the same must be true by definition (Nathhorst, 1969, p.21). This criticism is based on a misunderstanding. According to Propp a function "is understood as an act of character, defined from the point of view of its significance for the course of the action" (Propp, 1968, p.21). The position of the function relative to other functions is not part of this definition. To determine the meaning which a function has in the course of action the surrounding functions must be taken into account, identical actions may have different meanings depending on their context (Propp, 1968, p.21), but it is the meaning and not the position of the function that defines it. The definition does allow for the same function to occur in different positions.

Propp's definition of function is criticised also for focusing on the actions of the plot as the constant, stable elements and excluding the characters. "It's all in the point of view whether one wishes to regard the characters as stable and their actions as changeable, or the actions and the plot as stable with changes in the characters to generate new episodes and tales" (Fischer, 1963, p.289). Nathhorst (1969, p.19) takes Propp's definition of function to mean that an analyst should "pay no attention whatsoever to who carries out the action or to how it is carried out," and then objects to Propp's later use of characters in his definitions of the individual functions themselves. Nathhorst is mistaken, a function is defined as an act of a character and all of Propp's functions are defined in terms of the roles of the characters who carry them out. The villain causes harm or injury to the victim, the hero departs from home, and so on.

Fischer (1963, p.289) suggests that the events of a tale should be characterised in terms of not just the action, but also the actor, object, setting and any other relevant details. This is in fact what Propp has begun to do. Propp's descriptions of the functions mention the actor, the object and the consequence of each, and his ordering of the functions and identification of paired functions and of connections between the species of some functions begins to define the relationships between functions. But the functions are not defined very precisely, and Propp is not at all clear about the elements that make up a function. A precise definition of Propp's functions giving the actor, object and consequence of each and defining the relationships between the functions would be a significant improvement.

Fischer (1963, p.289) goes on to suggest that the elements that make up an event, such as the actor, can be further broken down into their constituent characteristics, a task that Propp also began (see sections 2.2.2.1 on page 41 and 2.2.5).

Levi-Strauss (1984, p.183) and Nathhorst (1969, p.25) have suggested that some closely related functions could be combined. For example, the functions of the assignment of a difficult task and the solution of a difficult task occur next to each other in the sequence of functions and always occur together in tales, so could be combined into one function. However, a function is defined as an act of a character, and the assignment of a difficult task and its solution are two acts carried out by two characters at two different times, other actions such as connectives may occur in-between consecutive functions, so they are separate functions (the solution also differs from the assignment in that it may be a success or, in its negative form, a failure) (Propp, 1984a, p.75).

Finally, Fischer (1963, p.299) questions the levels of abstraction chosen by Propp (function/genera, species and variety). Propp's morphology can handle expansion of tales by adding or repeating functions, but what about expansion by describing an event in more and more detail? Or subdividing an event into more specific events? Propp does not discuss why his three levels of abstraction should be the only three, and Fischer suggests a model that is able to deal with varying levels of abstraction.

In summary, critics have accepted Propp's core contribution to the understanding of folktales. Propp's methods, his conclusions, the completeness of his work and some specific aspects of his morphology have been questioned. The criticisms are sometimes unwarranted or are the result of misunderstandings, and are sometimes correct, but the method of studying tales according to their structural composition remains useful.

### 2.2.7 The Potential of Propp's Morphology for Learning

Propp's morphology appears to be a very promising model of narrative for use in an educational tool. By breaking down fairy tales into their component parts the morphology potentially provides children with the building blocks from which they can construct new stories. The components of the morphology and the rules by which they can be combined embody knowledge about the structure of narrative at different levels. The morphology concretises a very rich model of narrative, and one that can represent very simple narrative structures or very complex interwoven structures, and several levels in-between. For example a simple, short narrative with a beginning, middle and end might be represented by three carefully chosen Propp functions arranged in a linear se-

quence. A more advanced narrative structure might use many functions, arrange them in a complex sequence with overlapping simultaneous plots, map out character roles, motivations, connectives and other elements, make use of trebling, and so on. Finally, there is a ready-made corpus of fairy tales that conform to the morphology and provide a large and varied collection of sample material that can be used to demonstrate and discuss the elements of the morphology.

Favat (1977), Rodari (1996) and Charles (2006) have also written about the promise of Propp's morphology for children's learning. The morphology concerns fairy tales, a subject of interest to many children aged 5-10 (Favat, 1977, p.4). Rodari (1996) claims that the structure of fairy tales in some way mirrors the structure of the child's experience, in prohibitions, a series of missions and duels, difficult tests and disappointments, magical gifts and magical donors, powerful allies and diabolical enemies (Rodari, 1996, p.48). In this way fairy tales help children to make sense of and come to terms with their own experiences.

The fairy tale structure has cultural presence. Rodari (1996, p.46) observed "how alive and persistently present the fairy tale structure is in our culture," citing the *James Bond* films and adventure books, in which a surprising number of Propp's functions appear in almost the same order as described by Propp. While the narrative structures of modern films and books certainly cannot be entirely explained by Propp's morphology, anyone can conduct a simple experiment and observe that, to a surprising degree, Propp's roles and functions do occur in modern narratives that are popular with children, such as the films of *Pixar Animation Studios*.

Propp's morphology has the promise of giving children a powerful mental model with which to understand and create fairy tales. Rodari (1996, p.43) likens Propp's deconstruction of fairy tales to Da Vinci's capacity to regard a complex machine as a totality of simple machines, breaking the machine down into elements according to their functions and then studying each function in isolation. It is understanding the function of each element that enables the improvement of a machine or the construction of new machines, real or imaginary. Propp's morphology is a model that embodies abstract narrative concepts, and can be used to illustrate many powerful and advanced features of narratives. Favat (1977, p.15) describes through examples how Propp's morphology, by revealing the structure of a tale, lays bare previously hidden yet essential features of the tale and its construction. There exists a set of logical relationships between the events of a tale, in which each event has a role to play in the tale as a whole and each event articulates precisely with the other events in the tale: "being sent

to the well enables the younger daughter to meet the poor woman, which enables the poor woman to test the daughter, which enables her to respond, and so on; the mother's chasing of the younger daughter into the forest enables the king's son to come upon her, which enables him to recognise her state of enchantment, and so on" (Favat, 1977, p.15, Favat is using his own Proppian analysis of Perrault's tale "The Fairies."). There are similarly precise aesthetic relations in the structures of tales, which are "characterised by patterned contrastive repetitions at all levels: the good younger daughter goes to the well and returns with the gift of flowers and jewels, while the evil elder daughter goes to the well and returns with the curse of snakes and toads; the younger daughter flees to the woods where she is rescued by the prince, while the elder daughter flees to the woods and is abandoned by all, and so on" (Favat, 1977, p.15). Finally, in a similar way the structural relationships in a tale reveal the moral order encoded in the tale: "the essential goodness of the younger daughter is rewarded, while the essential wickedness of the elder daughter is punished" (Favat, 1977, p.15). If children can appropriate this structural model of fairy tales, they may be able to use it not only to deconstruct and analyse tales but to construct their own original tales that possess the same logical, aesthetic and moral consistency of classical fairy tales.

Rodari (1996, p.42-49) focuses on the potential of Propp's morphology for the generation of story ideas in children. He gives examples of particularly original interpretations of functions by children. An *interdiction* in which "a father leaves the house and tells his children not to throw flower vases from the balcony onto the heads of pedestrians" and a *difficult task*, "the command not to go to the cemetery at midnight" Rodari (1996, p.47). Often one Propp function is enough to suggest an entire tale, such as the hero's receipt of a magical agent which "was enough to prompt a fourth grader to invent a story about a pen that did homework assignments by itself" Rodari (1996, p.47). Because Propp's functions are abstract each function is open to many meanings and lends itself to a game with an infinite number of variations, "we can use them to construct an infinite number of stories, just as one can compose any number of melodies with twelve notes" Rodari (1996, p.46). At the same time, because the functions are derived from a concrete corpus of tales, each one is full of meaning. Each function represents "an entire section of the fairy tale world, a swarm of fantastic echoes" that is "rich in appeals to the personal world of the child" Rodari (1996, p.48). To Rodari it is because of this dual nature of Propp's morphology that children so easily succeed in generating ideas for fairy tales from Propp's functions.

Finally, Propp's morphology is a model that is open to personalisation by children.

Propp's functions enable children to appropriate the fairy tale structure for themselves and use it to express their own ideas. Charles (2006) studied how by recasting traditional tales using Propp's morphology, children were able to take ownership of the tales and imbue them with personal meaning, making traditional tales relevant to the children's contemporary lives (Charles, 2006, p.85).

## 2.3 A Brief Introduction to Interactive Narrative

Recent research has found that children's construction of computer-based interactive narrative games has many potential learning benefits, it is an activity that children enjoy and it has a powerful motivational effect for children who may often find writing to be a difficult chore (section 2.4 on page 60). Several existing interactive narrative systems use Propp's morphology as their underlying model of narrative (section 2.5 on page 65). The potential of a Propp-based interactive narrative system to support children's writing seems great, combining the rich narrative model of Propp's morphology with the motivational benefits of interactive narrative. This section will briefly introduce the key concepts of interactive and discuss the forms that it takes.

Meadows (2002) gives the following definition of *interactive narrative*:

“An interactive narrative is a time-based representation of character and action in which a reader can affect, choose, or change the plot. The first-, second-, or third-person characters may actually be the reader.” (Meadows, 2002, p.62)

The key is that ‘interactive narrative’ is not merely the presence of interaction and narrative in the same experience. An interactive narrative is understood as an experience in which the reader (player), through meaningful interaction, is able to change the events that occur in the narrative. This can mean affecting the events themselves, or affecting which events occur and which do not, or a combination of both. The interaction can be on a moment-by-moment basis as in ‘emergent narrative’ (see ‘Emergent Narratives’ in section 2.3 on page 59) or can consist of fewer decisions with longer-term effects as in a ‘branching story’ (see ‘Modulated Plot’ in section 2.3 on the facing page) or a combination of both.

This definition raises the question of how to define ‘plot.’ The idea of *continuity of action* by means of *causal relations* between the events represented has traditionally been central to the notion of plot, as Forster (1927)’s definition shows:

“We have defined story as a narrative of events arranged in time-sequence. A plot is also a narrative of events, the emphasis falling on causality. ‘The king died and then the queen died’ is a story. ‘The king died and then the queen died of grief’ is a plot.” (Forster, 1927, p.93)

Alternatively, Meadows describes plot as “the author’s planned organisation of the events of the story . . . a planned topology that has an implied opinion and perspective” (Meadows, 2002, p.27).

Forster and Meadows describe two different aspects of causality in the definition of plot. Forster focuses on the chain of cause and effect within the narrative: the queen died because she felt grief because the king died. Meadows focuses on the author’s role: the queen died because the author required it to fulfil the needs of the plot. In an interactive plot both aspects of causality are present. The defining property is that the plot consists of chronologically ordered and causally interconnected events.

*Player agency* is a concept that is crucial to the formal nature of interactive narrative as a medium. In the context of interactive narrative, Murray defines agency as:

“the satisfying power to take meaningful action and see the results of our decisions and choices.” (Murray, 1998, p.125)

and Mateas as:

“the feeling of empowerment that comes from being able to take actions in the [virtual] world whose effects relate to the player’s intention” (Mateas, 2001, p.2)

Mateas further clarifies that agency is a phenomenal category: it depends “on what’s going on in the interactor’s head, on what’s communicated between the technical system and the person, not only on technical facts like counting the number of system actions that are available at each moment.”<sup>14</sup>

Meadows and Jenkins provide two classifications of some of the narrative structures and devices available to interactive narrative designers. Meadows describes three plot structures for interactive narrative<sup>15</sup> (figure 2.4) that exist along a continuum from *Impositional* (the plot is heavily controlled by the game designer, only allowing the

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<sup>14</sup>Michael Mateas commenting on his weblog *Grand Text Auto*, the post is titled *Interaction and Agency* and dated 6th August 2003, <http://grandtextauto.gatech.edu/2003/08/06/interaction-and-agency/>

<sup>15</sup>Meadows explains that “interactive plot structure is more a system of connections than a curve or arc” (Meadows, 2002, p.63), and that these plot structures are an “analysis tool” and “don’t have much to do with emotional punch or aesthetic interest.” Meadows is aiming to differentiate his plot structures from formal descriptions of plot that focus on dramatic or emotional progression, such as the rising and falling dramatic action of the Aristotelian theory of theatre.

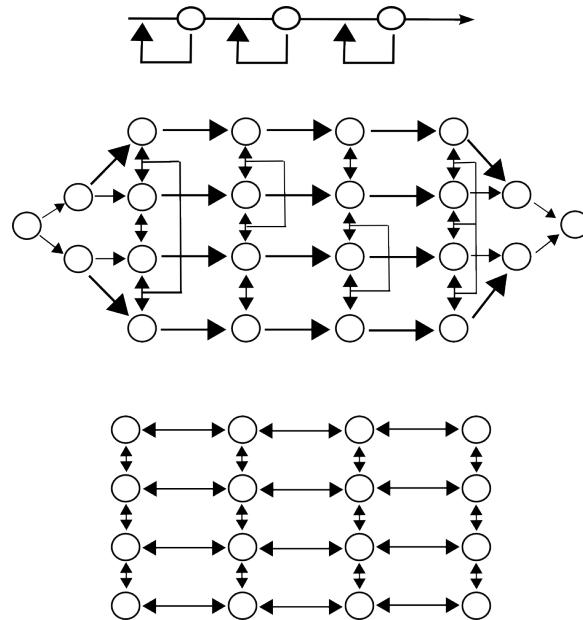


Figure 2.4: Meadows' nodal (top), modulated (middle) and open (bottom) plot structures (Meadows, 2002, p.64). The lines represent possible plot transitions, the circles represent decision points at which player behaviour can choose between plot transitions.

player a narrow margin of decisions, or particular moments of interactivity) to *Expressive* (the plot is heavily controlled by the player, the game behaves more like architecture, the player roams freely, explores, investigates, and changes the environment, the breadth of interactivity is much wider but the specifics of a narrative plot are far less defined). The three plot structures represent key descriptive points on the impositional—expressive continuum.

**Nodal Plot** “a series of non-interactive events, interrupted by points of interactivity” (Meadows, 2002, p.64). This is the most impositional plot structure, with the most support for the classic dramatic arc. Stories of this form have one beginning and two endings. The player fails and must start again from an earlier point in the narrative (this can happen at many points) or the player succeeds and finishes the game. This plot structure provides few affordances for player agency. The player cannot change the direction of the plot, but can only change the pace at which the plot progresses along its linear path. At each decision point, player action decides whether the player fails (and the game restarts from an earlier point in the plot) or succeeds (and the plot progresses).

**Modulated Plot** player action chooses which path the plot will follow by choosing

from finite sets of pre-defined options at fixed decision points in the plot. The player chooses a path through a finite ‘plot graph.’ These decision points provide affordances for player agency, but their finite nature means that agency is somewhat limited.

**Open Plot** this structure is “the most expressive for the [player], far less so for the [designer]” (Meadows, 2002, p.66), providing the most points of interactivity for the player. The player affects the plot through many small decisions, rather than a few big decisions. The classical dramatic arc may be completely abandoned in the interests of exploration, modification, and investment from the player. The story is usually based on the development of character or the development of environment, or both. The potential for player agency is great. But if the player cannot find meaningful ways to express her intentions on the plot and assess the consequences of that expression, a sense of agency may fail to materialise.

Jenkins describes four devices with which to create “the preconditions for an immersive narrative experience” (Jenkins, 2002, p.3) in what he calls ‘environmental storytelling’:

**Evocative Spaces** an interactive environment can build on stories or genres known to the players, painting the narrative world only in broad outlines and leaving it to the player to fill in the rest. This device provides no affordances for player agency in terms of player *action*, but may provide the player with a degree of agency similar to that of a traditional narrative audience as the player’s imagination is given some freedom to help paint the narrative world.

**Enacted Narratives** an interactive narrative can allow players to perform narrative events. The designer controls the narrative by setting broadly defined goals or conflicts for the characters and inserting localised, non-interactive narrative incidents. The narrative is episodic: “each episode (or set piece) can become compelling on its own terms without contributing significantly to the plot development” (Jenkins, 2002, p.6) and within each episode the “sequencing of actions may be quite loose” (Jenkins, 2002, p.6) allowing for much interaction. This device allows player action to affect the details and ordering of events within an episode, though this freedom is limited by the action constraints of the interactive environment and the higher level plot episodes themselves remain static.

**Embedded Narratives** Jenkins relates this approach to the traditional detective story.

The story is seen “less as a temporal structure than a body of information” (Jenkins, 2002, p.8). It is put together, piece by piece, by the player: “narrative comprehension is an active process by which viewers assemble and make hypotheses about likely narrative developments on the basis of information drawn from textual cues and clues.” (Jenkins, 2002, p.8). The designer controls the progression of the narrative by distributing narrative information throughout the interactive environment. The embedded narrative can be linear while still being closely tied to player agency as the player focuses on discovering and unscrambling narrative elements. The result is two narratives: one controlled by the player as she explores the environment, and another controlled by the designer and embedded in the environment to be discovered.

**Emergent Narratives** the narrative is not pre-structured but takes shape through game play. The game designer creates “a world ripe with narrative possibilities,” “a kind of authoring environment within which players can define their own goals and write their own stories” (Jenkins, 2002, p.9). The aim is to provide a form of player agency more similar to that of a traditional author than an actor or spectator.

Taken together the two classifications from Meadows and Jenkins describe a large portion of the approaches to interactive narrative and provide a good introduction to the field.

## 2.4 Children’s Construction of Interactive Narratives

Can children construct computer-based interactive narratives? Robertson & Good *et al* have studied the creation of interactive narrative computer games by children, first using a commercial product, the *Neverwinter Nights* toolset (Robertson and Good, 2004; Robertson, 2004; Good and Robertson, 2004; Robertson and Good, 2005b, 2006), and later using a custom-built tool, *Adventure Author* (Robertson and Good, 2005a; Robertson and Nicholson, 2007), that was designed to overcome some of the limitations of the commercial toolset.

### 2.4.1 The Game Maker Workshops and the Neverwinter Nights Toolset

The *Neverwinter Nights* toolset is described in Robertson (2004) and Good and Robertson (2006). It is a game editing tool that is sold along with the *Neverwinter Nights* computer games. The toolset is intended to allow players to create new content for the game and then share it with other players. It enables non-experts to create original characters, settings, and interactive plots and dialogue for the game. Because the toolset allows the creation of interactive narrative games and does not require advanced programming skills, children can focus on the narrative aspects of their games such as plot, characters and setting.

Robertson & Good have carried out a series of *Game Maker* workshops in which hundreds of children and young people have used the *Neverwinter Nights* toolset to create interactive narrative computer games (Robertson and Good, 2004; Robertson, 2004; Good and Robertson, 2004; Robertson and Good, 2005b, 2006). The ages of participants ranged from 7 to 15, with most participants aged 10-13. Participants were mostly male but some females also took part (Robertson, 2004, p.4). Participants' finished games were played by their peers and shown to their parents, and children showcased their games at a Museum of Scotland exhibition during the Edinburgh International Games Festival (Good and Robertson, 2006, p.47). The workshops aimed to give young people a chance to tell their own stories in the medium of computer games, to explore the development of children's narrative skills (such as character creation, plot planning and dialogue writing) through computer game creation, and to discover the strengths and weaknesses of the *Neverwinter Nights* toolset as an educational software package (Good and Robertson, 2006).

Creating an interactive narrative is difficult and complex, it requires many skills including using the computer interface, scripting of game characters and events, designing the game environment, designing characters, and creating interactive conversations. Despite this complexity, Robertson & Good have found that children participating in their workshops are able to create games successfully (Good and Robertson, 2006, p.57). Additionally, the potential learning benefits of game creation are many. Robertson & Good claim that by creating narrative computer games children learn general storytelling skills such as how to develop coherent plots, well-motivated characters and convincing dialogue, and also learn new storytelling skills that are specific to interactive computer games as a medium (Good and Robertson, 2006, p.58). The activity of game creation has a powerful motivational effect, young people enjoyed the

experience of the Game Maker workshops and said that they would continue to use the toolset if they could (Good and Robertson, 2006, p.53). The activity also helps to bolster the children's self-esteem; children were keen for their peers to play their games, and enjoyed showing their games to their parents and to the general public (Good and Robertson, 2006, p.57). Robertson & Good conclude that "it is well worth exploring how computer game authoring can be used in the classroom to raise both literacy standards and children's enjoyment of story making activities" (Good and Robertson, 2006, p.58).

Robertson & Good also identify a number of difficulties and limitations with the *Neverwinter Nights* toolset as a storytelling medium for children. Children had difficulty using the toolset's plot wizard feature. The plot wizard is a feature that guides the user through the process of creating a story, but the type of plot is very limited with most of the children's plots involving the player having to collect an item in order to receive a reward (Good and Robertson, 2006, p.52). Good and Robertson (2006, p.57) point out that the toolset has no explicit representation of the game's branching plot structure. Good and Robertson (2006, p.57) also find that the toolset's conversation scripting tool is inadequate, with the result that children's games do not take full advantage of the possibilities offered by interactive dialogue. The character creation tool focuses on physical appearance and skills such as combat abilities. Lack of support for the narrative qualities of characters means that it is easy to create a large number of characters that have no clear role in the narrative. The character models and settings available in the toolset are restricted to the pseudo-medieval, *Dungeons and Dragons* genre of *Neverwinter Nights* (Good and Robertson, 2006, p.58). Good and Robertson (2006, p.58) point out that this type of game content raises gender issues, as the violent, aggressive nature of many computer games is often a barrier to female involvement.

#### 2.4.2 Adventure Author

*Adventure Author* (Robertson and Good, 2005a; Robertson and Nicholson, 2007) is a prototype interactive story authoring tool that was developed following the *Game Maker* workshops. Like the *Neverwinter Nights* toolkit, *Adventure Author* enables children to create 3D interactive stories which can then be played by other children, with the aim of taking advantage of the motivational effect of computer games and enabling children "to experiment with an innovative means of literary self expression" (Robertson and Good, 2005a, p.1). *Adventure Author* combines a commercial games

engine with a purpose built story creation interface, and replaces the inappropriate content typical of commercial games (weapons, etc.) with a new library of twelve animated characters that were created to form a suitable cast for children's stories. Using *Adventure Author* children create interactive narrative computer games by creating the settings, characters, plot structure and dialogue through the story-creation interface, entering the game engine at will to test their story and then returning to the story-creation interface to continue working on it.

*Adventure Author*'s story-creation interface presents an overview of the game's branching plot structure as a directed acyclic graph.<sup>16</sup> Each node of the graph is a scene or plot episode. Each scene takes place at a location, and may involve one of the story characters and a scripted conversation. Conversations between the player and computer-controlled characters are turn-based conversation trees: the player is presented with a list of dialogue choices and makes her selection, the computer-controlled character responds, and then the player is presented with another list of choices or the conversation ends. Alongside the overview of the plot structure is a conversation editor with which the game author scripts the player's dialogue choices and the computer-controlled character's responses. At branching points in the plot, where more than one scene may follow the current scene, the player's dialogue choices determine the path that is taken. A series of wizards are available to help authors to create characters, locations and scenes. Finally, the *Test Scene* button on the story-creation interface allows the author to enter the game engine and test one of her scenes from the player's point of view, exploring the setting and the layout of characters and items, testing interactive conversations and the transitions from one scene to the next which depend on the player's actions. After testing, the author returns to the story-creation interface to continue working on her scenes. When the game is completed other children can be invited to play it.

A small-scale initial evaluation of *Adventure Author* with adults and children (boys and girls aged 10-14) found that "participants found interacting with Adventure Author to be a positive experience" and "young users appreciated the opportunity to author a story in a game world" (Robertson and Good, 2005a, p.7). Participants particularly enjoyed creating interactive dialogues for the player to experience. Adult participants including a teacher-trainer felt that it was beneficial for the children to experiment with branching narratives, and that the visual representation of the branching plot structure was helpful. Development of *Adventure Author* continues, aiming to develop software

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<sup>16</sup>A directed graph containing no cycles.

tools to support learners at each stage of the game creation and following a learner-centred design process (Robertson and Nicholson, 2007).

### 2.4.3 Script Cards

*Script Cards* (Howland, 2005; Howland et al., 2006, 2007) is “a visual programming language which enables young people to script story events in a 3D role-playing game” (Howland et al., 2006, p.1). With the *Neverwinter Nights* toolset a user must master NWScript, a scripting language based on the C programming language, in order to use features such as conditional events. NWScript is too difficult for young users to master in the limited time frame of a game making workshop, and learning a programming language distracts from the primary aim of learning narrative skills (Howland et al., 2006, p.1). As a solution to this problem, *Script Cards* allows authors to specify complex plot structures using graphics and natural language.

*Script Cards* uses a card game metaphor. The key building blocks of a plot structure are the *action cards*, *when cards* and *if cards* which represent statements and have empty slots onto which *slot-filler* cards that represent game objects (creatures, items, doors, placeable objects, waypoints and stores) must be dragged to complete the statements. An example of an action card with two slots to be filled by character cards is: make CHARACTER attack CHARACTER. The when card: when CHARACTER acquires ITEM has a slot for a character card and a slot for an item card, as does the if card if CHARACTER has ITEM. By dragging and dropping the user arranges a sequence of script cards and fills the slots of these script cards with slot-filler cards. The interface restricts the user’s actions so that only valid sequences of script cards can be formed, and only valid slot-filler cards can be placed onto each script card. *Script Cards* generates NWScript code so that the script can be brought to life in the *Neverwinter Nights* game.

In an initial evaluation ten participants aged 13-15 were asked to create stories using *Script Cards* following natural language descriptions of story events. A high rate of task completion was found, and participants stated that *Script Cards* was quick and easy to use. All participants “felt that *Script Cards* was a definite improvement over NWScript” (Howland et al., 2006, p.4).

#### 2.4.4 Conclusion

The *Game Maker* workshops, *Adventure Author* and *Script Cards* demonstrate that children can grasp the concepts necessary to create their own interactive narratives. Children can use interactive narrative authoring tools to create settings and characters, to script branching dialogues, and to script the actions through which the interactive plot is enacted and the branches and conditionals that control the execution of those actions. Additionally, Robertson & Good *et al.*'s research has found that creating interactive narratives has many potential learning benefits, has a powerful motivational effect, and is an experience that children enjoy.

### 2.5 Propp's Morphology in Interactive Narrative

Can Propp's morphology be applied to interactive narrative? This application of Propp's morphology was first suggested by Murray (1998, p.195), who saw Propp's algorithm as a way to tell the computer how to generate all the interesting variants of a narrative without having to specify each version individually. This section will demonstrate that Propp's morphology is a suitable model for interactive narrative, by reviewing interactive narrative systems that use Propp's morphology.

#### 2.5.1 GEIST

*GEIST* (Grasbon and Braun, 2001; Spierling et al., 2002; Schneider et al., 2003) was the first Propp-based interactive narrative system to be implemented. *GEIST* is an outdoor augmented reality computer game used by tourists during a real-world city tour. Players embark on a tour of historical landmarks in the city equipped with a laptop, semi-permeable glasses through which computer generated images are projected onto real-world scenery, tracking sensors with which the system monitors the player's location, and headphones. Players are free to decide which landmarks they will visit and in what order they will visit them. At each site they meet computer-animated characters who play the part of ghosts from the city's past and act out a historically educational narrative.

In *GEIST* the player takes on the role of the hero in Propp's morphology and enacts the functions of the hero. For example, the player setting out on a journey through the city corresponds to the function of *departure* (the hero departs from home). Other functions of the hero include reacting to tests in which the system's ghosts involve the

player, and receiving a magical agent from a ghost (Spierling et al., 2002, p.38).

*GEIST*'s interactive narrative system works with two levels of abstraction (Spierling et al., 2002, p.39). At the upper level *functions* are selected in real-time as the game is played. As in Propp, functions are abstract from the particular settings, characters and actions involved, and are defined in terms of their function for the plot. At the lower level, for each function that is selected a *scene* for that function is selected and executed. Scenes are concrete instances of functions involving particular characters, settings and actions, and are implemented as pre-authored linear scripts to be enacted by the animated characters. The system contains a large collection of scenes to select from. The sequence of functions and scenes is generated dynamically as the interactive narrative is played, according to several factors:

- An implementation of the algorithm described by Propp, including the sequence of functions, the ability to skip any function or repeat any function or sequence of functions three times, and the ability to combine sequences of functions in the form of moves (Spierling et al., 2002, p.39).
- The available time. The system ensures that the narrative lasts for a specified period of time. Scenes will not be selected if there is not time to perform them. If the player moves slowly from one landmark to the next then many functions will be skipped in order to conclude the narrative in time. If the player moves quickly then more functions will be used, and a second move may be inserted to prolong the narrative (Spierling et al., 2002, p.39).
- Each scene is tagged by its human author with certain context requirements that determine whether or not the scene is available for selection and what effect the scene will have on the context of the story if it is selected. A scene can create new context (e.g. by introducing a new character into a story), require a piece of context to be present (e.g. a certain type of misfortune), or remove a piece of context (e.g. the liquidation of a certain misfortune) (Spierling et al., 2002, p.40).
- The setting of the scene must be compatible with the players' real-world location (Spierling et al., 2002, p.40).
- Finally, when all factors have been taken into account if there are still multiple scenes to choose from then one is chosen at random (Spierling et al., 2002, p.40).

*GEIST* successfully illustrates the basic idea of applying Propp's morphology to interactive narrative. *GEIST*'s algorithm for sequencing Propp functions is a direct application of the method described by Propp for the artificial creation of new plots from functions and their species. Human-authored scenes annotated with context requirements and consequences are a simple way to produce concrete stories from the generated plots, while ensuring that all of the low-level details remain coherent from scene to scene. Certain functions must be enacted by the player, who plays the role of the hero in Propp's morphology, so the system must be able to recognise when player actions realise a function. *GEIST*'s narrative structure is a *modulated plot* structure (see page 57). At certain relatively infrequent moments (when the plot moves from one scene to the next, but not within scenes) player action determines the path that will be taken through the plot structure by selecting the next scene from a finite set of possible next scenes. *GEIST*'s modulated plot structure is partially specified by the author (who creates the scenes and the annotations that restrict their sequencing possibilities) and partially generated by the system (which dynamically sequences the scenes in response to player actions). By allowing authors to create different scenes for different settings and allowing the player freedom of movement between settings, *GEIST* also illustrates the *embedded narrative* approach (see page 59). The author distributes narrative episodes throughout the environment, and the player is free to explore the environment and discover these elements. Again, the embedded narrative is not a linear narrative entirely specified by the author. It is partially generated by the system, which creates a valid sequence of functions and scenes in response to the player's movements.

Player agency in *GEIST* primarily consists of moving through the city, determining how many and which landmarks to visit, and in which order. Each decision to move from one landmark to the next is an affordance for player agency. But if it is not made clear to the player how their navigational decisions affect the narrative, then a sense of player agency may not emerge. Additionally, some functions in *GEIST* may succeed or fail depending on the player's actions, providing a second form of player agency. For example the player may pass or fail a test that they are involved in by a donor character, or the player may foil an attempt at villainy by a villain character. If the system requires a particular function (such as villainy) to succeed then it may select a number of scenes that instance this function one after another until one succeeds, and may select a variant in which the player cannot determine the outcome (Spierling et al., 2002, p.40).

*GEIST*'s approach to interactive narrative is relatively simple to implement and gives a high degree of control to the author, but the player's opportunities to influence the plot are infrequent and limited in form. If the system is to be used by children to construct interactive narratives, then *GEIST*'s simplicity and high degree of authorial control may be an advantage, while its limited provision of player agency may not be a crucial flaw.

### 2.5.2 OPIATE

Kashani (2004)'s untitled implementation and Fairclough (2004)'s *OPIATE* are two very similar interactive narrative computer games based on Propp's morphology. Both systems combine a low-level, simulation-based or emergent narrative with a high-level authored narrative that is based on Propp's morphology. As in *GEIST*, the player plays the role of the hero in the narrative. The virtual environment is populated by the player and a number of autonomous computer-controlled characters, or agents. The ongoing emotional state of each agent is modelled using a simple model of emotion. Agents change their emotional state by generating emotional responses to events that they experience, the change depending on the emotional content of the event itself and on the personality of the agent and its relationships. The personality of an agent is simply a set of weights that determine how receptive the agent is to each type of emotion represented in the system. Each agent's relationships to other agents and to the player are defined by a friend list, listing all others that the agent considers to be its friends. The agents enact a simple social simulation. Agents wander around the environment, and if an agent sees a friend they will stop and gossip to each other. In gossiping agents pass on events that they have experienced and generated emotional responses to. If an agent witnesses a conversation involving another agent that is not its friend, it will stand nearby and eavesdrop on the conversation. Agents that hear about events through gossiping or eavesdropping in turn generate emotional responses to these events, and go on to gossip about them to their friends. The text of gossiping exchanges is created by a simple dialogue generation system. Agents will also gossip to the player, and the player can talk to agents by walking up to them and selecting from lists of dialogue choices generated from pre-specified templates. Additionally, each agent has a wish list of objects that it desires. Agents and the player can pick up any objects that they come across in the environment, and can exchange objects with each other. Agents will ask others for objects that they desire, and will generate positive emotions if they

acquire a desired object and negative emotions if they are refused a desired object, or if it is acquired by someone else.

This social simulation is a form of *emergent narrative*. The author sets the initial conditions by creating the environment, placing objects in the environment, and creating the agents, specifying their names, appearances, personality weights, friend lists and wish lists and dialogue templates, and finally creating the dialogue templates that are available to the player. The author can also seed the agent's memories with a ready-made history of emotion-generating events. Given these starting conditions the system proceeds dynamically, events occur and ripple throughout the population of agents through gossiping and eavesdropping, agent's emotional states and their attitudes towards other agents and the player evolve, groups of friends and enemies appear. In particular, agents develop various positive and negative attitudes toward the player's character. This simulation provides a high degree of immediate agency for the player, who is free to talk to whichever agents she chooses and make whichever dialogue choices she pleases, and to seek out objects and give them to or keep them from agents that desire them, and these actions will be reflected in the developing states of the agents and their gossiping. On its own, however, this constitutes a very limited narrative.

The social simulation is combined with a pre-defined plot, created by a human author and specified using Propp's functions and roles. When creating the plot the author does not refer to particular agents but to Proppian roles such as the villain, the helper and the sought-for person. For each of these roles the author specifies a personality profile that an agent who is to fill the role must match. For example, the author might specify that the villain should be an agent who is jealous of the player, or that the helper should be an agent who is friends with the sought-for person. Each function of the story is specified in terms of dialogue to be spoken and goals to be pursued by each role in order to enact the function. Goals may include acquiring an object, finding another character (often the player) and speaking a piece of dialogue, acquiring an object and then giving it to another character, etc.

A story director process oversees the enactment of this plot in the simulated world. The story director decides when the next function should be enacted, and if the function requires a new role then the drama manager selects an agent to fill that role by comparing the emotional states of the available agents to the profile of the role. When a function begins the story director assigns the goals and dialogue specified by the author to each of the agents involved, the agents then autonomously carry out the function.

The lower-level social simulation continues as the agents carry out authored functions. Emotional responses to the authored events are generated and gossiped about. The low-level simulation feeds the high-level plot by providing the characters and their motivations, and the plot in turn feeds the simulation by providing new events to be responded to.

*GEIST* takes a top-down approach, the system dynamically selecting the sequence of Propp functions and pre-authored scenes that should be enacted by the characters. Kashani and Fairclough’s systems take a bottom-up approach in which the low-level behaviour of characters is generated by a social simulation with autonomous agents, while the high-level plot structure is pre-authored. In *GEIST* authoring a story involves scripting the scenes that may be enacted, precisely defining the dialogue and actions of the characters in each scene, and adding annotations to each scene that affect the sequencing of the scenes. In Kashani and Fairclough’s systems, authoring a story involves specifying personality weights, friend lists, wish lists and collections of dialogue templates for each agent, and authoring Propp functions by specifying personality profiles for the story roles and associating goals to be accomplished and dialogue to be spoken with each role in each function. Kashani and Fairclough’s systems are both plot-centric and character centric. The characters are not subjected to the plot, and the plot is not subjected to the characters, instead character and plot are combined by a novel integration of a bottom-up social simulation and a top-down, Propp-based model of narrative.

Fairclough (2004)’s *OPIATE* goes beyond Kashani (2004)’s implementation in that it is generative at the higher level of Propp functions as well as at the lower level of social simulation. Like *GEIST*, *OPIATE* dynamically generates the sequence of Propp functions as the game is played, and attempts to generate a sequence of functions that tell a good story while fitting with the player’s actions. Like *GEIST*, if the player’s actions prevent a function from being enacted *OPIATE* may repeat the function three times in the same or in different forms. Going beyond *GEIST*, *OPIATE*’s story director can keep track of multiple plots (*moves* in Propp’s terms) at once. If the player’s actions or the state of the agents and the environment prevent further progress in one move, then that move is shelved and the story director begins a new move. A shelved move may be continued later if circumstances allow. *OPIATE* also differs from *GEIST* in the way that the sequence of functions is selected. While *GEIST* uses a rule-based system, *OPIATE* uses a case-based planner. The input to the planner is a library of 80 cases, each case being the sequence of functions making up a move from one of

the fairy tales in Propp's materials, taken from the tables in the appendices of Propp (1968). When beginning a move, the case-based planner evaluates each case in the library for suitability to the current state of the agents and their environment. If a move with high enough suitability is found then the system begins to execute that move. If no satisfactory case is found, then the most suitable Propp functions from a number of cases are combined to produce a more suitable case. Finally, *OPIATE* includes a networked multiplayer mode in which the system tracks multiple stories at once, one for each player.

Both Kashani (2004) and Fairclough (2004) describe authoring interfaces that they have developed for their interactive narrative systems. Their approach to interactive narrative with Propp's morphology seems promising, and is quite different to the approach taken by the *GEIST* project, illustrating the flexibility of Propp's morphology as a model for interactive narrative. This approach is more generative than *GEIST*'s and may afford greater player agency. On the other hand, the author's control over the narrative is less direct. Without first-hand experience of either system, it is impossible to judge the quality of the stories they produce or of the player agency they afford, or to judge the level of authorial control they provide or how difficult it is for an author to express herself through the system. Both Kashani (2004) and Fairclough (2004) report positive user evaluations of their systems, but with small numbers of participants.

### 2.5.3 TEATRIX

*TEATRIX* (Machado et al., 2000; Machado and Paiva, 2000; Prada et al., 2000; Paiva et al., 2001; Machado et al., 2001; Prada et al., 2002), is a networked, multi-player virtual environment for collaborative drama. In *TEATRIX* children (aged 7-9) work together to enact stories, each child controlling one of the story characters in the virtual environment. Each character has a role to play in the story, and the roles are taken from Propp's morphology. The aim of the activity is to support children's notions of narrative and their ability to take a second-and third-person perspective (Prada et al., 2000, p.1).

Before beginning to enact a story children construct the initial situation. They choose the scenes that the story will use, from a set of pre-defined scenes. Each scene is a spatial location (the house of the children, a path in the forest, the wicked witch's house, etc.) in which story events can be enacted. Each scene contains some decorative objects, and has a number of exits that connect it to other scenes that have been chosen

for the story. The characters that the story will contain must also be chosen. Each character has a name, a type or appearance (little girl, old lady, etc.) and a role. The roles are taken from Propp's morphology: villain, hero, helper, magician, beloved one and beloved relatives. Finally, the initial situation contains a number of items (a stick, a witches broom, etc). Once the scenes have been chosen and connected together, the characters have been created and the items chosen, and each character and item assigned a starting location in one of the scenes, the initial situation is complete.

Starting from the initial situation the children collaborate to enact a story, each child controlling one of the characters. Each character has six actions available to it at all times: get item, drop item, talk, walk, activate item, use item. The most interesting actions are achieved by using items. For example, with a stick the wolf may hurt little red riding hood, with a wand the witch may bewitch the little boy, etc. Depending on the actions of the children when controlling their characters, different stories may emerge from the same initial situation.

*TEATRIX* has no representation of Propp's functions or of the plot of the story. Rather, it takes a character-based approach in which a story emerges from the interaction of the characters, each character trying to achieve its own goals. The goals of each character are determined by its role, each Proppian role having a fixed sequence of goals regardless of the content of the story (Machado and Paiva, 2000, p.3). For example, a goal of the villain is to harm the hero, and a goal of the hero is to defeat the villain.

A disembodied, omniscient director agent oversees the story and can insert new items or characters into the world during the story, give performance directives to characters, or take over control of characters. The director agent can be controlled by a child, or can be left to the system to control.

Afterwards children can view a recording of their performance. They can create a montage of their performance from this recording, and can write about and criticise their performance.

If a character is not controlled by a child then it may be controlled by the system, and will carry out a series of actions planned to achieve its goals. These computer-controlled agents possess a representation of the world state, a set of actions that they can perform, and an internal emotional state that changes according to whether the character's goals are being achieved or not. The agents plan a sequence of actions to achieve their goals.

When a character *is* controlled by a child that character's world model, goals, emo-

tional state and planning are still simulated by the system, but the character does not autonomously enact the actions of its plan, its actions are controlled by the child. A feature called *hot-seating* (Machado et al., 2001) allows the children to inspect their character's internal state. Hot-seating may be invoked by the child, or may be invoked by the system if the child's actions do not fit with the plans and goals of their character. In hot-seating the child is given information about their character's role, previous actions, emotional state and goal. The child may consider this information and then decide to change her actions in the story to follow her character's role. On the other hand, the child might choose to modify her character's internal state to fit with the child's desired behaviour instead. The child can introduce a motivation for a behaviour (in the form of a typed explanation), and can change the character's emotional state and provide a typed justification for this change. Hot-seating enables children to act out their roles by directly expressing the emotions and motivations of their characters, as well as by controlling their character's actions and dialogue.

#### 2.5.4 Eudaemon

Finally, Tomaszewski and Binsted (2007) discuss the limitations of a Propp-based approach to interactive narrative, according to their design (not implemented) for a Propp-based interactive narrative system called *Eudaemon*.

The *Eudaemon* design takes a top-down, plot-centric approach to interactive narrative (as opposed to a character-centric, emergent narrative approach). As the game is played a drama manager process constructs the narrative piece-by-piece by sequencing pre-authored scenes, each scene being a concrete instantiation of one Propp function. As Tomaszewski and Binsted (2007) point out, this is essentially the approach taken by *GEIST*, but the *Eudaemon* design adds dynamic casting of characters into roles as in *OPIATE*.

Tomaszewski and Binsted (2007) identify four possible sources of player agency in the *Eudaemon* design:

1. Hoop-jumping: at a certain point in the plot a single action is required of the hero, the player must carry out this action or the plot cannot proceed.
2. Characterising: the player may choose one of several actions at a certain point in the plot, but each action has the same effect for the scenes that follow.
3. Content-shifting: the player may choose one of several actions and her choice

affects the scenes that follow, but the functions of the scenes that follow remain the same regardless of the player’s choice.

4. Structure-shifting: the player may choose one of several actions and her choice affects the sequence of functions that follows.

Tomaszewski and Binsted (2007) report that their design “does indeed provide interactive drama” with “strong, top-down control of the story” from a drama manager process that is nonetheless “only loosely coupled to the game world,” and with a plot that is “determined procedurally at run-time” rather than being a “fully pre-authored branching tree” (Tomaszewski and Binsted, 2007, p.6). However, Tomaszewski and Binsted (2007) also conclude that the *Eudaemon* design suffers from five limitations that they believe are inherent to a Propp-based approach to interactive narrative:

1. The hero in Propp’s morphology (the player in the *Eudaemon* design) only exerts influence in a few functions, such as when deciding to set out on a quest or when reacting to a test from a donor. Those functions that do offer a choice to the player only offer a binary choice: the player may fulfil an interdiction or violate it, may pass a donor’s test or fail it, and so on. These binary choices are actually illusory, the interdiction *must* be violated and the test *must* be passed or the plot cannot progress. If the player’s actions do not permit the narrative to continue, then systems like *GEIST* and *OPIATE* are forced to repeat functions in different forms, or to put an entire plot on hold and try another.

The *Eudaemon* design has two ways of mitigating this limitation. First, the player can be given several different possible means of achieving a function, so that although the hero must depart on a quest (for example) the player can choose the manner of the hero’s departure. Second, if the player does not fulfil a function such as the violation of an interdiction or the solving of a difficult task, the drama manager may skip this function and continue as if the function of interdiction or the setting of a difficult task never occurred.

2. Most of Propp’s functions detail actions that are inflicted on the hero/player by the other characters, rather than actions that are carried out by the hero.
3. The player has a high degree of local agency, she is free to wander the virtual environment interacting with its objects and characters and seeing the immediate effects of these actions. For example, the player can gossip and exchange objects

in the *OPIATE* system's social simulation, or navigate from one landmark to another in *GEIST*. As in *OPIATE* and *GEIST*, these local-level player actions may affect the drama manager's choice of what scene will be enacted by the non-player characters next, but it may not be clear to the player that she is making a choice. From the player's point of view, it might make no difference if the next scene was chosen at random.

4. The design has a high authorial load. If the player by her actions is able to choose one of several scenes at any given point in the plot, then the author must script multiple possible scenes for each point in the plot. Most of these scenes must be written so that they can follow different sequences of scenes that might have come before, depending on the player's actions.
5. Propp's functions describe short, simple, and very well-formed tales but they only work well for their specific genre, and do not work for fiction more generally. Determining functions for genres other than the fairy tale is difficult.

Tomaszewski and Binsted (2007) conclude that although a Propp-based approach "can still allow for an interesting form of interactive drama" it is limited to the boundaries set by the fairy tale structure (Tomaszewski and Binsted, 2007, p.7).

### 2.5.5 Conclusion

*GEIST*, *OPIATE*, *TEATRIX* and *Eudaemon* illustrate a range of approaches to applying Propp's morphology to interactive narrative. *GEIST* and *Eudaemon* take top-down approaches in which pre-scripted character actions are sequenced according to a dynamic model of plot that is based on Propp's morphology. In this approach, the characters are subjected to the plot. The author's control over the story is direct, player agency is present but is limited in degree. These systems demonstrate how Propp's functions might be integrated with a branching model of narrative, as used in *Adventure Author*. Alternatively, *TEATRIX* illustrates a bottom-up approach in which a plot emerges from the goal-directed actions of characters whose goals are based on the character roles of Propp's morphology. In this approach, the plot is subjected to the characters. The story is authored collaboratively, by multiple players controlling each of the characters. *OPIATE* illustrates a novel integration of a bottom-up, character-based emergent narrative with top-down control of the plot, the two combined in a mutual feedback loop. The characters are not subjected to the plot, and the plot is not subjected to the characters.

This approach seems promising but its effects on player agency and authorial control are not clear. *TEATRIX* and *OPIATE* demonstrate how Propp functions might be translated into the type of goals and dialogue that authors assign to computer-controlled characters when authoring stories in *Neverwinter Nights* or *Adventure Author*.

## 2.6 Children’s Story Writing with Propp’s Morphology

Before a Propp-based interactive narrative system to support children’s narrative development can be pursued, it is necessary to first look at children’s story writing with Propp’s morphology. The promise of Propp’s morphology as a model of narrative to be appropriated by children raises a number of questions. How can Propp’s morphology be represented in a story authoring tool for children? Are children able to grasp the abstract narrative concepts that Propp’s morphology contains, and can they apply Propp’s model of narrative to the task of creating their own, original stories? Does using Propp’s morphology affect the stories written by children and if so, in what ways? This section describes two examples in which Propp’s morphology was applied to creative story writing with children.

Rodari (1996) describes several games of story creation using popular folk tales as raw materials. A game which Rodari calls “recasting fairy tales” (Rodari, 1996, p.39) creates new fairy tales out of old ones by revealing the underlying narrative structure of the old tales. The game has three steps. First the tale is reduced to a written description of the bare plot of its events and their internal relations:

“Cinderella lives with her stepmother and stepsisters who go to a grand ball and leave her at home. Through the intervention of a fairy, she, too, goes to the ball. The prince falls in love with her. Et cetera.” (Rodari, 1996, p.40)

Second, the tale is reduced to a “pure abstract expression”:

“A lives in the house of B and stands in a relationship to B, different from the relationship that C and D have to B. While B, C and D go to E, where there is some kind of event F, A remains alone. However, thanks to the intervention of G, A, too, is able to get to E and makes an extraordinary impression on H. Et cetera.” (Rodari, 1996, p.40)

Finally, the abstract expression is interpreted in a new way:

“Carlo is a stable boy at the estate of Count Cindertolis, father of William and Anne. It is vacation time, and the count and his children decide to

take a journey around the world in their yacht. Carlo slips secretly on board with the help of the cabin boy. The yacht, however, is shipwrecked on a primitive island where Carlo proves himself to be valuable by giving a cigarette lighter as a present to the medicine man, who is the head of the natives. Carlo is celebrated as the god of fire. Et cetera." (Rodari, 1996, p.40)

The purpose of reducing the tale to an abstract expression is to create "a certain distance from the fairy tale, preparing its changeability" (Rodari, 1996, p.40):

"The essential moment of the "recasting" is the analysis of the given fairy tale. It is a process that is at once analytical and synthetic, and it goes from the concrete to the abstract, and from the abstract it turns to the concrete." (Rodari, 1996, p.42)

Next, Rodari (1996, p.46) describes an experiment with a group of children using a series of twenty playing cards each marked with a word and illustration representing one of Propp's functions. The children worked together to produce a story structured according to the twenty cards. Further games involved mixing the cards and changing the rules: drawing three cards at random and forming a complete story; beginning a story with the last card in the series; dividing the cards between two groups and having a contest to invent the most original story; using a single card to suggest an entire fairy tale (Rodari, 1996, p.47).

Rodari (1996, p.47) reports that the "cards of Propp" experiment was a success, the children easily succeeded in producing fairy tales following the sequence of the cards. However, Rodari (1996) is not (and was not intended to be) an empirical study so it presents little empirical evidence (such as stories created by the children) and for the purpose of empirical research it is informal and underspecified.

Charles (2006) returns to Rodari (1996)'s game of recasting a fairy tale, but replaces the pure abstract expression of the tale with a "symbol map" of the tale's narrative structure: a linear series of symbols arranged on a magnetic board, each symbol representing a Propp function from the tale. In a number of school sessions lasting about one hour each Charles (2006) collaboratively recast stories with children using the following procedure (Charles, 2006, p.79):

1. The session started with the researcher telling a sample tale to the children.
2. The researcher then introduced the symbol map of the story to the children, and replayed the tale on the symbol map.

3. The researcher “suggested that together we could make up a similar story” and by “posing non-leading questions, the children were guided, and their ideas and snippets of dialogue for the story’s characters were elicited and tied together” (Charles, 2006, p.80).
4. After the new story had been created the researcher briefly summarised the story and replayed it on the story map, asking the children to correct any mistakes.
5. Finally, the children were asked to draw the scene from the story that each of them found most interesting.

While inspired by Rodari (1996), Charles (2006) criticised Rodari (1996) for concentrating solely on the children’s use of imagination (Charles, 2006, p.36). The result was that the stories invented by the children using Rodari’s games “do not come across as satisfying and evoking deep emotions, as did their predecessors” but rather “seem more like improvisations, fragments, stories that wander and get lost along the way” (Charles, 2006, p.36). By combining Rodari (1996)’s game of recasting a fairy tale with symbol maps of Propp functions Charles (2006) aimed to “invent a game or approach which would enable children to create a tale using their ideas and imagination and, at the same time, to create original, full and emotionally satisfying stories” (Charles, 2006, p.36).

Rodari (1996) and Charles (2006) suggest that Propp’s morphology is a promising model for children’s story authoring, but important questions remain unanswered. The present study aims to build on Rodari (1996) and Charles (2006) in a number of ways:

1. Rodari (1996) and Charles (2006) imply that children are able to grasp Propp’s abstract concepts and apply them to their own story writing. But Rodari (1996) provides no empirical data, such as the stories written by the children or an analysis of the stories. Participants in Charles (2006)’s study did not create stories independently but contributed to a process of collaborative, oral story creation guided and facilitated by an adult. The facilitator’s role in the story creation would have ensured that the story realised the correct sequence of Propp functions. The present study aims to verify that children themselves can apply Propp’s concepts to story writing by empirically studying children’s independent creation of new stories using Propp functions.
2. At times, Charles (2006)’s writing suggests the notion that Propp’s morphology might enable children to create structurally complete and well-formed stories,

that display the structural form of the fairy tale while expressing the child's own imaginative ideas. Charles (2006, p.2) expresses the opinion that what matters about fairy tales is their common narrative structure: "It did not seem to matter where the stories took place, who did what and under which circumstances; what seemed to matter was what really happened in those tales, in other words their essence contained in their structural bones." A word processor empowers a child to produce writing with the same typographical quality as adult works, while still being the child's own writing. Similarly, Propp's morphology might empower children to form their characters and ideas into well-structured stories, and give them greater confidence in the quality of their finished product.

However, Charles (2006) does not analyse the structure of the stories created. The analysis focuses on the content rather than the structure of the stories, and searches for evidence that the children took ownership of the tales and imbued them with personal meaning, making the traditional tales relevant to the children's contemporary lives (Charles, 2006, p.85).

Given the story creation procedure that Charles (2006) used, analysis of the structure of the stories would not have been interesting. The present study uses a story writing procedure in which the children themselves are responsible for the structure of their own stories, and analyses the structures of the stories written by the children.

3. By focusing on the process of recasting traditional tales using pre-constructed story maps of the tales, Charles (2006) discards one constructive aspect of Rodari (1996)'s games with the cards of Propp. In Rodari (1996)'s experiment children first selected and sequenced the Propp cards to construct a story map, before creating a story that followed the story map. The present study will explore both the process of recasting traditional tales using their story maps, and of constructing new story maps and writing stories for them.
4. Rodari (1996) and Charles (2006) did not compare stories written with and without, or before and after experience with Propp's morphology. The empirical study reported in chapter 7 asks how Propp's morphology affects children's stories, by comparing stories written using Propp's morphology to stories written using typical classroom methods.



# **Chapter 3**

## **Analysis of Children’s Stories using Propp’s Morphology**

This chapter motivates and describes the development of a formal interpretation of Propp’s morphology. The interpretation was used to analyse the stories written by children for the empirical study reported in chapter 4. The study required a consistent method of analysing the Proppian structures of the stories, so a clear and concise definition of Propp’s morphology was needed. Propp’s description of the morphology given in Propp (1968) was found to be inadequate for this purpose. Since Propp does not define his morphology precisely an analyst using the morphology must make their own interpretation of Propp’s meaning, and this interpretation should be made explicit. The interpretation of Propp’s morphology was also used in the development of the computer story authoring application reported in chapter 5, and has further applications (see chapter 8).

The difficulties with Propp’s description of his morphology are described in section 3.1. The formal interpretation of Propp’s morphology developed in this chapter is based on Propp (1968)’s descriptions and on empirical data from the study reported in chapter 4. The interpretation is in the form of clear and concise definitions of each of Propp’s functions and the species of each function. The development of the formal interpretation of Propp’s morphology is described in section 3.2, and the complete definition of the interpretation is given in appendix B. Finally, the procedure that was developed for analysing a story using the formal interpretation of Propp’s morphology is described in section 3.3.

### 3.1 Difficulties of Analysing Children's Stories using Propp's Morphology

Propp's descriptions of his functions in Propp (1968) were found to be inadequate for the task of analysing the stories written by children for the present study. The inadequacy may be a result of Propp's intentions while writing the *Morphology*. In Propp (1968) Propp tried "to find a form of presentation which, by simplifying and abbreviating wherever possible, would not overly tax the reader's patience ... In the interest of a shorter and more vivid presentation it became necessary to renounce many things which would be relevant for a specialist" (Propp, 1968, author's foreword). Propp goes on to list several aspects and details of the work that have been omitted). Propp later regretted this approach: "I wrote the book when I was young; I believed that it was enough to put forward an observation or an idea for everyone to grasp and to share it immediately. My style was terse; I expressed myself in theorem form and did not care for detailed proofs, because I thought that even in that form they would be clear at first view. I was wrong about that" (Propp, 1984a, p.168). The English translation of the *Morphology* adds further difficulties: it contains printing mistakes, obscurities and faulty translation (Levi-Strauss, 1984, p.168, Bordwell, 1988, p.5).

There are four general difficulties with Propp's descriptions of the functions. First, Propp did not attempt to formally define any of the functions, only to describe them. For each function Propp gives "a brief summary of its essence," "an abbreviated definition in one word" (this is a *name* for a function rather than a precise definition of it) and then a list of examples that "far from exhaust our material" and are "given only as samples" (Propp, 1968, p.25). For some components few or no examples are given, and examples are always given without the context of the tales they are taken from. Additionally, as mentioned and as will be seen, Propp's descriptions of the functions in the English translation are not always clear. The result is that Propp's meaning is at times obscure, and is often open to multiple interpretations.

Second, Propp does not always state explicitly the significance of a function for the course of action. According to Propp this significance is the definition of the function: "an action cannot be defined apart from its place in the course of narration. The meaning which a given function has in the course of action must be considered ... Thus, identical acts can have different meanings and vice-versa. *Function is understood as an act of a character, defined from the point of view of its significance for the course of action.*" (Propp, 1968, p.21, emphasis Propp's). In some cases Propp appears to

assume that the place of a function in the overall sequence of functions is enough to define the significance of the function for the course of action and does not state the significance explicitly.

Third, Propp's functions as units are too abstract for the task of consistently decomposing stories. Finding the constituent functions of a story using definitions at the function level is a difficult and interpretive analytic task. Although Propp does not explicitly describe his technique for analysing a tale, it can be seen from his "materials for a tabulation of the tale" (Propp, 1968, appendix 1) that Propp decomposes stories into much more concrete units than functions and groups these units under the functions. Propp's technique appears to have been to decompose a tale using these smaller, more concrete units and then derive the functions of the tale from this initial decomposition.

The units that Propp calls *species* are particularly useful. When describing the functions Propp distributes his examples for each function into groups which he says "are in relation to the definition [of the function] as *species* to *genus*." These species can be very useful in understanding the definition of a function and in identifying instances of the function because they represent a mid-level of abstraction, being more abstract than the concrete examples but less abstract than the functions. Unfortunately in many cases Propp has not identified the correct groupings at this mid-level of abstraction, some of his species contain concrete elements and some of his species are catch-all lists of concrete varieties that do not fit under any of the other species of the given function. For Levi-Strauss (1984) this inconsistency is one of the main weakness of Propp's morphology. Levi-Strauss (1984, p.179) criticised Propp for unwittingly introducing aspects of concrete content into his formal species categories, particularly in the twenty two species of the crucial function *Villainy* which include the villain "abducts a person," "steals a magic agent," "plunders or spoils the crops," "steals the daylight," and "makes a threat of cannibalism."

Fourth, in some cases Propp's descriptions of functions or species are too restrictive because they contain concrete elements typical of traditional folktales. For example, Propp describes the victim of the tale as "a member of a family," and Propp describes the final function as "the hero is married and ascends the throne" (Propp, 1968, p.63). Stories written by modern children contain examples that contradict these descriptions but that, in our interpretation, achieve the same significance for the course of action as the function described by Propp. For example, children often write about groups of friends, animals, super heroes, etc. rather than families, and children invent many varied forms of reward for the hero at the end of the story, they rarely write about the

hero getting married or ascending the throne.

## 3.2 Development of an Improved Formal Interpretation of Propp's Morphology

A more formal interpretation of Propp's morphology was developed for the purposes of this study. The complete definition of the interpretation is given in appendix B. The interpretation contains a clear and concise definition of each of Propp's functions, and a set of clear and concise definitions of the species of most functions. For some functions Propp does not describe any species, and in these cases only a function-level definition is used. These are simple functions that correspond to a precise moment in the tale, such as when the hero departs from home. Propp may have omitted species for these functions because they are momentary and do not lend themselves to decomposition into species. Definitions at the function level are sufficient to identify instances of these simple functions, and no species definitions are needed.

An attempt was made to make the form of the function and species definitions consistent. The definitions aim to describe the minimal preconditions necessary to realise a function or species, keeping the definitions short and avoiding the exclusion of any valid realisations. The function and species definitions define what actions must be carried out and which character roles must be involved (both subject and object) to realise a function or species, and the function definitions also attempt to make the significance of a function for the course of action clear. For example, the function of villainy is defined: *the villain creates a misfortune or crisis*.

To identify instances of functions in stories, the species definitions, not the function definitions, are used. The definition of each species is within the definition of its function so that an instance of a species is by definition an instance of that species' function. The reverse does not necessarily hold, an instance of a function may not be an instance of any of the species defined for that function. In this case a new species has been discovered. However, the species defined do exhaust all instances of the functions in our material and the discovery of new species is rare. The species of a function are not always mutually exclusive, in some cases a single instance of a function may instantiate more than one of the function's species.

The general method of developing the interpretation was:

1. Where Propp's summary of a function is adequate, a definition of the function

- was derived directly from Propp's summary, or Propp's summary is used verbatim as the definition.
2. Where Propp's name and summary of a function do not capture the significance of the function for the course of action, a new function definition was developed that attempts to capture this significance, according to our interpretation of Propp's meaning.
  3. Where Propp's summary of a function excludes some of Propp's own species of the function, a broader function definition that includes all of Propp's species was developed.
  4. Where Propp's summary of a function excludes examples from the stories written by children for this study that are, in our interpretation, clear examples of the function, a broader definition of the function that includes these examples was developed.
  5. Where Propp's descriptions and examples of the species of a function are adequate, definitions of the species were derived directly from Propp's descriptions.
  6. Where Propp's descriptions of the species of a function are too concrete, new, more abstract species definitions were developed by grouping Propp's descriptions.

For some functions the species described by Propp are too concrete and as a result do not include all possible varieties of the function. In these cases there are (in our interpretation) clear examples of the function in the stories written by children for the present study that do not fit under any of Propp's species, or varieties of the function can easily be imagined that would not fit under any of Propp's species. Propp has failed to identify the mid level of abstraction between function and variety. In these cases new, more abstract species were developed by grouping the species described by Propp under new definitions.
  7. In some cases a species definition was developed that is broader than Propp's description of the species or a new species was added in order to account for examples from the stories written by children for this study that are, in our interpretation, clear examples of the function but that do not fit under any of Propp's species.

8. Where Propp's description of a species is uninterpretable (because Propp's words are too unclear and his examples insufficient) the species was omitted from our set of species definitions.

The rest of this section will consider each of Propp's functions in turn. Propp's name and summary for each function is given, our interpretation of the function is explained, and then our definitions of the function and its species are given. A complete table of the definitions of Propp's functions and species that were developed for the present study is given in appendix B.

## **0. The initial situation**

A tale usually begins with an initial situation in which some or all of the characters are introduced. The initial situation is an important morphological element but it is not technically a function because it is not an action carried out by a character Propp (1968, p.25). The main text of Propp (1968) mentions the initial situation but does not define it or describe it in any detail as is done with the functions. However, Propp (1968, appendix 1) lists all of the elements of initial situations that Propp found in his materials. Propp lists 23 elements of the initial situation grouped into several categories. The categories include “temporal-spatial determination (‘in a certain kingdom’),” the introduction of various characters (“composition of the family,” “the future hero,” “the future false hero”) and several types of detail of the initial situation of the characters (“childlessness,” “pregnancy,” “well-being,” “argument of brothers over primacy,” “prophecies, forewarnings,” etc). For this study three species of initial situation were identified and defined by grouping Propp’s categories:

Name: the initial situation

Species:

- a** Statement of the time and/or place in which the story occurs.
- b** A character or characters are introduced.
- c** Statement of details of the situation of the character(s).

Initial situations always occur at the beginning of a story and their presence or absence is easy to identify using the above species definitions. It was not necessary to create a function-level definition of the initial situation (which, in any case, is not a function), instead the element is simply termed “the initial situation.”

### 1. Absentation

Propp's summary:

"One of the members of a family absents himself from home." (Propp, 1968, p.26)

Propp's description leaves the significance of this function for the course of action implicit. Later on Propp comments that "for the sake of better understanding, a digression may be made" (Propp, 1968, p.27) and mentions that "the very absentation of elders prepares for the misfortune, creating an opportune moment for it. Children, after the departure or death of their parents, are left on their own," and later on again Propp mentions that the first seven functions exist to "prepare the way for [the villainy function], create its possibility of occurrence, or simply facilitate its happening" (Propp, 1968, p.31). From these clues and the three species of absentation described by Propp the significance of the function of absentation can be interpreted, it is to create vulnerability due to separation of one group of characters from another. This can be achieved by members of the older generation leaving home (to go to work, etc.) or dying as in Propp's first and second species or by members of the younger generation leaving home and going out on their own as in Propp's third species. For Propp the function is always the separation of members of the older generation from members of the younger generation but this study's materials contain other examples that also achieve the function, such as the separation of super-heroes from normal people or of boys from girls. In Propp's description the absentee is always "one of the members of a family" but again this study's materials contain examples in which the absentee is not a member of a family. Children simply do not always write stories about families, often writing instead about groups of friends who live together.

For this study a definition of the absentation function from the point of view of its significance for the course of action and a new set of three species for the function were developed:

Name: absence

Definition: The absence of a character or characters (the absent guardian(s)) is created

Species:

- a A person or people leave home and the narrative stays at home with those that are left behind.
- b A person or people die and the narrative stays at home with those who are left alive.
- c A person or people leave home and the narrative goes with them.

## **2. Interdiction**

Propp's summary:

“An interdiction is addressed to the hero.” (Propp, 1968, p.26)

In Propp's description it is always the hero who receives an interdiction. This study's materials contain examples in which another character receives the interdiction and in which the interdiction is addressed to multiple characters at once, and the function is still achieved. The definition of the function was therefore broadened for this study.

Propp describes two species of interdiction. In the first species an interdiction is given to the hero: “Do not venture forth from the courtyard,” “You dare not look into this closet,” “If Baba Jaga comes, don't you say anything, be silent,” etc. The second species is an inverted form in which an order is given instead of an interdiction: “Bring breakfast out into the field,” “Take your brother with you to the woods,” etc. (Propp, 1968, p.27). Propp explains that the difference between the two species is that an interdiction will later be violated by the hero, whereas an order will later be fulfilled by the hero, but in either case the significance for the course of action is the same. To identify the species it may be necessary to look further ahead in the story, for example “stay inside the house” could be either an interdiction or a command depending on whether it is violated or fulfilled by the hero. For this study the two species were collapsed into a single function-level definition:

Name: Interdiction

Definition: An interdiction or order is given.

## **3. Violation**

Propp's summary:

“The interdiction is violated” (Propp, 1968, p.27)

Propp describes two species of this function corresponding to the two species of the previous function: an interdiction is violated or an order is fulfilled. For this study Propp's function definition was broadened to include both species of the function, and two species definitions were derived directly from the species described by Propp:

Name: Violation

Definition: An interdiction is violated or an order fulfilled

Species:

- a** A character violates an interdiction
- b** A character fulfils an order

#### 4. Reconnaissance

Propp's summary:

"The villain makes an attempt at reconnaissance." (Propp, 1968, p.28)

Our definition of this function is very similar to Propp's. Propp describes three species of the function. In the first species the villain makes an attempt at reconnaissance with "the aim of finding out the location of children, or sometimes of precious objects, etc." (Propp, 1968, p.28). Propp's examples of this species make it clear that the villain's aim is not always merely to find out the location of something, it is more generally to find out some information that will aid in the future act of villainy, e.g. "How were you able to get well so quickly?" or "What does the bitch live on? Jag-isna thinks. She sends One-Eye, Two-Eye and Three-Eye on reconnaissance" (Propp, 1968, p.28). The sample tale *The Magic Soup Pot* used in the present study contains an instance of reconnaissance in which the villain asks the hero how it is that he has an endless supply of delicious soup (the hero possesses a magic soup pot, which the villain later steals). Propp's second species is an inverted form in which "the intended victim questions the villain" (Propp, 1968, p.28), Propp's examples of this species show that the victim's aim is to find out something that will be helpful against the villain in the future: "Where is your death, Koscej?" and "What a swift steed you have! Could one get another one somewhere that could outrun yours?" Propp's third species is mysterious, Propp says only that: "In separate instances one encounters forms of reconnaissance by means of other personages" and does not give any examples (Propp, 1968, p.28).

Since Propp's species show that the reconnaissance need not be carried out by the villain we have broadened the definition of the function, and based on Propp's descriptions and examples of his first two species we derived two corresponding species definitions. Propp's third species is omitted from our definition.

Name: Reconnaissance

Definition: An attempt to obtain information is made

Species:

- a** The villain attempts to obtain information about the intended victim
- b** The victim attempts to obtain information about the villain

## 5. Delivery

Propp's summary:

"The villain receives information about his victim." (Propp, 1968, p.28)

Propp's species of *delivery* correspond to his species of *reconnaissance*, and again we have omitted Propp's mysterious third species and have broadened the definition of the function to include instances in which it is not the villain who receives the information.

Name: Delivery

Definition: Information is delivered

Species:

- a** The villain receives information about the victim
- b** The victim receives information about the villain

## 6. Trickery

Propp's summary:

"The villain attempts to deceive his victim in order to take possession of him or of his belongings." (Propp, 1968, p.29)

Propp describes three species of trickery: "the villain uses persuasion," "the villain proceeds to act by the direct application of magical means" (e.g. the villain gives the victim a sleeping potion and then sticks a magic pin in the victim's clothing) and a catch-all species: "the villain employs other means of deception or coercion" (Propp gives two examples of this species: the villain lays a trap of knives and spikes for the victim to fall into, and the villain rearranges wood shavings that were to show the way). *Deception* doesn't capture the villain's intent in these three species, the villain's aim is to get the victim to do something the villain wants, by persuading or otherwise coercing the victim (persuasion is a weakened form of coercion). We broadened the function definition to include deception or coercion, and derived three species definitions:

Name: Trickery

Definition: The villain attempts to deceive or coerce the victim

Species:

- a** The villain tries to persuade the victim
- b** The villain tries to use magic to deceive or coerce the victim
- c** The villain otherwise tries to deceive or coerce the victim

## 7. Complicity

Propp's summary:

“The victim submits to deception and thereby unwittingly helps his enemy.” (Propp, 1968, p.30)

Propp's summary of the complicity function was used verbatim as the definition of the function. Propp gives three species of this function that correspond to his three species of the previous function, trickery. Similarly, corresponding species definitions were derived from each of the species definitions that were developed for the trickery function:

Name: Complicity

Definition: The victim submits to deception or coercion

Species:

- a The victim agrees to the villain's persuasions
- b The victim submits to the villain's use of magic
- c The victim submits to deception or coercion

Propp additionally mentions a “special form” of complicity. The victim is caught in a difficult situation (perhaps caused by the villain) and the villain takes advantage of the victim's situation to compel the victim to agree to the villain's demands (Propp, 1968, p.30). We omit this special form from our definition.

## 8. Villainy

Propp's summary:

“The villain causes harm or injury to a member of a family.” (Propp, 1968, p.30)

Villainy is the crucial function which the first seven functions exist to prepare the way for, and which begins the complication and creates the “actual movement of the tale” (Propp, 1968, p.30). Propp's description of this crucial function is particularly problematic.

Propp's summary of the function: “the villain causes harm or injury to a member of a family” (Propp, 1968, p.30) is too restrictive as a definition. As discussed many stories from our material contain groups of friends rather than families, so they contain examples in which the victim's family is not mentioned. In our interpretation these

instances still achieve the function of villainy. Additionally, many of Propp's own examples of the function violate his summary. In Propp's examples the villain does not always cause harm or injury to a person but sometimes abducts a person, uses magic to make a person disappear, expels a person, etc. Also in Propp's examples, the immediate object of the villainy is not always a person, such as when the villain steals a magical agent or pillages or spoils the crops (although it is people who suffer as a result of these actions). Finally, Propp's summary of the function misses the significance of the function for the course of action. The significance of the villainy is that it introduces a misfortune or crisis into the narrative, and this drives the narrative until the function of *liquidation* in which the misfortune or crisis is resolved. Propp's summary leaves this significance implicit. To account for these problems Propp's definition of the function was widened and rephrased in terms of the function's significance for the course of action: *the villain creates a misfortune or crisis*.

Propp's species of villainy are also problematic. Propp describes 22 species and sub-species of villainy. The level of abstraction of Propp's species varies but all are too concrete for our purposes (some are very concrete, such as "the villain seizes the daylight" or "the villain orders someone to be thrown into the sea"). Any set of definitions at this level of abstraction will inevitably contain some very rare forms and, worse, will be missing some valid forms of the function. For the present study three more abstract species definitions were developed by collecting Propp's 22 species into three groups. These new species definitions exhaust the examples of villainy in our material.

Name: Villainy

Definition: The villain creates a misfortune or crisis

Species:

- a** The villain steals something or abducts someone
- b** The villain hurts someone or damages something
- c** The villain makes someone leave home

### 8a. Lack

Propp's summary:

"One member of a family lacks something or desires to have something."  
(Propp, 1968, p.35)

Lack is an unusual function. Propp fails to point out that a lack does not correspond to an act of a character in the tale and so is not a function according to Propp's definition

of function as “an act of a character, defined from the point of view of its significance for the course of action” (Propp, 1968, p.21). Like the initial situation, lack is an important morphological element but not a function. Propp explains that in tales that do not contain a villainy function there is “a certain situation of insufficiency or lack, and it is this that leads to quests analogous to those in the case of villainy” (Propp, 1968, p.34). A lack is the morphological equivalent to the villain’s seizure of a person or object in that the result is the same, some person or object is lacking, and the rest of the tale proceeds in the same way, a hero leaves on a quest to resolve the lack. In this sense lack is almost a species of villainy, but since villainy is a function corresponding to an act of the villain and lack is not a function and does not correspond to an act of a character, lack cannot be included in the definition of villainy.

As with other functions, Propp’s summary of the lack function was broadened to account for examples in which the characters do not constitute a family, producing a new function definition. Propp describes six species of lack. Five species definitions were derived from five of Propp’s descriptions. Propp’s fourth species is very concrete: “A specific form: the magic egg containing Koscej’s death (or containing the love of a princess) is lacking” (Propp, 1968, p.35) and was omitted from our species definitions. As in Propp’s species descriptions, our last species definition is a catch-all “other” category. Because it is not an act of character there are not multiple ways in which a lack can be achieved, Propp instead groups instances of lack according to the type of thing that is lacking. Propp mentions of the examples of lack in his materials that “these instances lend themselves to grouping only with difficulty” (Propp, 1968, p.35) and that “Just as the object of seizure does not determine the structure of the tale, neither does the object that is lacking. In consequence, there is no need to systematize all instances for the sake of the general goals of morphology. One can limit oneself to the most important ones and generalize the rest” (Propp, 1968, p.36).

Name: Lack

Definition: Something is lacking or desired

Species:

- a** Lack of a friend
- b** Lack of a magical agent
- c** Lack of something wonderful (that is not used as a magical agent)
- d** Lack of money or other means of existence
- e** Lack of another sort

## 9. Mediation, the connective incident

Propp's summary:

"Misfortune or lack is made known; the hero is approached with a request or command; he is allowed to go or he is dispatched." (Propp, 1968, p.36)

Propp's description of the function of mediation is quite difficult to understand. His summary does not adequately describe the function or its significance for the course of action. Propp's descriptions of the species of mediation present further difficulty. Our interpretation is as follows. Three species of mediation apply to stories with *seeker* heroes, heroes that go off in search of something (Propp, 1968, p.37): "a call for help is given" (to which the hero responds), "the hero is dispatched directly" (by a command or a request addressed directly to the hero), and "misfortune is announced" (someone tells the hero about some misfortune without asking for help or making any particular command or request to the hero, but the result is that the hero sets out on his own initiative). Although Propp's descriptions fail to make it explicit, in each case the character acting (calling for help, giving a command or request to the hero, or telling the hero of a misfortune) is fulfilling the role that Propp terms *the dispatcher*.

Propp also describes a fourth species of mediation that applies to seeker heroes, "the hero is allowed to depart from home" (Propp, 1968, p.37), but we have omitted this species from our definition because Propp's meaning is too unclear and he gives no examples.

Additionally, in Propp's example analysis of *The Swan Geese* there is a moment at which the heroine on returning home finds that her brother (the victim) is no longer there and from this realises that he has been kidnapped by the villain. Propp codes this moment as an instance of his species "misfortune is announced" although it does not fit Propp's description of that species because there is no dispatcher who announces the misfortune to the heroine. Instead the heroine learns of the misfortune of her own accord. Propp describes this instance as "rudiment of the announcement of misfortune" (Propp, 1968, p.96). This example is important to the present study because one of the sample tales used in the study, *The Black Geese of Baba Yaga*, is a version of *The Swan Geese* and contains the same moment. A new species was added to our definition to account for this example: *the hero, without the aid of a dispatcher, learns of a misfortune or shortage*.

Two further species apply to stories with *victimised* heroes (heroes who are seized or banished): "the banished hero is transported away from home" (e.g. a father takes

his banished daughter to the forest and abandons her) and “the hero condemned to death is secretly freed” (Propp, 1968, p.37). In these instances the dispatcher is the person transporting the hero away from home or the person freeing the hero. Propp also describes a third species that he says applies to victimised heroes: “a lament is sung” for a murdered, bewitched, banished or substituted person, “the misfortune becomes known, thanks to this, and evokes counteraction” (Propp, 1968, p.38). Again this species is omitted from our model because Propp’s meaning is too unclear and he gives no examples.

Mediation seems almost to be a double function, with one function applying to seeker heroes and another quite different function applying to victimised heroes. The two fit together under the definition of a single function only with difficulty. Propp explains that both sets of species belong to the same function because: “A moment of mediation is present in both cases. The significance of this moment lies in the fact that the hero’s departure from home is caused by it.” (Propp, 1968, p.37)

Based on our interpretation of Propp’s species of mediation we derive a new definition of the function: *the misfortune or shortage is made known to the hero* and six species definitions based on Propp’s descriptions of six of his eight species of mediation:

Name: Mediation

Definition: The misfortune or shortage is made known to the hero

Species:

- a The dispatcher gives out a call for help to correct a misfortune or shortage
- b The dispatcher gives the hero a direct command or request to correct a misfortune or shortage
- d The dispatcher tells the hero of a misfortune or shortage (but does not give a call for help, request, or command)
- h The hero, without the aid of a dispatcher, learns of a misfortune or shortage.
- e The dispatcher shows the banished hero the way away from home
- f The dispatcher frees the imprisoned hero

## 10. Beginning counteraction

Propp’s summary:

“The seeker agrees to or decides upon counteraction.” (Propp, 1968, p.38)

Propp's summary of this function is used verbatim as the definition of the function. Propp explains that the function corresponds to the moment at which the hero decides to take counteraction to resolve the villainy or lack, the moment may be expressed in words: "Permit us to go in search of your princess" or may not be "but a volitional decision, of course, precedes the search" (Propp, 1968, p.38). Propp does not describe any species of this function, for this study four species were defined corresponding to the four species of mediation that apply to seeker heroes:

Name: Deciding Counteraction

Definition: The seeker hero agrees to or decides upon counteraction

Species:

- a** The seeker hero answers the dispatcher's call for help
- b** The seeker hero accepts the dispatcher's direct command or request
- d** The seeker hero decides upon counteraction to correct a misfortune or shortage related by the dispatcher (but not in the form of a call for help, request or command)
- h** The seeker hero decides upon counteraction to correct a misfortune or shortage

## **11. Departure**

Propp's summary:

"The hero leaves home." (Propp, 1968, p.39)

This is a simple function that corresponds to the moment at which the hero (seeker or victimised) leaves home. Propp's summary "the hero leaves home" (Propp, 1968, p.39) is used verbatim as the definition for this study. Propp describes no species of the function.

Name: Departure

Definition: The hero leaves home

## **12. The first function of the donor**

Propp's summary:

"The hero is tested, interrogated, attacked, etc., which prepares the way for his receiving either a magical agent or helper." (Propp, 1968, p.39)

A clearer function definition was derived, based on Propp's description and clarifying the *donor's* role in the function: *The donor presents a test to the hero.*

Propp describes ten species and a number of sub-species of this function. For this study three species definitions were derived directly from Propp's descriptions of his first, second and tenth species: "the donor tests the hero" (Propp, 1968, p.39), "the donor greets and interrogates the hero" and "the hero is shown a magical agent which is offered for exchange" (Propp, 1968, p.40). The rest of Propp's species for this function are too concrete, and were collected into new groups to form new species definitions.

Four of Propp's species, in which the test is in the form of the donor requesting something of the hero, are too concrete and a fifth is a catch-all species "other requests" (Propp, 1968, p.41). Propp explains that "strictly speaking, requests as such constitute an independent class, while the individual types constitute subclasses" but he decided "arbitrarily" to consider each variety of request to be a class itself "in order to avoid an excessively cumbersome system of designation" (Propp, 1968, p.41). For this study these five species and their sub-species were grouped under a single new species definition: *the donor requests a service from the hero.*

In two of Propp's species the donor is a hostile creature and the test of the hero is a battle with the donor: "a hostile creature attempts to destroy the hero" and "a hostile creature engages the hero in combat" (Propp, 1968, p.42). Under the first species Propp groups attempts to destroy the hero such as by trying to put the hero in an oven, by trying to behead the hero at night, by trying to feed the hero to rats, etc. Under the second species Propp groups fighting, combat, a scuffle or brawl. These two species were grouped under one new species definition: *the donor attacks the hero.*

Name: Test

Definition: The donor presents a test to the hero

Species:

- a The donor gives the hero an explicit test
- b The donor asks the hero a question or questions
- c The donor requests a service from the hero
- d The donor attacks the hero
- e The donor offers the hero an exchange
- f The donor gives the hero an implicit test for politeness. (If the hero is polite he will be rewarded, if he is impolite he will not be rewarded.)

### 13. The hero's reaction

Propp's summary:

"The hero reacts to the actions of the future donor." (Propp, 1968, p.42)

The definition for this function comes directly from Propp's summary. Each of Propp's species for this function corresponds to one of his species for the previous function, and can have either a positive or a negative form, e.g. "the hero withstands (or does not withstand) a test" (Propp, 1968, p.42). Corresponding positive and negative species definitions were developed for each of the species definitions developed for the previous function:

Name: Reaction

Definition: The hero reacts to the donor

Species:

- a** The hero passes the donor's test
- a** The hero fails the donor's test
- b** The hero answers the donor's questions correctly
- b** The hero does not answer the donor's questions correctly
- c** The hero provides a service to the donor
- c** The hero does not provide a service to the donor
- d** The hero defeats the donor's attack
- d** The hero does not defeat the donor's attack
- e** The hero accepts the donor's exchange
- e** The hero does not accept the donor's exchange
- f** The hero is polite to the donor
- f** The hero is not polite to the donor

#### **14. Provision or receipt of a magical agent**

Propp's summary:

"The hero acquires the use of a magical agent." (Propp, 1968, p.43)

Propp's summary of this function is used verbatim as the function definition. Propp explains that the magical agent may be an animal, an object out of which magical helpers appear, an object with magical properties, or a quality or capacity that is given to the hero such as the ability to transform into an animal (Propp, 1968, p.43). Propp's species for this function (Propp, 1968, p.44) correspond to the means by which the magical agent is transmitted to the hero. For this study twelve species definitions were derived from the species and sub-species described by Propp.

Name: Receipt

Definition: The hero receives the magical agent

Species:

- a** The donor gives the magical agent directly to the hero.
- a1** The donor gives something of innate value (that is not a magical agent) directly to the hero.
- \_a1** A delayed form. The donor promises to give something of innate value to the hero at a future time. The object is not given to the hero immediately, but the hero is given the right to the object at a later time.
- b** The donor makes the magical agent known to the hero.
- c** The donor sells or exchanges the magical agent to the hero.
- d** The hero finds the magical agent by chance.
- e** The magical agent appears to the hero of its own accord.
- f** The hero steals the magical agent from the donor. Cases where the donor sells the magical agent to the hero and the hero then uses the magical agent on the donor and steals back what was exchanged should be coded as f, rather than c.
- g** The donor helps the hero. The donor does not give something to the hero but rather *makes a gift of itself* by providing a service to the hero. In this case the donor also takes on the role of the magical agent/helper.
- \_g** A delayed form. The donor promises to help the hero in the future, the hero is not given a helper but is given the right to a helper at a later time.
- neg** No magical agent is transferred to the hero. This occurs when the hero's reaction to the donor is negative.
- contr** The hero is punished by the donor. This occurs when the hero's reaction to the donor is negative.

## 15. Spatial transference between two kingdoms, guidance

Propp's summary:

"The hero is transferred, delivered, or led to the whereabouts of an object of search." (Propp, 1968, p.50)

The significance of this function for the course of action is that, after this function has occurred, the hero is at the whereabouts of the object of search. A function definition to this effect was developed.

Propp's six species for this function are too concrete and may not be exhaustive, so were grouped under new, more abstract species definitions. Two of Propp's species (Propp, 1968, p.51): "the hero flies through the air" (on a steed, on a bird, in the form of a bird, on board a flying ship, on a magic carpet, etc.) and "the hero travels on ground or on water" (on the back of a horse or wolf, on board a ship, etc.) were combined under a new species definition: *the hero uses a mobile means of transport: animal or vehicle, magical powers, etc.*

Another three of Propp's species (Propp, 1968, p.51): "he is led" (a ball of thread shows the way, a fox leads the hero to the princess), "the route is shown to him" (a hedgehog points out the way) and "he follows bloody tracks" were combined under a new species definition: *the hero is guided, another character shows or leads the way, the hero follows a trail left by another character, the hero follows a sign, etc.*

Propp's species "he makes use of a stationary means of communication" (stairway, underground passageway, bridge) (Propp, 1968, p.51) was used directly.

Finally, Propp noted that "delivery, as a function in itself, is sometimes absent: the hero simply walks to the place" and did not count the function in these instances (Propp, 1968, p.51). This is incorrect: the function is the transference of the hero to the whereabouts of the object of search, and this has been achieved by walking rather than by one of the above special means of transport. It seems arbitrary to consider the hero's travelling on an animal (for example) as an act of character but not to consider the hero's walking to the same location with the same end result as equally an act of character. Also, Propp's decision seems to contradict his earlier decision to count instances of the function of beginning counteraction ("the seeker agrees to or decides upon counteraction") even when the moment is not expressed in words, because "a volitional decision, of course, precedes the search" (Propp, 1968, p.38). A new species definition was added to cover this case.

Name: Arrival

Definition: The hero arrives at the whereabouts of the object of search.

Species:

- a** The hero uses a mobile means of transport: animal or vehicle, magical powers, etc.
- b** The hero is guided, another character shows or leads the way, the hero follows a trail left by another character, the hero follows a sign, etc
- c** The hero uses a stationary means of transport: climbing a rope, descending a stairway, crossing a bridge, passing through a doorway, etc.

- d** No special means of transfer, the hero simply arrives at the whereabouts of the object of search.

## 16. Struggle

Propp's summary:

“The hero and the villain join in direct combat.” (Propp, 1968, p.51)

Propp's summary “the hero and the villain join in direct combat” (Propp, 1968, p.51) fits his first species “they fight in an open field” but does not fit the rest of his species: “they engage in a competition,” “they play cards” and a “special form”: a competition between a she-dragon and Prince Ivan to see “who will outweigh the other” (Propp, 1968, p.52). The definition of the function was broadened to accommodate all of the species. Propp's third and fourth species (playing cards and a competition between a she-dragon and Prince Ivan to see who will outweigh the other) are instances of his second species “they engage in a competition” so were grouped under that species definition.

Name: Struggle

Definition: A struggle begins between the hero and the villain

Species:

- a** The hero and the villain begin a fight
- b** The hero and the villain begin a competition or game

## 17. Branding, marking

Propp's summary:

“The hero is branded.” (Propp, 1968, p.52)

The function and species definitions for this function were derived directly from Propp's descriptions.

Name: Branding

Definition: The hero is branded or marked

Species:

- a** The hero receives a recognisable wound or mark to the body
- b** The hero is given a recognisable item

## **18. Victory**

Propp's summary:

“The villain is defeated.” (Propp, 1968, p.53)

Propp's summary of this function was used verbatim as the definition of the function. Propp's first four species of this function correspond to his four species of struggle: the villain is beaten in open combat, he is defeated in a contest, he loses at cards, he loses on being weighed. As with struggle the third and fourth species were grouped under the second, reducing Propp's four species to two species definitions. Propp describes two more species in which a victory over the villain occurs without a preceding struggle between the hero and villain, two species definitions were derived directly from these.

Name: Victory

Definition: The villain is defeated

Species:

- a** The villain is defeated in a fight
- b** The villain is defeated in a competition or game
- c** The villain is killed without any preceding struggle
- d** The villain is driven out without any preceding struggle

## **19. Liquidation<sup>1</sup>**

Propp's summary:

“The initial misfortune or lack is liquidated.” (Propp, 1968, p.53)

Propp's summary of this function is used verbatim as the definition of the function. Propp describes eleven species and a number of subspecies of this function, grouping instances of the function according to the means by which the misfortune or lack is liquidated: “the object of search is seized by the use of force or cleverness,” “the object of search is obtained by several personages at once, through a rapid interchange of their actions,” etc. (Propp, 1968, p.53). Many of these species are too concrete, and correspond to Propp's species of villainy which were grouped into new species for this study. Propp's species of liquidation were discarded in favour of new species definitions that correspond to the species definitions developed for the villainy function:

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<sup>1</sup>Oddly, Propp (1968) gives a summary but no name for this function, so a name was invented.

Name: Liquidation

Definition: The misfortune or lack is liquidated

Species:

- a A stolen, lacking or kidnapped object or person is retrieved
- b An injured person is healed or a damaged object is repaired
- c A banished person returns

## 20. Return

Propp's summary:

“The hero returns.” (Propp, 1968, p.55)

It can be seen from Propp's example decomposition of a complete tale (Propp, 1968, p.96) that this function corresponds to the moment at which the hero sets out to return home, rather than to the moment at which the hero arrives home. Propp's summary of the function was modified to clarify this point in the function definition. Propp describes no species for this function.

Name: Return

Definition: The hero sets out to return

## 21. Pursuit

Propp's summary:

“The hero is pursued.” (Propp, 1968, p.56)

Propp's summary of this function was modified to clarify that the function corresponds to the beginning of the pursuit. Propp describes seven species of this function, grouping instances according to the mode of pursuit: “the pursuer flies after the hero,” “he pursues the hero, rapidly transforming himself into various animals, etc.,” “pursuers turn into alluring objects and place themselves in the path of the hero,” “the pursuer tries to devour the hero,” “the pursuer attempts to kill the hero,” “he tries to gnaw through a tree in which the hero is taking refuge” (Propp, 1968, p.56). Some of these species are too concrete, this list of species is not exhaustive, and some are very unlikely to appear in the stories written by the children participating in the present study. Since the function of pursuit is very easy to identify, these species were simply discarded and the function was used without any species definitions.

Name: Pursuit

Definition: A pursuit of the hero begins

## 22. Rescue

Propp's summary:

"Rescue of the hero from pursuit." (Propp, 1968, p.57)

Propp's species for this function group instances according to the means of escape: by flying, by hiding, by changing into an object and becoming unrecognisable, etc. Again some of the species are too concrete and the list of species not exhaustive, the escape from pursuit can be easily identified so species for this function were discarded.

Name: Escape

Definition: The hero is rescued or escapes from pursuit

## 23. Unrecognised arrival

Propp's summary:

"The hero, unrecognised, arrives home or in another country." (Propp, 1968, p.60)

Propp's description of this function is particularly problematic. The description is very short, and without complete examples it is difficult to interpret what sense of "unrecognised" is meant. We follow Charles (2006)'s interpretation. In the sample tale (also used in this study) *The Farmer's Boy and the Orange Cat* (Charles, 2006, p.56) the hero, having accomplished the resolution of the lack, returns home but is not given due recognition as a hero. The hero's family do not believe the hero's story, and mock him. Charles (2006) codes this moment as an instance of the unrecognised arrival function (Charles, 2006, p.58). With this clarification, function and species definitions were derived directly from those described by Propp:

Name: Unrecognised arrival

Definition: The hero, unrecognised, arrives home or in another domain

Species:

- a The hero arrives home unrecognised and enters into service.
- b The hero arrives home unrecognised but does not enter into service.
- c The hero arrives unrecognised in another domain.

## 24. Unfounded claims

Propp's summary:

“A false hero presents unfounded claims.  
(Propp, 1968, p.60)

Propp's summary of this function was used verbatim as the definition of the function. Propp does not give any species of this function.

Name: Unfounded claims

Definition: A false hero presents unfounded claims

## 25. Difficult task

Propp's summary:

“A difficult task is proposed to the hero.” (Propp, 1968, p.60)

Propp's summary of this function was used verbatim as the definition of the function. Propp does not attempt to group instances of this function into species, saying that “these tasks are so varied that each would need a special designation,” instead Propp lists all of the instances present in his material “with an approximate arrangement into groups” (Propp, 1968, p.60). Propp describes twelve such groups including some which are too concrete (“to jump up on top of the gates,” “to kiss the princess in a window”) and a catch-all category “other tasks” (Propp, 1968, p.60). For this study six new, more abstract species definitions were derived from Propp's descriptions.

Name: Difficult Task

Definition: A difficult task is proposed to the hero

Species:

- a** A test of endurance is proposed to the hero
- b** A test of cleverness or knowledge is proposed to the hero
- c** A test of ability is proposed to the hero
- d** A test of strength is proposed to the hero
- e** A test of courage is proposed to the hero
- f** A test of character is proposed to the hero

## **26. Solution**

Propp's summary:

“The task is resolved.” (Propp, 1968, p.62)

Our interpretation of Propp's description of this function is that it is always the hero who resolves the difficult task. A definition of this function was developed which states this explicitly. Propp does not describe any species of this function but states that the forms of solution correspond exactly to the forms of tasks. Six species definitions were developed corresponding to the six species definitions that were developed for the previous function.

Name: Solution

Definition: The hero accomplishes a difficult task

Species:

- a** The hero passes a test of endurance
- b** The hero passes a test of cleverness or knowledge
- c** The hero passes a test of ability
- d** The hero passes a test of strength
- e** The hero passes a test of courage
- f** The hero passes a test of character

## **27. Recognition**

Propp's summary:

“The hero is recognised.” (Propp, 1968, p.62)

Propp's summary of this function was used verbatim as the definition of the function. Propp describes three species of this function from which three species definitions were directly derived.

Name: Recognition

Definition: The hero is recognised

Species:

- a** The hero is recognised by a mark or item he possesses
- b** The hero is recognised by his accomplishment of a difficult task
- c** The hero is recognised immediately on his return

## 28. Exposure

Propp's summary:

“The false hero or villain is exposed.” (Propp, 1968, p.62)

Propp's summary of this function was used verbatim as the definition of the function. Propp describes three species of this function from which three species definitions were directly derived.

Name: Exposure

Definition: The false hero or villain is exposed

Species:

- a** The false hero is incapable of completing a difficult task
- b** A story is told that exposes the false hero or villain
- c** Other forms of exposure

## 29. Transfiguration

Propp's summary:

“The hero is given a new appearance.” (Propp, 1968, p.62)

Propp's summary of this function was used verbatim as the definition of the function. Propp describes four species of this function from which four species definitions were directly derived.

Name: Transfiguration

Definition: The hero is given a new appearance

Species:

- a** Use of a magical agent or helper directly transforms the hero's appearance
- b** The hero builds a new home for himself
- c** The hero puts on new clothes
- d** False evidence of wealth and beauty is accepted as true evidence

### 30. Punishment

Propp's summary:

"The villain is punished." (Propp, 1968, p.63)

Propp's summary of the function was widened slightly in the definition of the function to make clear that either the false hero or the villain may be punished. Propp describes two species of this function from which two simple species definitions were derived: either the villain is punished or (a negated form) the villain is given a magnanimous pardon.

Name: Punishment

Definition: The false hero or villain is punished

Species:

**a** The villain or false hero is punished

**neg** The villain or false hero is pardoned

### 31. Wedding

Propp's summary:

"The hero is married and ascends the throne." (Propp, 1968, p.63)

Propp's summary of this function is too restrictive. Even within the species described by Propp the hero's reward is not always marriage or ascension to the throne, Propp's species include "the hero sometimes receives a monetary reward or some other form of compensation" (Propp, 1968, p.64). The sample story *The Black Geese of Baba Yaga* used in this study contains a reward in the form of sugar buns. The stories written by the children participating in this study contain many varied forms of reward. The definition of the function was therefore widened to include any form of reward. Three species definitions were derived from Propp's descriptions. Many of the stories in our material contain the characters' safe arrival home (sometimes with an expression of the character's relief or joy at being safely home) in place of reward. A species definition was added to cover these instances. Finally a catch-all species definition "other forms of reward" was added rather than attempting (unnecessarily) to categorise all of the forms of reward in our material.

Name: Reward

Definition: The hero is rewarded

Species:

- a The hero is married, is promised a marriage, or resumes a prior marriage
- b The hero receives a new home
- c The hero receives a monetary reward or other form of material compensation
- d The hero's safe arrival home is used in place of an explicit reward.
- e Other forms of reward.

### 3.3 Procedure for the Analysis of a Story

This section will describe in detail the technique that was used to analyse the stories written by children for the study to discover the sequence of Propp functions that each realises, using the definitions of Propp's functions and species that were developed for the study (appendix B). The procedure for the analysis of a story produces results similar to the completed analyses presented by Propp (1968, Chapter IX B and Appendix II) and also reflects the two-step process described by Rodari (1996, p.40) for reducing a tale to an abstract formula before recasting. Section 3.3.1 will define the concepts required for the analysis of a story, and section 3.3.2 will illustrate the procedure of analysis by giving a complete analysis of one of the stories from the study.

#### 3.3.1 Concepts

An analyst needs to understand a small number of simple concepts before being able to code a story.

A *plot event* is a brief, concrete description of a significant event in the plot of a particular story. A plot synopsis of a story can be constructed as a sequence of plot events, where each plot event corresponds to one or two sentences in the plot synopsis.

A *species* is an abstract description of a type of plot event. A species gathers together many possible plot events under a single type.

A *Propp function* is a yet more abstract description of a type of species, defined from the point of view of the event's significance for the course of action of the plot. A function collects together a number of species under a single type.

The available functions and their species are defined in appendix B.

The aim of the analysis is to derive the sequence of Propp functions realised in each story written by a participant, from the text of the story.

The species provide a mid-level of abstraction between the concrete plot events, and the more abstract functions. When coding the data, we do not look for functions

but for species. It is easier to identify species in a consistent way, because species can be defined more concretely than functions. And because species belong to functions, we can say that if a plot event instances any species of a function, then it instances the function.

For example, the function *Arrival* has four species:

**Function** The hero arrives at the whereabouts of the object of search.

**Species a** The hero uses a mobile means of transport: animal or vehicle, magical powers, etc.

**Plot Event** A tsar gives an eagle to a boy. The eagle carries the boy to the top of the highest mountain.

**Plot Event** A princess gives Ivan a ring. Young men appearing from out of the ring carry Ivan away to another kingdom.

**Species b** The hero is guided, another character shows or leads the way, the hero follows a trail left by another character, the hero follows a sign, etc

**Plot Event** Sucenko sees a magical animal in the forest and follows it. The animal leads Sucenko to the lake at the heart of the forest.

**Plot Event** A fish tells Kelandra the way. Following the fish's direction Kelandra arrives at the villain's castle.

**Species c** The hero uses a stationary means of transport: climbs a rope, descends a stairway, crosses a bridge, passes through a doorway, etc.

**Plot Event** A sorcerer makes a magic portal appear before Ivan. Ivan passes through the portal and emerges in another world.

**Plot Event** Dummling discovers a trap door in the ground. Opening it, he finds a dark staircase inside. He descends the staircase, and emerges in an underground landscape.

**Species d** No special means of transfer, the hero simply arrives at the whereabouts of the object of search.

**Plot Event** After much travelling Baldred eventually arrived at the Firth of Forth.

In this example the function of each of the species and plot events is constant. The hero (a boy, Sucenko, Ivan, etc.) is transferred to a new location, which is where

the object of the hero's search is to be found. The characters of the plot events, their attributes and their actions, the objects and locations involved, and so on, are variable. Many different acts may instance the same function.

Conversely, identical acts may instance different functions depending on their chronological position relative to other functions in the plot and on the characters involved. For example, a hero struggles with an enemy, defeats the enemy, and takes a prize from the enemy. In this sequence the enemy may be the donor of the story, the struggle the test of the hero by the donor, the hero's victory his response to the test, and the taking of the prize the hero's receipt of a magical agent (functions 12, 13 and 14). The same sequence may also be a struggle between the hero and the villain of the story, the hero's victory would be the defeat of the villain, and the taking of the prize would be the liquidation of the misfortune that motivates the hero's quest (for example, after defeating the villain the hero retrieves a kidnapped person). This would instance functions 16, 18 and 19. To determine the function of a plot event the structure of the story as a whole must sometimes be considered.

Finally, a single indivisible plot event may at once instance two or more functions. For example, the victim is given a warning not to go outside (function 2, an interdiction or injunction is given), then the villain appears and tempts the victim go outside (function 6, the villain attempts to deceive or coerce the victim), then the victim agrees and goes outside. This last action of the victim instances both function 3 (an interdiction is violated) and function 7 (the victim submits to deception or coercion) at once.

A *Propp card* is a playing card that represents one of Propp's functions, decorated with an illustration of the function, the name and a short description of the function.

In this study participants wrote stories using sequences of Propp cards as guides. The stories are written on the Propp cards.

A *Propp role* is an abstract description of a character, defined by the role that the character plays in the Propp functions of the story. Whereas a plot event may refer to concrete characters, such as Ivan and the sorcerer, a Propp function may refer to Propp roles, such as the hero and the donor.

The role of a character is identified by the actions of the character in the functions of the story. The roles mentioned in the definitions of the functions are:

- Hero
- Victim
- Villain

- Dispatcher
- Donor
- Magical agent or helper

A role may be fulfilled by more than one character, for example one character may carry out the functions of the hero in one part of the story, and another character may take on those functions later on. A character may also take on more than one role, carrying out for example both the functions of the hero and of the victim.

### **3.3.2 An Example Analysis**

The basic steps in the analysis of a story are:

1. Reduce the writing on each Propp card to its bare plot events. Note which characters act in each event. This produces a plot synopsis of the story in which the events are connected to their Propp cards.
2. Considering this synopsis, decide which Propp role(s) are filled by each character. Knowledge of the roles of the characters helps to identify the species, as roles form part of the definition of some species.
3. Decide which species each plot event instances. A plot event may instance zero or more species, and may instance multiple species of the same function or of different functions.

From these steps the sequence of species, and therefore functions, contained in the story is derived, and each species is connected to the Propp card on which it was written. Given this data for every story in the study, quantitative analysis can be performed.

The analysis of story number 5 from the data (see figure 3.1 on the next page) is used to illustrate the process. The story features a family of two superhero boys and two superhero girls. The two superhero boys play the role of the absent guardians. The first superhero girl is the victim, and the second is the heroine. Bonanza is the villain. A fish is the donor and the magical agent is a crystal.

The story is a typical example from the data. All of the events in the story are Propp functions, there are no anomalous events.

The author has at times added events that are not present on the Propp cards. But these events turn out to be Propp functions (Mediation and Victory), they appear in the

Figure 3.1: A story written by an 8 year old male during the exploratory study.

Once in the countryside stood a small old cottage where four super heroes lived (two boys and two girls).

One day the two boys left the small old cottage because they were going to meet the prime minister, leaving the two girls on their own.

As the two boys left they shouted back “Don’t go down to that park because next to it there’s a dark spooky forest in which Bonanza lives.”

But after two hours one of the super heroes got bored of being stuck in the house so she made her way down to the park because she saw her friends there. When she was half way down there the other super hero shouted “Come back!” but it was too late.

Soon Bonanza started to get hungry and wanted to have something to eat so he crept out of the forest and looked in the park and saw the super hero. Bonanza slowly crept up behind the super hero and stuffed her down his throat.

Soon the other super hero goes down to the park and looks for the other super hero but she had gone then suddenly! The super hero sees Bonanza walking back from the park.

*At this point the author drew a picture showing one of the super heroes in the park and Bonanza escaping through the forest.*

Then the super hero heard a little voice coming from the pond. It was the fish, “Help! Somebody got me out of the pond and left me.” The super hero put the fish back in the pond.

“Take this crystal, put it on the floor when you are in danger.”

The super hero set off to the forest and eventually got there.

Then the super hero saw Bonanza and threw a knife at his throat and his throat split open then the other super hero came out of it’s throat.

Soon they started to set off.

Then the super hero started to come alive and started to chase them.

Then the super hero remembered about the stone crystal and dropped it on the ground, then a deep icy lake appeared.

Bonanza could not swim so he decided to give up. So they got home and lived happily ever after.

correct positions relative to other Propp functions, and they increase the richness of the story.

The author has also omitted some functions, but this results in the story losing coherence. The moments at which the heroine decides to take action to liquidate the villainy (Deciding Counteraction) and departs (Departure) from home are missing, but the story continues as if these events have happened.

The Reaction card is left blank by the author because the heroine's reaction has already taken place on the previous card.

The Villainy in the story may at first appear to be a murder (species b), the villain eats the victim. But the victim is later retrieved alive and apparently unharmed from the villain's stomach, and it is seen that the villainy acts more like a kidnapping (species a).

### **Plot Synopsis**

To identify the sequence of functions in detail it is necessary to know which characters are acting in which roles, and it is often not clear which character fills which role in a story until you have an overview of the whole plot of the story.

The first step is to read through the story from start to finish to note down the plot events and which characters are acting in each event, then with this overview decide which roles are present and which character fills each role.

This first step results in a plot synopsis:

- Four super heroes, two boys and two girls, are introduced.
- The two boys leave to meet the prime minister
- The boys tell the girls not to go down to the park because Bonanza lives nearby
- One of the girls gets bored and sees her friends in the park. She goes to the park.
- Bonanza gets hungry and wants something to eat. He creeps out of the forest and scuffs the girl down his throat.
- The second girl (the heroine) goes to the park to look for the first girl (the victim). She sees Bonanza leaving the park.
- A fish asks the heroine for help.
- The heroine helps the fish.

- The fish gives the heroine a magic crystal to use when she is in danger.
- The heroine arrives at the forest where Bonanza (the villain) lives.
- The heroine throws a knife at Bonanza's throat. Bonanza is killed.
- The victim climbs out of Bonanza's throat.
- The two girls set off.
- Bonanza comes back to life and starts chasing them.
- The heroine remembers the magic crystal and uses it. A deep, icy lake appears between Bonanza and the two girls. Bonanza cannot swim, so he gives up.
- They get home and live happily ever after.

and a list of roles:

- Absent guardians: the two boys
- Victim: first girl
- Villain: Bonanza
- Heroine: second girl
- Donor: fish
- Magic agent: crystal

### Detailed Analysis

We can now code the story in more detail. We consider each Propp card in turn. To each Propp card we assign zero or more plot events, the plot events that are written on the card. If a plot event is written across more than one card it is assigned to the card on which the event culminates and the function of the event is achieved. To each plot event we assign zero or more species, the species that are manifested by the plot event.

In the second step, consider each Propp card in turn, decide which plot events (if any) are on the card, and decide which species (if any) each event instances.

The second step produces a detailed coding:

#### Card Initial Situation

**Event** Four super heroes, two boys and two girls, are introduced.

**Species** Initial Situation, b (a character or characters are introduced)

**Card** Absence

**Event** The two boys leave to meet the prime minister

**Species** Absence, a (a person or people leave home, and the narrative stays at home with those who are left behind)

**Card** Interdiction

**Event** The boys tell the girls not to go down to the park because Bonanza lives nearby

**Species** Interdiction, a (a character is given an interdiction or injunction)

**Card** Violation

**Event** One of the girls gets bored and sees her friends in the park. She goes to the park.

**Species** Violation, a (a character violates an interdiction)

**Card** Villainy

**Event** Bonanza gets hungry and wants something to eat. He creeps out of the forest and scuffs the girl down his throat.

**Species** Villainy, a (the villain steals something or abducts someone)

**Card** Deciding Counteraction

**Event** The second girl (the heroine) goes to the park to look for the first girl (the victim). She sees Bonanza leaving the park.

**Species** Mediation, h (the hero, without the aid of a dispatcher, learns of a misfortune or shortage)

**Card** Departure

**Card** Test

**Event** A fish asks the heroine for help

**Species** Test, c (the donor requests a service from the hero)

**Event** the heroine helps the fish

**Species** Reaction, c (the hero provides a service to the donor)

**Card** Reaction

**Card** Receipt

**Event** The fish gives the heroine a magic crystal to use when she is in danger

**Species** Receipt, a (the donor gives the magical agent directly to the hero)

**Card** Arrival

**Event** The heroine arrives at the forest where Bonanza (the villain) lives

**Species** Arrival, d (no special means of transfer: the hero simply arrives at the whereabouts of the object of search.)

**Card** Liquidation

**Event** The heroine throws a knife at Bonanza's throat. Bonanza is killed.

**Species** Victory, c (the villain is killed without any preceding struggle)

**Event** The victim climbs out of Bonanza's throat.

**Species** Liquidation, a (a stolen, lacking or kidnapped object or person is retrieved)

**Card** Return

**Event** The two girls set off

**Species** Return, a (the hero sets out to return home)

**Card** Pursuit

**Event** Bonanza comes back to life and starts chasing them

**Species** Pursuit, a (a pursuit of the hero begins)

**Card** Escape

**Event** The heroine remembers the magic crystal and uses it. A deep, icy lake appears between Bonanza and the two girls. Bonanza cannot swim, so he gives up.

**Species** Escape, a (the hero is rescued or escapes from pursuit)

**Card** Reward

**Event** They get home and live happily ever after.

**Species** Reward, d (the hero's safe arrival home is used in place of an explicit reward)

## 3.4 Conclusion

This chapter has described the need for and development of a formal interpretation of Propp's morphology suitable for the purpose of reliably and consistently analysing stories written by children, to reveal the sequences of Propp functions that the stories contain. The descriptions of Propp's functions in Propp (1968) were found to be inadequate for this purpose. After identifying the general and specific inadequacies, a formal interpretation of Propp's morphology was developed to overcome them. The interpretation is based on Propp (1968)'s descriptions and on empirical data from the study reported in chapter 4. The interpretation is in the form of clear and concise definitions of each of Propp's functions and the species of each function. The complete definition of the interpretation is given in appendix B. The procedure that was developed for the analysis of a story using the formal interpretation of Propp's morphology was described and a complete example analysis of a child's story was given.

The development of a formal interpretation of Propp's morphology enables a quantitative analysis of the stories written for the empirical study reported in the next chapter. The clear and concise definitions contained in the interpretation will also be invaluable for further work in the development of story authoring tools that use Propp's morphology as their underlying model of narrative. The development of a computational story-authoring tool using the model is described in chapter 5. Further applications of the interpretation of Propp's morphology are discussed in chapter 8.

# **Chapter 4**

## **Exploratory Study**

This chapter reports an exploratory, empirical study in which participants aged 7-11 wrote stories using a paper-and-card story writing tool based on Propp's morphology. The study builds on previous applications of Propp's morphology to children's story writing that used similar writing tools, Rodari (1996) and Charles (2006) (see section 2.6 on page 76).

The primary aim of the study was to verify that Propp's morphology, and its representation in Propp cards and story maps based on the suggestions of Rodari (1996) and Charles (2006), is a valid model of narrative for a children's story authoring tool. The research question was: *can children use Propp cards and story maps to write stories that realise the Proppian narrative structures that the Propp cards and story maps aim to represent?* The quantitative results from the study show that the children were able to apply this tool to story writing with a high degree of accuracy. This result implies that the participants were able to understand Propp's abstract concepts of plot function, role, and that a huge variety of tales can be derived from a finite compositional scheme, they were able to apply these concepts to their own story writing, and that the representations of these concepts in the story writing tool are adequate for the purpose.

The study had a number of additional aims. The study aimed to provide observations about how children interact with these story authoring tools when creating stories. These observations will inform the design of a computer story authoring application (see chapter 5). The study aimed to provide observations about how the authoring tool affects children's story writing, generating hypotheses for further work. Finally, the study aimed to trial the procedures for children's story writing sessions using the authoring tool, and for the analysis of the children's stories.

## 4.1 Research Design

A two-week exploratory study was carried out in an English primary school.<sup>1</sup> 42 pupils aged 7-11 wrote two stories each for the study (one story in the first week of the study and one in the second), using a paper-and-card story writing tool based on Propp's morphology. The story writing tool was developed for the study based on the 'Propp cards' and 'story maps' used by Rodari (1996) and Charles (2006) (see sections 4.4.2 and 4.4.3). The first week of the study explored the process of *recasting* a story, similar to the process used by Charles (2006) (see section 4.5.1). The second week went beyond recasting and explored a new process of *constructing* story maps and then using them to write original stories (see section 4.5.2).

## 4.2 Research Questions & Hypotheses

The primary research question for the study was: *can children use Propp cards and story maps to write stories that realise the Proppian narrative structures that the Propp cards and story maps aim to represent?* Based on claims made by Rodari (1996) and Charles (2006) (see section 2.6 on page 76) the hypothesis is that the children *will* be able to write stories that realise Proppian narrative structures.

## 4.3 Participants

42 pupils aged 7-11 participated in the first week of the study. 35 of these participants, aged 7-10, returned to participate in the second week. Before the start of the study signed informed consent forms were collected from the participants and their guardians, confirming that they understood and accepted the conditions of the study, including the collection of video and audio data.

## 4.4 Materials

### 4.4.1 Sample Stories

Charles (2006) undertook "several months of concentrated research" (Charles, 2006, p.48) to select appropriate fairy tales for her study, assessing a great number of tales

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<sup>1</sup>Thanks to Collingwood Primary School, Newcastle, for participation and to the school's deputy head teacher Mrs Hammond for her help.

from around the world for several characteristics including a simple yet distinctive plot, potential appeal for children, absorbing imagery and potential for interactive play and replacement of the story's symbolic elements (Charles, 2006, p.47). Rather than repeat this work, three Proppian fairy tales from Charles (2006) were used as sample stories to recast in the first week of the present study.

*The Black Geese of Baba Yaga* (Charles, 2006, p.51) is a telling from Lurie (2005) of the traditional Russian wonder tale *The Black Geese*, adapted and shortened by Charles (2006). The tale is an example of the tale type *The Children and the Ogre*.<sup>2</sup> The tale type involves a child protagonist with whom children can readily identify, "standing alone against the ogres of the adult world." The tale type deals with "issues that concern children, such as fear of abandonment, self-reliance and struggle for independence." The child protagonist "has to be cunning, resourceful and compassionate" and has to "act upon his own initiative" to succeed and survive (Charles, 2006, p.49). When Propp (1968) gave an example analysis of "a brief, single-move tale—the shortest one of our material" he chose a tale of this same type, *The Swan Geese* (Propp, 1968, p.96).

*The Farmer's Boy and the Orange Cat* (Charles, 2006, p.56) is a modification by Charles (2006) of the tale *The Poor Miller's Boy and the Little Cat* from Grimm's Fairy Tales. Charles integrated elements from another Grimm's tale, *The Three Feathers*. The tale has a "modern, feminist-like ending" with potential appeal for contemporary children (Charles, 2006, p.55).

*The Magic Soup Pot* (Charles, 2006, p.61) is a hybrid, created by Charles (2006), of tales of the type *The Magic Mill*.<sup>3</sup> The tale type deals with issues of envy and theft (Charles, 2006, p.59). The tale type involves a magic object that is "acquired in some extraordinary manner" and used by the hero to gain "wealth and status." When a jealous antagonist steals the magic object the hero must get it back. The magic object is usually something that produces food, which "holds a major appeal for children and figures extensively in literature for them" (Charles, 2006, p.59).

#### 4.4.2 Propp Cards

Charles (2006) created "symbol maps" for each of the three tale types studied. Each symbol map was a linear sequence of pictographic symbols (arranged on a portable

<sup>2</sup>Type AT 327 in Aarne and Thompson (1961)'s classification.

<sup>3</sup>Type AT 565 in Aarne and Thompson (1961).

magnetic board) in which each pictograph represented a Propp function.<sup>4</sup> Most functions were represented as a single graphical symbol without words, but in cases where no image came to mind a single word was used instead (Charles, 2006, p.68). Pictures were preferred over words because twenty percent of students in Charles (2006)'s study spoke limited English, because information is ideally presented in at least both the verbal and pictographic modes, and because immature or inexperienced audiences benefit from visual aids (Charles, 2006, p.67).

The present study departs from Charles (2006) and returns to Rodari (1996)'s description. Rodari created a set of playing cards in which each card represented a Propp function. Each "card of Propp" was marked with a word (the "title" of the function) and "illustrated with a pertinent symbol or caricature" (Rodari, 1996, p.47). In contrast to Charles (2006)'s emphasis on pictographic symbols, Rodari claims that anyone can make a pack of "cards of Propp" and that the title of the function on each card is enough, illustrations are not required (Rodari, 1996, p.47).

For the present study a *Propp card* was designed for each of Propp's functions. Figure 4.1 on the facing page shows an example Propp card from the study. Each Propp card displays the name of its Propp function, a brief description of the function, and an illustration. Most of the card is empty space for a participant to use to write part of their story.

Unfortunately Rodari (1996) does not give the words that were used to represent each Propp function, and Propp (1968) itself uses many difficult words in the titles and summaries of the functions (interdiction, reconnaissance, complicity, mediation, transfiguration, etc). Simpler and sometimes modernised names and descriptions had to be developed for the functions.

The Propp cards were reviewed by the teacher, who suggested improvements which were made before the study.

#### 4.4.3 Story Maps

A *story map* was created for each of the sample tales to be used for recasting in the first week of the study. The story maps are equivalent to Charles (2006)'s symbol maps, each story map is a linear sequence of Propp cards representing the structure

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<sup>4</sup>There were some exceptions: in some cases a single symbol was used to represent two consecutive functions, a function was omitted in the symbol map, or the same symbol was used twice to represent two separate (non-consecutive) functions. To represent the sample tale *The Farmer's Boy and the Orange Cat* (which we note is a Grimm's tale, not a Proppian tale) additional symbols not corresponding to Propp functions were added, and one Propp function was used out of sequence (Charles, 2006, p.72).

Figure 4.1: A Propp card.

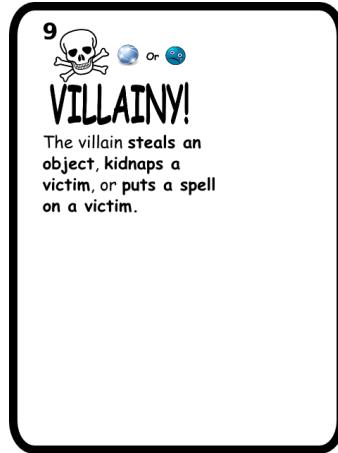
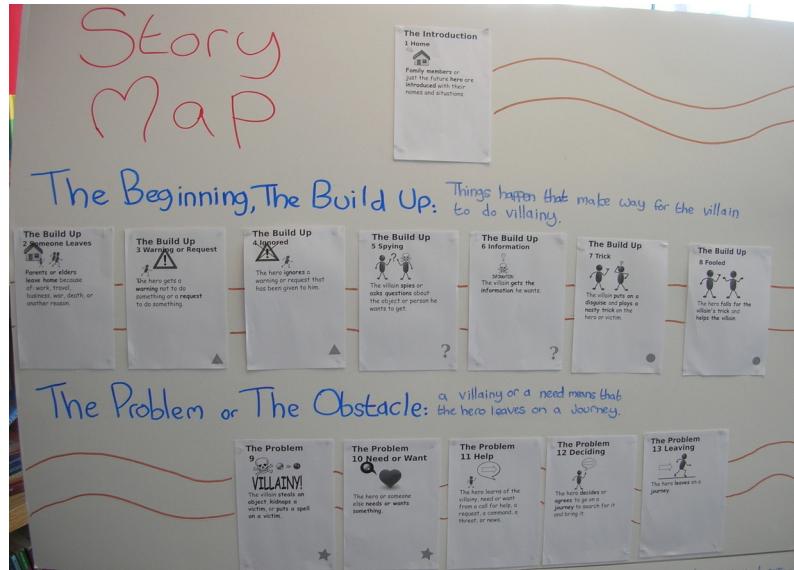


Figure 4.2: A story map.



of a sample tale, displayed on a large cardboard background. Figure 4.2 shows an example of one of the story maps used in the study.

## 4.5 Procedure

The materials and recording equipment were set up in the school's library, and participants visited the library in groups of five at a time to participate in one to two hour story writing sessions. At the beginning of each session the participants were told that we were testing the idea of story maps for writing stories, and needed their opinions and ideas. They were reminded that it was the story maps, and not themselves, that

were being tested.

#### **4.5.1 Week One, Recasting Stories**

In the first week of the study the process of recasting tales using story maps was explored. In each session one of three sample tales (see section 4.4.1 on page 120) was recast, each participant writing an original story following the same story map as the sample tale. The procedure for each session was as follows:

1. The participants were introduced to the session. They were told (either by the researcher or the teacher) that the research was being done to test the story maps ideas, that their honest opinions were needed, that they themselves were not being tested and that there were no wrong answers.
2. Each participant filled out a cover sheet giving their name, age and sex.
3. The researcher introduced himself and reiterated that the story maps ideas were being tested and that the children's opinions and ideas were sought, then explained step by step what was going to happen during the session.
4. The teacher read out the sample tale to the children.
5. The researcher then introduced a prepared story map for the sample tale and stepped through the story map card-by-card with the participants. It was found most effective to explain the story map interactively, so that the participants did not get bored. For each card participants were asked "Who knows what this card means?" or "Who knows what part of the story this card stands for?" In all sessions participants were quickly able to relate the events and characters of the sample tale to the Propp cards.

The researcher then explained that a story map can be used to recast a story by writing a new, original story that follows the same story map.

6. A five-minute group discussion was led by either the teacher or the researcher, with the purpose of generating ideas to inspire story writing. The discussion revolved around potential theme elements for the stories, similar to Rodari (1996)'s "keys" of time and place (Rodari, 1996, p.51): a time or place, a character, a genre, a magical object or power. During this discussion participants were told that they could use any ideas, places, objects or actions that they wanted, from

their own imagination, from real life, from movies, TV, computer games, books, etc.

7. Finally the participants were each given a set of Propp cards, the same series of cards as in the sample story, on which to write their stories. Participants were asked to write the part of their story corresponding to each Propp card on that Propp card. Participants were told that they could write as much or as little as they pleased for each card, they did not have to fill all the space on the cards and could ask for extra paper if they ran out of space on one card. Participants were then asked to begin writing their stories.

#### **4.5.2 Week Two, Constructing Stories**

In the second week of the study the process of constructing stories using Propp cards was explored. In each session each participant constructed a story map by selecting a set of Propp cards and then wrote an original story following their story map. The procedure for each session was as follows:

1. The researcher reminded the participants of the story maps and story cards concepts from the previous week, that the story maps not the participants were being tested, and that their honest opinions were needed. Participants were told that in this session they would be making their own story maps.
2. There was a discussion of story themes and ideas as in the first week.
3. The participants each chose the Propp cards for their story. Propp cards were arranged in stacks on a table, one stack of identical cards for each Propp function, the stacks ordered according to the overall sequence of Propp's functions. Participants took the cards that they wanted from this table and took them back to the writing table where each participant arranged their cards as they wished.

At any point during story writing participants were allowed to discard Propp cards from their story maps or to get new Propp cards from the card table. Participants were *not* required to select all of the Propp cards they wanted to use before beginning to write their story.

In each session participants were given rules to follow when selecting their Propp cards and constructing their story maps. The rules used were:

**The Choosing Rule** You choose which cards to use for your story map.

**The Numbers Rule** You must use the cards in the right order.

**The Pairs Rule** If you choose the first card of a pair you must choose the second card of that pair.

The Pairs Rule refers to the pairs of functions identified by Propp, for which the second function always follows if the first function is found.

4. Finally, participants were asked to begin writing their stories. As in the first week the stories were written on the Propp cards, with the part of the story corresponding to each card written on that card.

#### 4.5.3 Data Collection

The following data were collected from all sessions:

- All participants filled out cover sheets with their name, age and sex.
- Audio and video of each session was recorded by a fixed-position camera focused on the table on which the participants were placing and writing on their Propp cards.
- A dictaphone was used to record participants' responses to emergent questions from the researcher. Participants were asked to explain their stories, asked about observations made by the researcher, or asked about their opinions of the story cards: what they liked or did not like, what they found easy or difficult.
- The researcher made paper and pencil notes of observations during each session which were written up at the end of each day.
- At the end of each session each participant's Propp cards containing the story written by the participant were collected.

### 4.6 Results & Analysis

The quantitative analysis focused on one source of data, the stories written by the children for the study. The analysis asks: *how accurately do the stories follow the sequences of Propp functions represented by the story maps that were used to write*

them? To measure the accuracy of the stories the text of each story was analysed to derive the sequence of Propp functions realised by the story, according to the formal interpretation of Propp's morphology that was developed in chapter 3. The full definition of the interpretation of Propp's morphology is given in appendix B. The procedure for analysing a story is described in sections 3.3 to 3.3.2 on pages 109 to 118.

Once the sequences of functions contained in the stories had been derived they were compared quantitatively to the sequences of functions represented by the Propp cards that were used to write the stories. The degree of fit between the sequence of functions contained in a story and the sequence of functions represented by the story map that was used to write that story represents the *accuracy* with which the story fits the story map.

The analysis of the accuracy of the stories was applied separately to the stories written in the first week and the second week of the study. In the first week, the results reflect how accurately the sample stories were recast using Propp cards. In the second week, the results reflect how accurately the Propp cards were applied when used independently, without a sample story as a basis. Finally, the analysis was applied to each Propp function separately (rather than to each story), producing data on the accuracy with which each function was applied.

#### 4.6.1 Upper and Lower-bound Measures of Accuracy

To measure the fit between the sequences of functions realised by the stories and the sequences of functions represented by the Propp cards two specific measures were used, a lower-bound (under-estimate) and an upper-bound (over-estimate):

**Lower-bound** The lower-bound measure asks: *how often is the function represented by a Propp card instanced on that card?* This measure suffers from false negatives, as the story may contain the right sequence of functions without every function being on the right card. (For example, if the author has used one card to write several functions.)

**Upper-bound** The upper-bound measure asks: *how often is the function represented by a Propp card instanced on any of the Propp cards of the story?* This measure will count the instances missed by the lower-bound measure, but suffers from false positives because it does not account for the order of the sequences. (An anomalous instance of a function may be counted if it happens to match a card

elsewhere in the story.) Both measures ignore additional functions instanced in a story that are not represented by any of the cards of the story.

These two simple measures provide lower- and upper-bounds and offer a good indication for the degree of fit between the sequences of functions represented by the Propp cards used and the sequences of functions implemented in the stories written. The operationalised hypothesis is that *the participant's stories will have upper-bound accuracy measures higher than 50%*.

#### 4.6.2 Results from Week One: Recasting Stories

Of 42 stories collected from week one, 35 stories were analysed. 7 stories were excluded from the analysis because they could not be accurately coded.<sup>5</sup> No stories from week two were excluded. To discover the sequences of Propp functions that they contain, using the procedure described in section 3.3 on page 109. Table 4.1 on the facing page and figure 4.3 on page 130 (top) show the results of applying the lower- and upper-bound accuracy measures to these 35 sequences of Propp functions. As hypothesised, the majority of participants were able to write stories that accurately followed the Propp functions of the sample tales they were recasting (upper-bound: mean 90.27%, standard deviation 13.35%, lower-bound: mean 74.89%, standard deviation 18.74%).

No obvious pattern (age, sample story used, day or session, etc.) identifies the few participants with low accuracy measures.

When considering each function separately the sample tales that were recast must be taken into account. The frequency of use of each function reflects the functions contained in the sample tales. The instances of the functions in the sample tales acted as examples from which the participants recast the functions, and the difficulty of recasting depends to some extent on the difficulty of the story being recast.

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<sup>5</sup>Four stories were excluded because it was clear that the participants had made no attempt to follow the story writing instructions. For example, two stories described the action of a level from a computer game, making no attempt to break up the story into functions or to follow the Propp cards. Three more stories were excluded because of a problem with the sample tale *The Farmer's Boy and the Orange Cat*. This sample tale from Charles (2006) is a Grimm's tale, not one of the tales that were Propp's materials. The Grimm's tales do display Propp's narrative structure, but in an impure form. *The Farmer's Boy and the Orange Cat* deviates from Propp's morphology in certain key moments. The problem makes analysis impossible, at some points the stories written by the participants fail to conform to the definition of Propp's functions because they have used the functions as they are used in the sample tale. Fortunately the researcher noticed this problem in the first session that used *The Farmer's Boy and the Orange Cat* and did not use that sample tale in any further sessions.

	Lower-bound		Upper-bound	
	Mean	Standard deviation	Mean	Standard deviation
Week One (recasting)	74.89%	18.74%	90.27%	13.35%
Week two (generating)	74.49%	17.99%	79.28%	16.76%

Table 4.1: Mean per-participant accuracy measures, both weeks.

Figure 4.4 on page 131 (top) shows the results of applying the lower-bound and upper-bound measures to each function, using the stories from the first week of the study. Sixteen functions (from left to right, initial situation to pursuit) have both high accuracy (upper-bound greater than 50%) and a high frequency of use (used by twenty or more participants). It appears that participants were able to recast these sixteen functions reliably and accurately.

Eight functions have high accuracy (upper-bound greater than 50%) but low frequency of use (used by nine participants or less), these are: reconnaissance, lack, punishment, exposure, delivery, mediation, unrecognised arrival and recognition. Given that little data is available for each of these functions, no strong conclusion about them can be drawn.

Two functions have a low accuracy (upper-bound less than 50%) and low frequency of use (used by eight participants or less): difficult task and solution. Again, given that little data is available for either of these functions, no strong conclusion about them can be drawn.

For six functions there is no data because the functions did not appear in any of the sample tales and therefore were not used in the first week of the study.

Finally, we note that no frequently used function has a low accuracy.

### 4.6.3 Results from Week Two: Constructing Stories

The lower- and upper-bound measures were applied to 35 stories coded from week two (table 4.1 and figure 4.3 on the following page bottom). As hypothesised, the majority of participants were able to write stories that accurately followed the Propp functions of story maps that they had constructed for themselves (upper-bound: mean 79.28%, standard deviation 16.76%, lower-bound: mean 74.49%, standard deviation 17.99%).

As in the first week of the study no obvious pattern (age, sample story used, day or session, etc.) identifies the few participants with low accuracy measures, but with only one exception it is the same participants that have relatively low accuracy in both

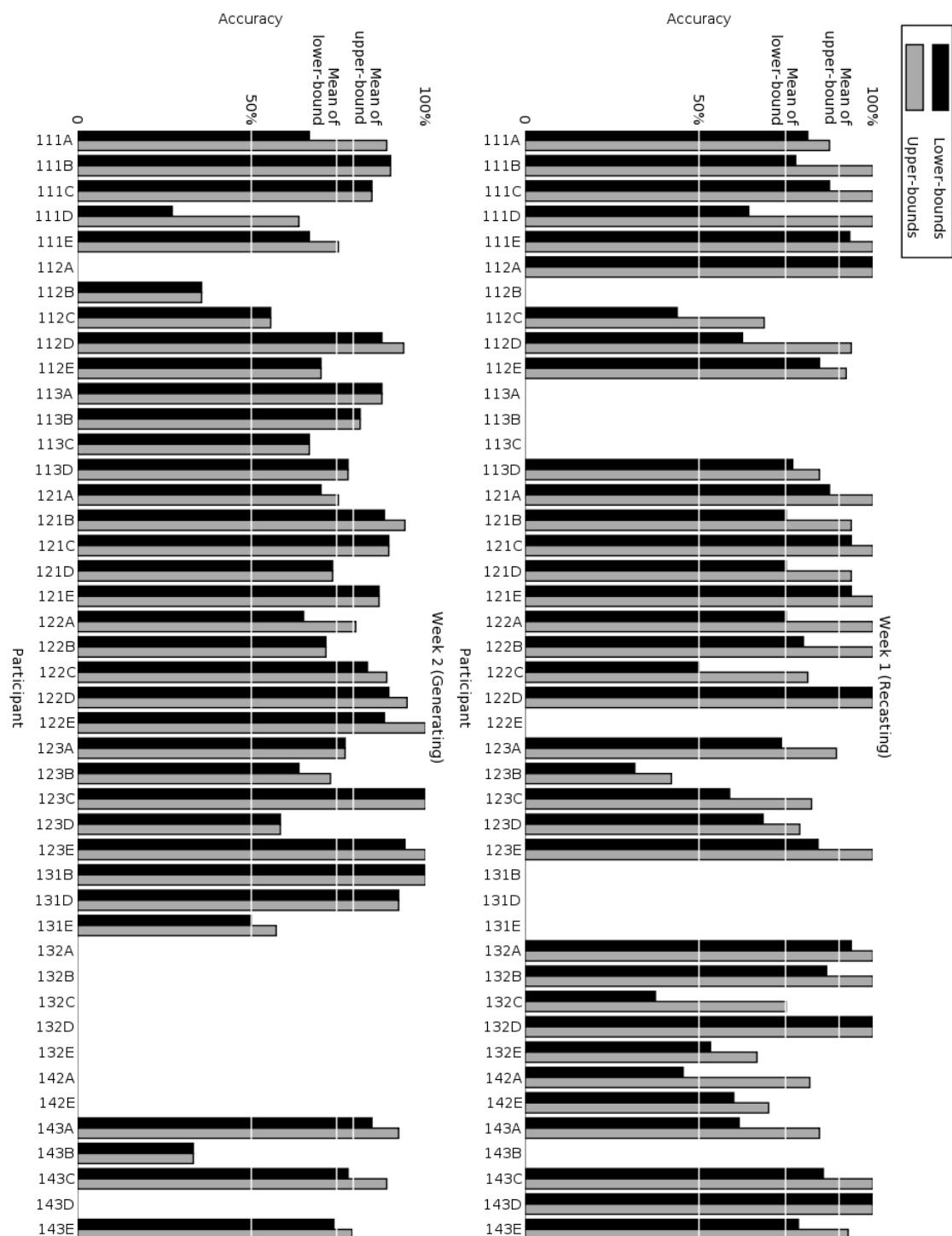


Figure 4.3: Lower- and upper-bound accuracy measures per participant.

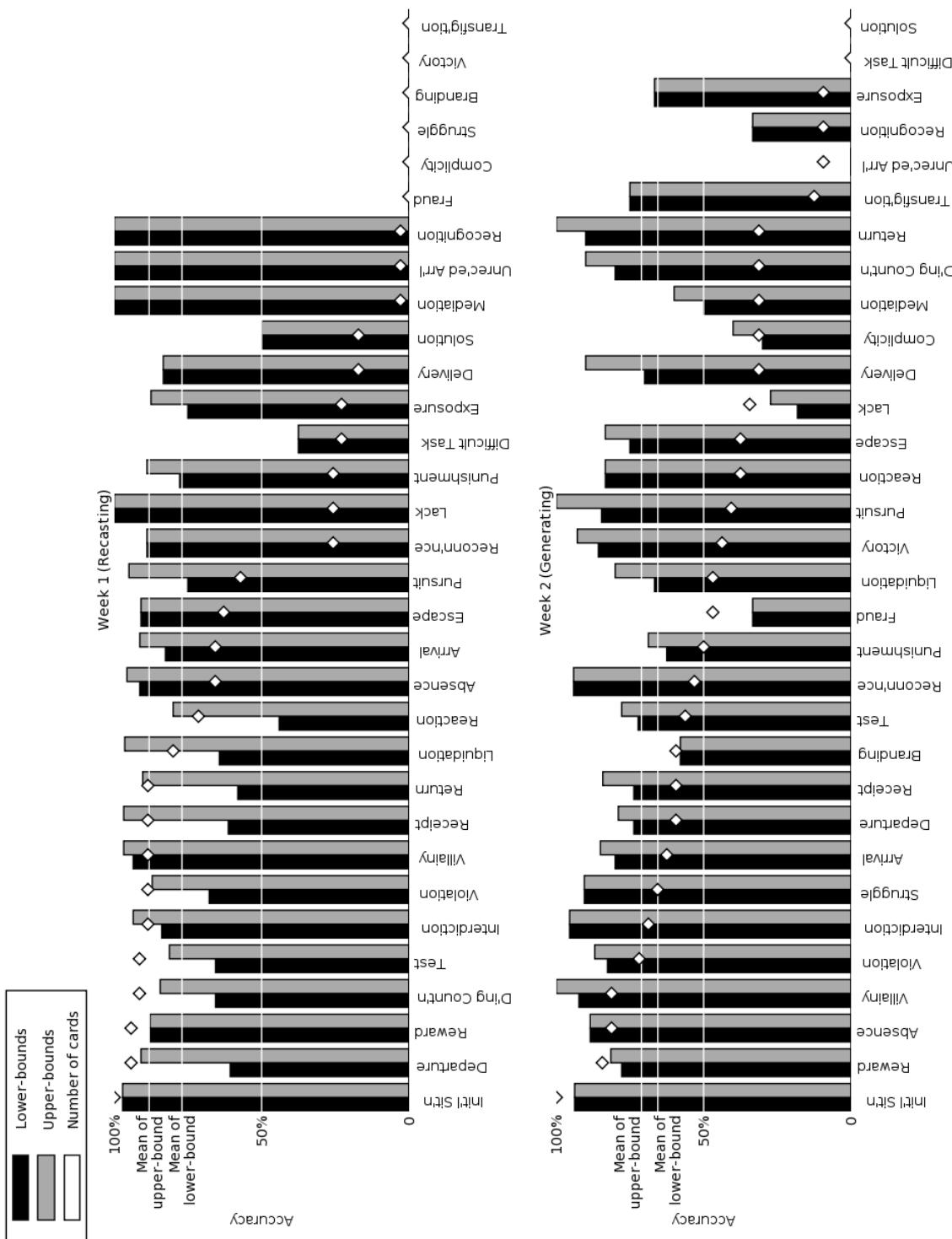


Figure 4.4: Lower- and upper-bound accuracy measures per function. The diamonds show the number of times each function was used on a scale of 0-35 (week 1) and 0-32 (week 2).

weeks of the study. It is probable that the difference is due to individual differences between the participants.

Figure 4.4 on the previous page bottom shows the results of applying the lower-bound and upper-bound measures to each function, using the stories from the second week of the study. For most functions both the upper and lower-bound accuracy are well over 50%.

Four functions have upper and lower bound accuracies of less than 50%, trickery (the villain attempts to deceive or coerce the victim) which was used by seventeen participants, complicity (the victim submits to deception or coercion, the function that immediately follows trickery in the overall sequence of functions) which was used by twelve participants, lack (something is lacking or desired) which was also used by twelve participants, and recognition (the hero is recognised) which was used by only three participants. For the recognition function the amount of data is too small to draw any strong conclusion, but participants appear to have had difficulty with the trickery, complicity and lack functions.

Three functions unrecognised arrival, difficult task and solution were not used by any participants so there is no data for these functions.

#### **4.6.4 Analysis of the Difference Between the Lower and Upper-bound Measures**

Many of the stories written in the first week of the study have a large difference between their lower- and upper-bound accuracy measures. The mean difference between the lower- and upper-bound measure of each story in week one is 15.38% (standard deviation 10.6%). For the stories written in the second week of the study this difference is much smaller (mean 4.79%, standard deviation 7.63%). During the study participants were often observed writing two or three correct functions on a single Propp card, and then leaving the next one or two cards blank when they realised their mistake. The story ‘runs ahead’ of the Propp cards. In these instances the story contains the correct functions (and in the correct sequence) and they will be counted by the upper-bound measure, but because the functions are not on the right cards they will not be counted by the lower-bound measure. Our hypothesis is that these run-aheads occurred frequently in week one but not in week two, causing the lower-bound accuracy measures in week one to suffer.

The run-aheads hypothesis is confirmed by a comparison of the numbers of run-

aheads in the first and second weeks of the study. A run-ahead is counted wherever a participant has failed to implement a function on the correct card, but has implemented the function on either one of the previous two cards. By this measure 62 run-aheads occur in week one, 14 in week two.

If we add the run-aheads to the lower-bound count of each story in both weeks the differences between the lower- and upper-bounds shrink, to a mean of 3.3% in week one and 1.96% in week two (variances 5.7% and 3.55%). When run-aheads are added to the lower-bound measures, the mean lower-bound accuracy for week one increases from 74.89% to 86.96%. The mean from week two changes little, from 74.49% to 77.32%.

A quantitative analysis of the types of run-ahead shows that run-aheads occur most often when certain pairs of Propp cards appear in sequence in a story map, and that these sequences appear more often in the story maps from week one than in those from week two. Our hypothesis is that run-aheads occur because the author is thinking about the sample story that they are recasting. Particularly at points where events are closely related, one event in the sample story brings the next to mind and both are recast on the same card. Because the participants were not recasting in week two run-aheads were less frequent.

## 4.7 Discussion & Further Work

The quantitative results show that the participants were very successful in writing stories that manifested the narrative structures represented by the story maps. Using story maps children were able to manifest the right Propp functions in the right order in their stories, both when using story maps from traditional tales and when using story maps of the children's own construction. This implies that children are able to understand Propp's concepts of plot function, role, and that a huge variety of tales can be derived from a finite compositional scheme. Children are able to apply these concepts to their own story writing, and the representation of these concepts as Propp cards and story maps is adequate for the purpose. The result demonstrates that Propp's morphology is a valid model of narrative for a children's story authoring tool.

## 4.7.1 Limitations of the Quantitative Results

### 4.7.1.1 The Quantitative Results are Concerned with Propp's Functions Only

As well as Propp's functions, Propp's morphology contains many other components (for a detailed description of Propp's morphology see section 2.2 on page 28) that are not taken into account by the measure used, and are not represented in the writing tool. The relationships between functions are also more complex than sequence alone, there are logical and aesthetic dependencies and connections that are ignored by the measure. To account for this limitation, the model of Propp's morphology that is embodied by the story authoring and analysis tools would need to be expanded. A longer intervention would be required for learners to pick up further concepts from Propp's morphology. These directions for further work are discussed in chapter 8.

### 4.7.1.2 The Measure of Accuracy does not Account for the Originality of the Stories

The quantitative measure of accuracy does not account for the originality of the stories. When children are recasting a story the measure does not distinguish between a story that applies each Propp function in a highly original way and a story that simply succeeds in retelling the sample tale with some surface elements changed. A successful but not very original retelling of the sample tale would score highly on the quantitative measure of the accuracy of the stories.

Care was taken to encourage participants to create original stories rather than retelling the sample tale. During each session before participants began story writing the researcher was careful to explain that they were going to use the Propp cards to write their own stories using their own ideas, and a short group idea-generating session was held to generate ideas about genre, settings, and characters.

In the second week of the study participants, after an idea-generating session, constructed their own story maps and then wrote stories to follow these story maps. No sample tales or recasting were used in the second week. This process would seem to avoid the risk of the children retelling a sample tale, but in fact participants may have attempted to reconstruct and retell the sample tale that they had heard in the previous week.

It may seem desirable to analyse stories written using story maps constructed by children who have not been exposed to a sample tale and its story map, guaranteeing that there can be no retelling of a sample tale. However during the present study, the

use of example tales and their story maps was found to be a very effective means of communicating the abstract concepts of Propp's morphology. The lack of examples given in Propp (1968) for some of Propp's functions and species, and that the examples that are given are given without the context of the tales that they are taken from, contributes greatly to the difficulty of precisely interpreting the functions (see chapter 3). From participants answers to questions asked during story writing sessions in the first week of the study (when recasting stories), the researcher noticed that the participants appeared to use the concrete example of the sample tale, rather than the abstract illustrations and instructions on the Propp cards themselves, to understand each function. For example, when participants having trouble with particular Propp cards asked the researcher for help they would ask to be reminded what part of the sample tale this card corresponded to. Participants never asked 'what does this card mean?' or asked for clarification of the illustration or words on the card, they always asked to be reminded of the card's use in the sample tale.

Three levels of representation of Propp's functions are possible. First, a function may be represented by a purely abstract description and illustration. Second, examples of a function may be given without the context of the tales that the examples are taken from. Third, an example of a function may be given in context, by a complete telling of a tale. These levels of representation can each be used independently or they can be combined. The third level is by far the most effective way to communicate the concept of a function. It is doubtful that children would grasp Propp's abstract concepts as quickly or as effectively if given only an abstract description. In the design of future studies, the use of example tales to illustrate abstract representations of functions will be crucial.

After reading and analysing the children's stories for the purpose of quantitative analysis, it is clear to the researcher that some of the stories are retellings of the sample tales with surface elements changed. Other stories are original, sometimes remarkably inventive applications of the Propp functions that differ significantly from the sample tales. Many other stories lie somewhere in-between, with both original and unoriginal elements. Often an element taken directly from the sample tale appears in the middle of an otherwise original story.

Convincing evidence of the degree and forms of originality of the stories could only be provided by systematic *qualitative* analysis of the stories. The potential for further qualitative analysis is discussed in chapter 8.

#### **4.7.1.3 The Measure of Accuracy does not Account for the Quality of the Stories**

How does using Propp cards and story maps as a story writing tool affect the quality of the stories written? The measure of accuracy does not necessarily distinguish between a very good story and a poor story, or between a coherent story and an incoherent one. Additionally, the study has not compared stories written with the authoring tool to stories written without it.

The authoring tool may improve the quality of stories in a number of ways. First, by helping to ensure that the story is structurally complete and well-formed. As authors generate and realise their ideas during story writing, the need to follow the Propp cards keeps the story on track. Second, the tool takes some of the cognitive load off the author by embodying a good story structure for them. This may free the author to concentrate on other aspects of the story and help to produce a better quality story overall. Third, the tool may assist in the generation of original and successful ideas for story writing. The Propp cards help the author to structure, complete and realise the ideas that the author brings to the tool. The Propp functions represented by the cards are very rich themselves, so the cards may also assist the author in generating ideas for their story.

However, the Propp-based story authoring tool may also detract from the quality of the stories. First, the tool may add to the authors cognitive load because they have not only to write a story but also to ensure that the story follows the sequence of Propp functions at each step. Second, because of the need to realise the events of the story using a finite selection of Propp functions that also necessitate certain character roles, the range of possible ideas that authors can express may be curtailed.

The quantitative measure of the accuracy of the stories does not account for the quality of the stories so it does not begin answer the question of how a Propp-based story authoring tool affects the quality of children's stories, in terms of structure or content. This is an experimental question. The experimental study reported in chapter 7 attempts to address this limitation by comparing stories written with and without using a Propp-based story authoring tool, making the comparison by using an independent measure of the inclusion and quality of the parts of a story.

#### **4.7.1.4 The Study has not Attempted to Measure Learning**

The quantitative results show that, by using Propp cards and story maps, children are able to write stories that display Proppian narrative structure. Is this feature of the

stories merely a consequence of the authoring tools that were used? Or did participants appropriate narrative concepts from their experience with the tool? The study reported in chapter 7 attempts to address this limitation by including a pre- and post-test.

#### **4.7.1.5 Some of Propp's Functions were used Infrequently**

Some of Propp's functions appear infrequently in the story maps used by participants, meaning that there is a lack of data about these particular functions. In the first week of the study, only those functions occurring in the sample stories appear in the story maps used. In the second week of the study, in which participants constructed their own story maps, the frequency of use of the functions reflects how often their Propp cards were chosen by participants. The study provides no insight into why participants chose some Propp cards frequently and other Propp cards less frequently. Infrequent use of a particular function does not necessarily suggest that children had difficulty understanding and applying that function. However, it does mean that evidence that children can understand and apply the function is lacking. Further studies might address this limitation by selecting sample tales for recasting that, between them, contain all of Propp's functions. Nonetheless, the main body of Propp's functions were used frequently and accurately throughout the study, evidence *is* provided that children can understand and apply most of Propp's functions and therefore that they can understand and apply the underlying concepts of function and role.

#### **4.7.2 Observations**

As this was an exploratory study, the researcher noted many observations about how children use Propp cards and story maps, how these tools appear to affect children's story writing, and how best to conduct sessions in which children are writing stories using a Propp-based story authoring tool for an empirical study. These observations informed the work that followed. This section describes a few of the more interesting observations.

The procedure for running a story writing session was successful. First an example tale is read, then a story map for the tale is explained by asking the children to identify the part of the tale that each Propp card stands for, then Propp's concepts and the story authoring tool are introduced, and finally the researcher leads a group idea-generating session that revolves around times, places, characters, genres, magical objects or powers, etc., before asking the children to begin working on their stories. This procedure

can be used as the basis for procedures in future studies of children's story authoring with Propp's morphology.

Propp cards may sometimes damage the coherence and structure of a story in certain ways, even while they help in other ways. When using Propp cards, the writer not only has to write a story but has to ensure that the story follows the cards. The writer is given an additional constraint to satisfy in her writing, even as the Propp cards assist the writer in satisfying other constraints. The researcher noticed some stories that, while they successfully manifested the Propp functions and displayed good story structure in that sense, have a convoluted quality to them at times when it appears that the writer has had to twist the story to meet the demands of a particular Propp card.

A simple example is the case where the author has killed off the villain as part of an earlier function, but then finds that he needs to use the villain to realise a later function. In one story from the study the act of villainy is that the villain swallows the victim. Later this misfortune is liquidated by the hero who splits open the villain's throat, allowing the victim to climb out. But a later function requires the villain to pursue the hero and victim. To handle this, the writer simply states without explanation that the villain comes back to life. Propp mentions that in his materials there are cases just like this, but instead of the villain coming back to life various accomplices of the villain appear and enact the remaining functions of the villain. Other stories show more serious instances of convolution. The degree of difficulty depends on how serious a mistake the author has made and how early on the mistake is made. For example, there is a story in which the villains are a swarm of bees whose act of villainy is to fly into the house and sting the children. The heroine (the eldest child) escapes by running out of the house, but realises that in her panic she has left her younger brother with the bees and has run so far that she doesn't know how to get back. The villainy is a kidnapping in reverse. Normally the villain enters the home and removes the victim, and the hero then leaves home to retrieve the victim and bring him back. In this case the villain enters the home and expels the hero, who has to find her way back home to rescue the victim! Despite the reversal, this particular story is quite successful. The heroine decides that she must get back home to rescue her brother. She meets a gardener who helps her to find the way and gives her a magic flower. When she arrives home she uses the flower to distract the bees and rescue her brother. Another story from the study suffers from a different kind of structural reversal. The heroine is a poor woman who has no possessions other than a magic sheep. She goes to the market and sells the sheep for money. Normally in tales of this type the heroine would

meet the donor and trade something mundane for something magical that relieves the heroine's poverty, but in this case the heroine has sold the magic object to the donor at the beginning of the tale! The donor later turns out to have been the villain in disguise, and the author's efforts to follow the remaining functions of the story map result in a very convoluted plot.

The researcher observed that participants had a tendency to stack their Propp cards on top of one another, rather than spreading them out on the desk in front of them as the researcher had expected. Participants would stack the Propp cards and then take the top card from the stack, write that part of the story and put the card aside, take the next card from the stack, and so on. With the Propp cards stacked, the author cannot see an overview of her story map. This may contribute to the problem of convolution as the author does not realise, for example, that the villain is needed later in the story. The computer story authoring application developed in chapter 5 does not allow Propp cards to be stacked on top of each other, and is designed to keep the story map in view while the author is writing.

The researcher observed that the participants always wrote their stories linearly, which may also contribute to the problem of convolution. Participants first selected all of the Propp cards that they would use in their story, then they wrote their stories from start to finish, from the first Propp card to the last, very rarely going back and modifying what they had written. Participants rarely followed an iterative style, sketching out the story in a little detail, then filling in each section in further detail, and so on. Paper as a writing medium no doubt encourages the linear style. Modifications are difficult to make as you need to erase and rewrite sections, and it is difficult to write later parts of the story before earlier parts because you have to know how much space to leave for the earlier parts. It was expected that writing on Propp cards might overcome this limitation. Each Propp card, each part of the story, is a separate piece of paper. Propp cards can be easily rearranged on the desk, they can be discarded, and replacement Propp cards can be added in. A story map represents a plan for a story, but it is a plan that can easily be modified during story writing by rearranging, discarding or exchanging Propp cards. A writer may choose to work by selecting one or two Propp cards, writing that part of her story, and only then returning to the card table to decide which Propp card will come next. This is a more spontaneous style of writing, in which each part of the story generates the idea for the next part as the story is written, but at each stage a Propp card must be chosen with which to realise the next idea. The cards help in the generation of ideas, but they also help to give form to the ideas and to keep

the story on track structurally. Participants, however, rarely appeared to make use of these possibilities. The computer story authoring application developed in chapter 5 was designed to support linear, iterative and spontaneous writing styles.

Finally, in some sessions the researcher asked the participants questions relating to Propp's concept of paired functions. Propp observed that certain functions occur in pairs, if the first function of a pair appears in a story then the second function of that pair will always occur later in the story. For example, if an interdiction is given it will always be violated. If a difficult task is set it will always be solved, and so on. Paired functions are always consecutive in the overall sequence of functions. The researcher asked groups of children to look at a story map and see if they could spot any Propp cards that were pairs. The researcher was surprised to find that the children identified many connections between functions, both consecutive functions and functions that are widely separated in time. The function of villainy creates a crisis and the function of liquidation solves the crisis, the hero departs from home at the beginning of the tale and returns at the end, the tale starts at home and ends at home, and so on. Sometimes there is an element, such as the setting, that is shared between two functions. In other instances the children stated that functions were paired because they were 'opposites'. The children's observations reveal that there are many relationships between Propp's functions. By identifying certain pairs and groups of functions and a sequence of the functions, Propp had barely begun to sketch these relationships. The situation is discussed in more detail in section 2.2.1.6 on page 36.

#### 4.7.3 Limitations of a Paper Interface

During the study a number of practical limitations with the paper-and-card interface were encountered that motivate the development of a computational story authoring tool for use in future studies. The study shows that Propp cards and story maps are successful as the basic interactive units for a story authoring interface. These objects, combined with the researcher's observations of how the participants interact with them, can now form the basis of a computational interface.

- Writing with paper and pencil is hard work for children. The process of choosing and arranging Propp cards and coming up with an idea for a story is fun and spontaneous, but then the author has to sit down and write the story, and at this stage much of the energy can be lost. A computer interface may be more enjoyable for children to use than paper and pencil.

- A computer interface can be designed to avoid specific problems, such as the stacking of Propp cards on top of one another, that were identified with the paper tool.
- A computer interface makes it easier to modify text and to move it around, this flexibility may enable alternative styles of writing such as the linear and spontaneous styles discussed above.
- A paper interface is not easy to modify. The researcher found that it was very time-consuming to design, print, and cut-out large numbers of paper Propp cards. With only a single researcher, it was not possible to make changes to the interface quickly enough between writing sessions, in order to respond to observations and try out different designs. A computer application can be designed so that certain changes to the interface can be made very quickly by modifying a configuration file.
- The static nature of a paper interface is too limiting. Propp's morphology holds the promise of encoding structural rules and constraints, constants and variables into the interface, but these types of dependent structural relationships cannot be achieved on paper. A paper interface is limited to a simple representation of Propp's functions and their sequence. For example, when combining Proppian components of different types to form a story map, using paper only simple rules for the combination of components are possible because participants must be asked to conform to these rules. With a computer interface, the rules for combining components could be programmed into the system. In general, the development of a computer interface would create the possibility of exploring dynamic features in future studies.
- Finally, a computer interface creates the possibility of integrating the story authoring tool with existing computer game or *interactive narrative* authoring tools that bring their own benefits, such as those discussed in section 2.4 on page 60.

## 4.8 Conclusion

This chapter has described an exploratory, empirical study of children's story writing using a paper-and-card story writing tool based on Propp's morphology. The tool is based on the 'Propp cards' and 'story maps' described by Rodari (1996) and Charles

(2006). The quantitative results from the study show that children aged 7-11 are able to use Propp cards and story maps to write stories that accurately realise the sequences of Propp functions that the story maps represent, both when recasting a sample tale using its story map and when using new story maps that the children have constructed for themselves. This result demonstrates that Propp's morphology is a valid model of narrative for a children's story writing tool. Children are able to understand Propp's concepts of plot function, role, and that a huge variety of tales can be derived from a finite compositional scheme. Children are able to apply these concepts to their own story writing, and the representation of these concepts as Propp cards and story maps is adequate for the purpose.

However, the quantitative results from the study have some limitations. The study investigated Propp's functions only and did not consider other components of Propp's morphology, the quantitative results do not account for the originality or the quality of the stories, and the study did not investigate whether children appropriate knowledge about narrative structure from their experience with the story authoring tool. The experimental study reported in chapter 7 attempts to address some of these limitations, others are left for further work and are discussed in chapter 8. Finally, several observations were discussed about how children use Propp cards and story maps, how these tools appear to affect children's story writing, and how best to conduct sessions in which children are asked to write stories using a Propp-based story authoring tool. These observations inform the development of the computer story authoring application described in chapter 5 and the design of the experimental study reported in chapter 7.

# **Chapter 5**

## **The Story Maps Application**

The exploratory study using a paper-and-card interface, reported in chapter 4, has confirmed the adequacy of Propp cards and story maps as interactive representations of Propp's functions. Based on this research a first computational version of the tool can now be developed for use in further studies. The development and verification of an initial story authoring application will lay the foundation for further development of the application, exploring more advanced features.

The design of the story maps application was based on the paper and card story writing tools used in the previous exploratory study and on the researcher's observations of participant's interactions with these tools. These design foundations are described in section 5.1. Section 5.2 specifies the formal requirements for the application. Section 5.3 describes the implementation and evaluation of a prototype that was designed to meet these requirements. A final version of the application was arrived at following several significant and many minor changes to the prototype in response to evaluations with users. This final version meets the requirements specified, and was used in the experimental study described in chapter 7. The final version of the story maps application is presented in section 5.4.

### **5.1 Foundations for Design**

In the exploratory study participants constructed story maps by selecting the Propp cards they wanted to use from a set arranged on a table, taking their chosen cards back to their own writing table and arranging them as desired to form their story map. Participants were asked to keep their chosen Propp cards in the order determined by the overall sequence of the Propp cards. Participants wrote their stories by writing

the corresponding part of their story on each of their Propp cards. At any time during story writing participants were allowed to return Propp cards to the card table, take new Propp cards from the card table for their story map, or reorganise the Propp cards in their story map. Participants did not have to finish constructing their story map first and then write their story but could interleave the two processes.

The basic interactive objects in the story maps design are the *Propp cards*, which are analogous to the paper Propp cards used in the exploratory study; the *card store*, which is analogous to the card table; and the *story map* which is analogous to the story maps constructed by participants in the exploratory study. The design aims to recreate the process of constructing story maps and writing stories using paper Propp cards on a table. To this end, the *zooming interface paradigm* is adopted to tie together the three basic interactive objects.

### 5.1.1 The Zooming Interface Paradigm

The paper Propp cards arranged on a table that were used in the exploratory study (whether on the card table or in the user's story map on her own table) have some features that the story maps application aims to reproduce:

1. The user can easily take an overview of all of the cards available and their arrangement, but she can also choose to focus on a particular card or group of cards that she is currently working on by taking a closer look at them.
2. By moving her cards around on her table, the user can arrange them into formations and groupings with her own semantics. For example, arranging the cards that she intends to use in her story map in one group and those that she has already positioned in the ordered story map in another, or placing the cards she has finished with in one group and those she still has to do in another.
3. With enough table space the user can arrange a large number of Propp cards on the desk in front of her. It would not normally be possible to display the same number of Propp cards on a typical-sized computer screen, while still keeping each card large enough for its text and images to be legible.

The *zooming interface paradigm* (ZIP) (Raskin, 2000, p.152) was adopted for the story maps application because it best reproduces these features of the paper and desk interface. The ZIP is based on the idea that the user has access to "an infinite plane

of information having infinite resolution” (Raskin, 2000, p.153). Everything that the user can access is displayed on this plane, which is called the *zoom world*. Using the mouse and keyboard the user controls the viewport through which the zoom world is displayed on her screen by panning the viewport left, right, up or down, and zooming in and out. The navigation metaphor is one of “flying” by “climbing” to zoom out and “diving” to zoom in. To see more of the zoom world the user can fly higher and higher above it, while to look at a particular item in the zoom world she can dive down into it. Raskin (2000, p.153) describes a zoom world as being “conceptually similar to the walls of a project planning room … covered with annotations, tacked-up sheets of paper, sticky notes, photos, or whatever else.” Diving and climbing emulates what a person does in a planning room: “stepping back to view large areas, then walking up to just the one that is desired, and finally leaning forward to read the fine print or using a magnifying glass to see a detail in a photo” (Raskin, 2000, p.154). This form of navigation takes advantage of our inherent tendency to remember relative position and landmarks: the user can always see her goal (an object that she wants to get to) and the path to it (by diving into it), and continuously animated diving and climbing preserves the user’s sense of position so she knows how to get back to where she has been (Raskin, 2000, p.154).

The zoom world metaphor fits nicely with the paper-and-desk interface. For the purposes of the story maps application the zoom world can be thought of as conceptually similar to the user’s desk space, covered with her used and unused Propp cards, pieces of writing paper, etc. The zooming interface paradigm offers a simple and flexible foundation so that the finished application should have potential for expansion and modification in the future.

### 5.1.2 Propp Cards

A Propp card is a card that both represents a Propp function and, if the user has used the Propp card in her story map, contains the text for the part of the user’s story that corresponds to that Propp function. At a minimum a Propp card displays a single word, the name of the function that it represents. A Propp card may also display an illustration of its Propp function, a longer description of its Propp function, the number of its Propp function in the overall sequence of functions, and further information such as a list of example realisations of its Propp function from Propp (1968) or elsewhere. Each Propp card contains an editable text area on which the user can write some notes

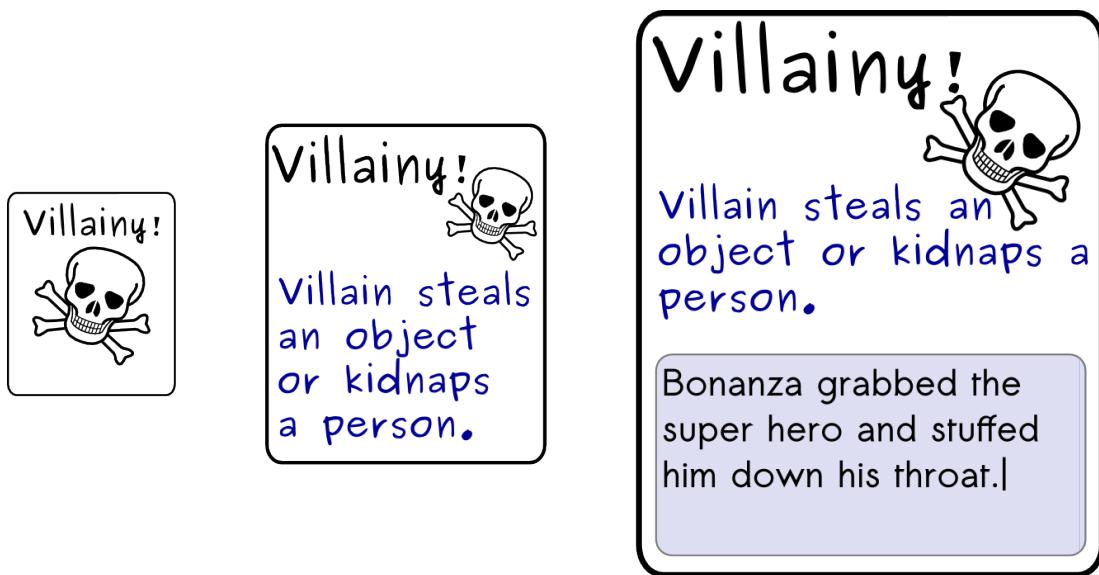


Figure 5.1: A mockup of a Propp card at three levels of semantic detail. From left to right: when viewed at a distance only the name and illustration can be seen on the Propp card; as the user dives in closer more descriptive text on the card is revealed; as the user dives still closer the Propp card's editable text area appears.

or part of the text of her story.

*Semantic zooming* is a common design pattern in ZIP interfaces: an object changes its visual representation according to the scale it is being viewed at. The object can remain legible and recognisable when viewed from afar, and as the user zooms in on the object more details are revealed as the screen area available to the object makes it possible for the object to display those details legibly. Figure 5.1 illustrates semantic zoom applied to a Propp card. Using a low level of semantic detail a large number of Propp cards can be displayed on screen at once while remaining legible and recognisable. When the user dives into a card or group of cards for a closer look more of their semantic detail is revealed.

The user can move Propp cards around in the zoom world by dragging and dropping using the mouse, emulating the ability of participants in the exploratory study to pick up paper Propp cards and move them around. When the user moves the mouse pointer over a Propp card the card should be highlighted (e.g. by brightness reversal, colour change, applying a border to the object, etc.) to indicate to the user that the application recognises that she is pointing to the card and that the card is an interactive object.

### 5.1.3 The Card Store

The card store is a container for the set of Propp cards available to the user for use in her story map. The card store initially contains a Propp card for each Propp function represented in the application. The Propp cards are displayed in their correct order according to Propp (1968). The user can remove Propp cards from the card store and place them into her story map, and can remove Propp cards from her story map and return them to the card store. The cards remaining in the card store retain their overall order as cards are removed and returned by the user.

### 5.1.4 The Story Map

The story map is an ordered sequence of Propp cards that represents the plot structure of the user's story. The story map is initially empty. The user can move Propp cards from the card store to the story map and vice-versa, and can move Propp cards around within the story map. The arrangement of Propp cards within the story map is determined by the user.

Figure 5.2 on the following page is a mockup of some Propp cards and a story map in the zoom world. From the highest vantage point the user has an overview of all of the Propp cards available to her and their arrangement. The user has arranged the cards that she intends to use in her story map into a cluster in one part of the zoom world. By diving into it she can focus on her story map and inspect it more closely. By diving in further she can focus on a single Propp card at a time. The user can then climb out again to get an overview of her story map or of the zoom world as a whole. Diving and zooming emulates the user's ability when using paper Propp cards on a desk to take in an overview of her Propp cards or focus on a particular card or group of cards at a time.

## 5.2 Requirements & Constraints

This section specifies the formal requirements and constraints for the implementation of the story maps application. The application should be usable in a study that repeats the process used in the exploratory study in which participants aged 7-11 constructed story maps and then used the story maps to write stories, and the stories written by the participants were collected as data. The requirements for the application can be divided into three categories: functional requirements, data requirements, and usability



Figure 5.2: A mockup showing the story maps zoom world viewed at three different scales. From left to right: 1. An overview of the zoom world shows many Propp cards scattered around, a group near the bottom right are arranged into a grid. 2. The user dives into this grid, which contains the cards she has selected for her story map. 3. The user dives in further to inspect a single card from her story map.

requirements.

### 5.2.1 Functional Requirements

The functional requirements describe the tasks and sub-tasks that the user must be able to perform with the application. The functional requirements for the story maps application are as follows:

1. Construct a story map.
  - (a) Get an overview of the Propp cards currently in the card store and in the story map.
  - (b) Inspect any Propp card in the card store or story map in closer detail.
  - (c) The user should be able to change from an overview of the Propp cards to a detailed view of a particular Propp card and back at any time.
  - (d) Move a Propp card from the card store into the story map.
  - (e) Remove a Propp card from the story map, putting it back into the card store.
  - (f) Arrange Propp cards within the story map into the desired order.

2. Write a story for a story map.

- (a) Select a Propp card to write on.

During the exploratory study most participants were observed writing the text for the first Propp card in their story map, and then moving onto the

second Propp card, and so on in a linear style. This style should be supported by allowing the user to easily move to the next or previous Propp card in her story map.

A linear approach to story writing should be enabled but not enforced, at any time the user should be able to move from the currently selected Propp card to any other Propp card in her story map and edit her text on that card.

- (b) Add and edit text on the selected Propp card. The amount of text should be able to vary from one Propp card to the next, from a single line of text to multiple paragraphs.

Basic text editing functions should be supported: adding, deleting and editing text, selections, cut, copy, paste, and breaking text into paragraphs.

More advanced text editing functions such as a dictionary, spell checking and grammar checking, and style controls (headings, italics, bold text, lists, etc.) should *not* be present. Such features are undesirable because the story maps application must be as simple as possible so that children using the application for the first time can learn to use it very quickly, and because the intent of the application is to focus the user's attention on story structure and content and not distract them with details such as spelling and text styling.

3. Both linear and iterative approaches to story creation should be supported. The user should be able to take a linear approach, planning her story by constructing her story map first, and then proceeding to write her story once her story map is finished.

The application should enable but not enforce a linear approach. The user should also be able to take an iterative approach, working a little bit on her story map, then doing some writing, then going back to modifying her story map, and so on.

4. Save a story map and open it later to continue working on it.

It may happen that some participants are not able to finish the stories in the time available. If this happens they should be able to come back to their stories and finish them later. The complete state of the user's story map must be able to be saved and restored: the set of Propp cards in the card store, the set of Propp cards in the story map and the positions of the cards in the story map, any text that the

user has added to any of the cards in the story map or card store, and any title that the user has given to her story.

5. Export a story into a format suitable for editing in other common applications (e.g. a word processor).

This will allow the application to be used as a planning and drafting tool for a story that can later be edited in a more traditional writing application such as a word processor, with support for the more advanced word processing features that are not provided by the story maps application.

6. Print a story.

This will allow the application to be used as a planning and drafting stage for a story that will then be written out on paper, and will allow users to take home copies of their completed story maps.

### **5.2.2 Data Requirements**

The data requirements define the meaning and structure of data that need to be represented within the application. The data requirements for the story maps application are as follows:

1. The set of Propp's functions.

The application will create a Propp card for each Propp function that is represented in the application. For each Propp function there should be a textual name and description of the function and an illustration of the function. Additionally, the sequential ordering of the Propp functions should be defined.

2. The Propp cards.

The set of Propp cards represented in the application is initially generated from the set of Propp functions. Each Propp card has an associated Propp function, an associated text field that contains any text that the user has added to the card, and a location in the card store or story map.

3. The card store.

The application will keep track of the set of Propp cards currently present in the card store.

4. The story map.

The application will keep track of the set of Propp cards currently present in the story map and the position of each card within the story map.

5. Logging.

For research and development purposes the application will keep a log of application state (Propp cards, card store and story map) and the sequence of user interactions that have operated on the application state.

### 5.2.3 Usability Requirements

The usability requirements focus on the usability of the application, the characteristics of the intended users and the environment in which the application is intended to be used. The usability requirements for the story maps application are:

1. The application is intended to be used by school children aged 7-11. The users will have experience with computers from school and some of them will have computers at home. It can be assumed that the users will know how to use a mouse and keyboard, and will be familiar with common interactions such as selecting an object by clicking on it with the mouse, and moving an object by dragging and dropping with a mouse.
2. To be used by children the application should have a simple interface that is easy to operate, and any images or texts used in the application should be able to be understood by children.
3. The application is primarily intended to be used in a school environment, secondarily at home.

The researcher should be able to bring the application into a school on a USB thumb drive and run it on the school's computers, with minimal requirements. Since school environments vary, the application should be usable with different operating systems (although most British primary schools use some version of Microsoft Windows), and at different screen resolutions (in the researcher's experience, primary school computers usually run at a much lower screen resolution than is common elsewhere). The application should not be demanding in terms of the software that a computer must support in order to run the application, most software packages are not likely to be installed on school computers

and the computers are usually locked down so that teachers or the researcher will not be able to install additional software. Software that runs over the internet should also be avoided as school computers usually have restricted internet access. Finally, the application must not require high hardware specifications of the computers that run it, such as memory, processor speed or graphics hardware, because school computers are unlikely to meet these specifications.

If the application meets the above demands of a school environment, then it is likely to be usable on the home computers of pupils, teachers and other users as well.

4. The application should be learnable by the child users with not more than fifteen minutes demonstration and practice. The purpose and operation of the application should be quickly recognisable, and the navigation and interactions within the application as simple as possible. Access to child participants and to computers in primary schools (where a single computer laboratory is usually time-shared between all classes) is likely to be time limited, whether for a research project or for lessons conducted by teachers.
5. The application should be efficient to use, with high throughput and few user errors, allowing the user to concentrate on the task at hand as directly as possible, keeping the time required to complete the task to a minimum.

It is particularly important to prevent the possibility of any application or user errors resulting in loss of user content. It should not be easy for the user or the application to unintentionally destroy content created by the user, and changes to content should be revertible. Data should be collected and user content saved automatically by the application, without requiring the user to save their content and therefore allowing the user or a software error to close the application or destroy the content without saving it first.

6. The application should be pleasant to use, engendering a positive attitude in the user and motivating the user to complete the task.

## 5.3 Prototype Implementation & Evaluation

### 5.3.1 Implementation

The first prototype of the story maps application was implemented in the Python programming language using the graphics rendering engine Panda3D.<sup>1</sup> To create the prototype a zoomable interface framework was developed for Panda3D. The story maps prototype itself was then built on top of this framework. The code was designed in a generic and flexible way to allow new features and different variations of the prototype to be added quickly.

#### 5.3.1.1 The Opening Screen

Figure 5.3 on the next page is a screenshot of the opening screen that greets the user on launching the prototype application. In the top half of the screen is the card store containing the set of available Propp cards. The title and illustration of each Propp card is visible, and these elements are scaled to fill the space available to the card so that they are as legible as possible. In the bottom half of the screen is the story map, initially empty, represented as a grid of boxes into which Propp cards from the card store can be dragged and dropped.

The user is welcomed with a passive, transparent overlay message that provides the minimal instructions necessary to begin using the application: “Left-click to zoom in. Middle-click to drag.” The message fades in, remains for five seconds, then fades out and is gone. Passive overlay messages of this sort are used whenever the application needs to inform the user of something.

From this opening screen the user can move the mouse pointer over any of the Propp cards, which will react by animating themselves, scaling to 110% of their original size as the mouse pointer moves over them and shrinking back down to their original size when the mouse pointer leaves.

#### 5.3.1.2 Moving Propp cards

Using the middle mouse button, the user can drag-and-drop one Propp card at a time from the card store above to the story map below. The empty boxes of the story map do not react to normal mouse-overs because no action is available, but when a Propp

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<sup>1</sup>Panda 3D is free and open source, available from <http://www.panda3d.org>.

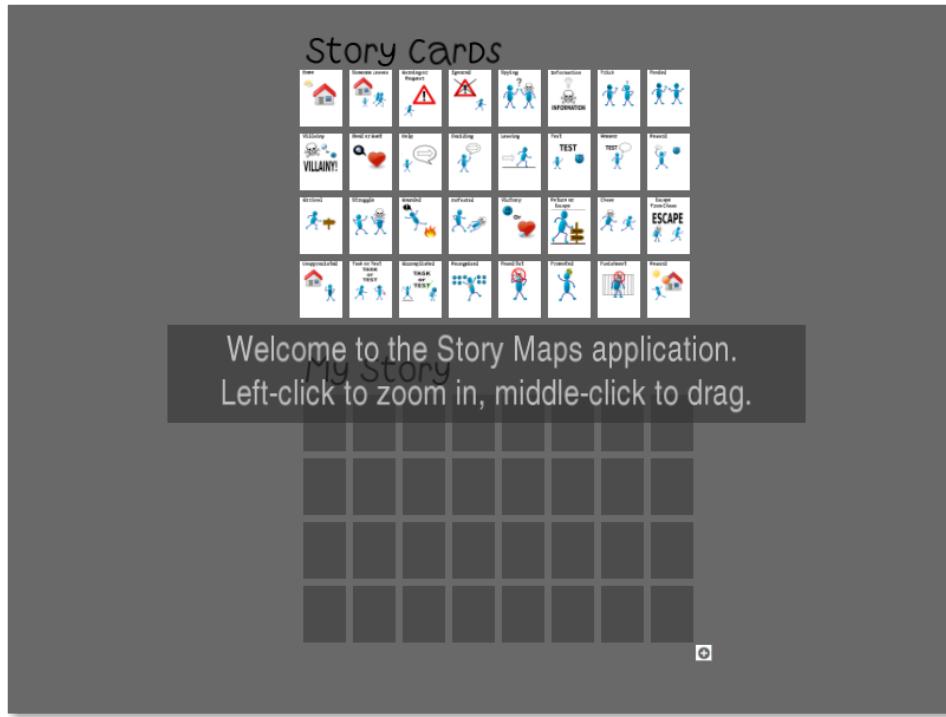


Figure 5.3: The opening screen of the prototype story maps application.

card is dragged over an empty box the box highlights itself to indicate that the Propp card can be dropped onto the box.

If a Propp card is dropped onto a box it snaps to the location of that box, if it is dropped onto nothing it snaps back to its original location in the card store. When a Propp card is moved from the card store to the story map a passive, faded image of the card is left behind in the card's original location in the card store (see figure 5.4 on the facing page). This means that the user can see where a card she has moved came from, and when inspecting the remaining cards in the card store she can which cards used to be between them so that the sequence of the Propp cards (which contributes to their meaning) is never broken in the card store.

A Propp card can be dropped onto any box in the story map, and once in the story map cards can be rearranged by dragging and dropping them between boxes to achieve any arrangement the user wants (see figure 5.5 on the next page). As before, if a card is dragged out of the story map and dropped onto nothing, it simply snaps back to its original position in the story map.

Propp cards are never deleted, they always return to their original location in the card store from where they can be retrieved again if wanted.

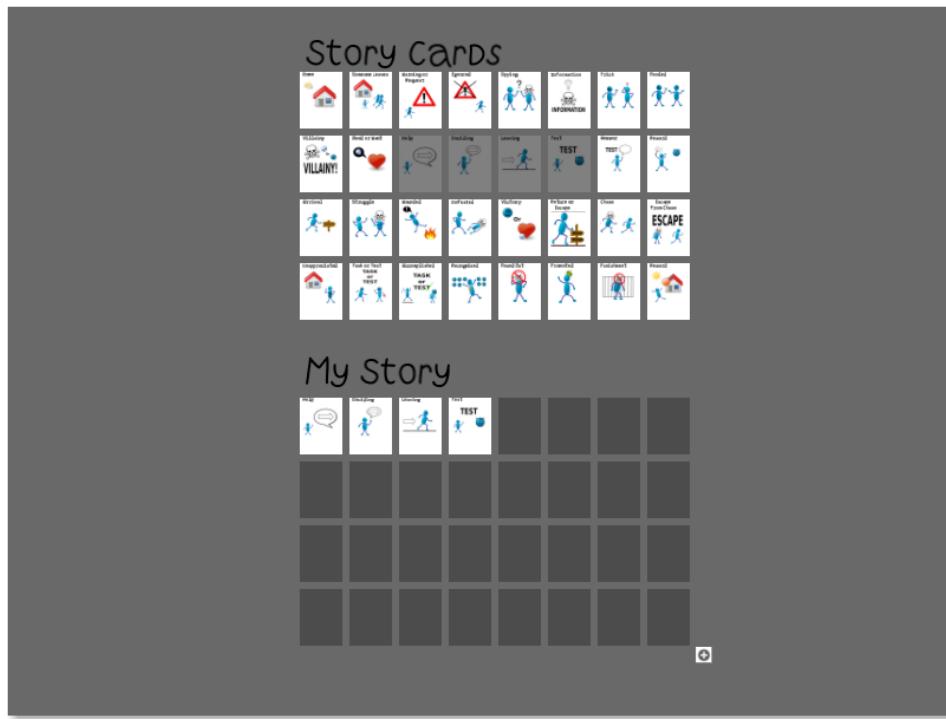


Figure 5.4: The opening screen of the prototype after the user has dragged some Propp cards from the card store (above) into the story map (below). A faded image of each card remains at the card's original location in the card store.

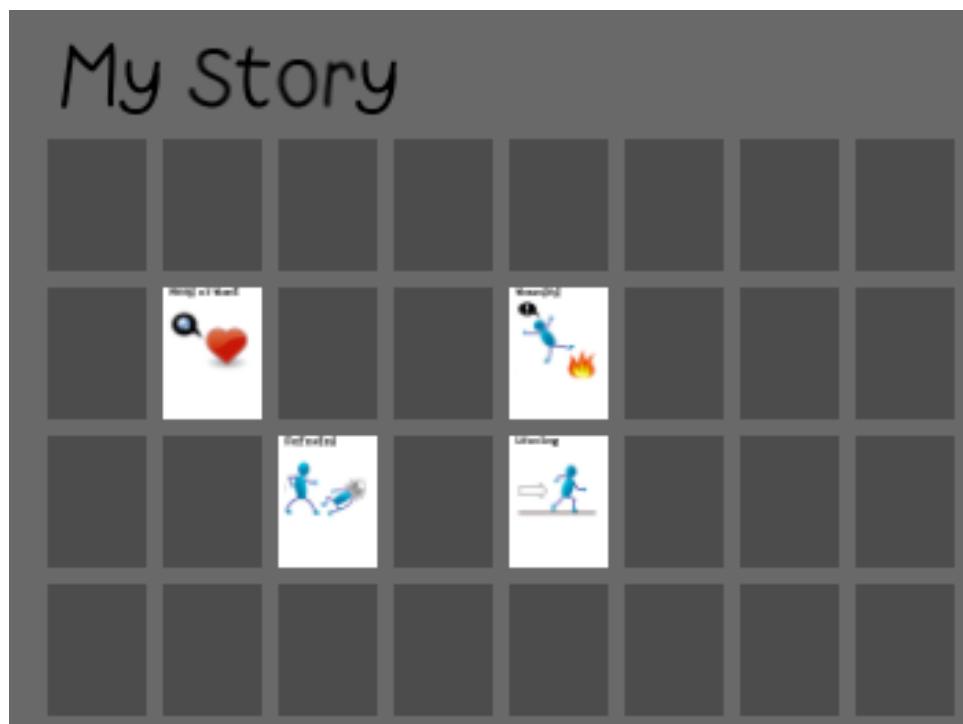


Figure 5.5: A screenshot of the prototype story maps application showing that within the story map Propp cards can be arranged into any formation that the user chooses.

### 5.3.1.3 Entering the Story Title

By left-clicking on the text ‘My Story’ above the story map and then using the keyboard, the user can replace the title with the name of her story.

### 5.3.1.4 Zooming In to Focus on a Propp Card

By positioning the mouse pointer over any Propp card in the card store or story map and left-clicking the user can zoom in on that Propp card for a closer look. Clicking the right mouse button will cause the view to zoom out again (the first time a user zooms in on a Propp card an overlay message reading “Right click to zoom back out” appears for five seconds, then fades out). All zooms and pans are smoothly animated so that the user’s sense of position is preserved.

Figure 5.6 on the facing page is a screenshot of the prototype when the viewport is focused on a Propp card in the card store. When focused a Propp card is revealed in greater semantic detail, the title and image no longer fill the card but take up only a small area, and a longer description of the card’s Propp function and a button labelled ‘+’ appear on the card. The eight cards surrounding the focused Propp card remain active, they respond to mouse-overs and if the user left-clicks on one of them the camera pans to focus on that card. In this way the user can move from card to card within the card store or story map without having to zoom out and zoom in again.

### 5.3.1.5 The Stack

Figure 5.7 on page 158 is a screenshot of the story maps application when ‘the stack’ is in view to the right of the screen. The stack is a temporary holding area for Propp cards that moves with the viewport as it zooms in and out and pans around. When the viewport is focused on a card in the card store the user can pan the viewport from card to card within the card store, but she cannot drag a card to the story map without first zooming out to bring the story map into view. The stack was added as a convenient place for the user to store several cards that she is interested in from the card store without having to zoom out to drag each card to the story map. The ‘+’ button on a Propp card in the card store adds the card to the stack. Cards can also be dragged to and from the stack. The stack is always available whether the viewport is zoomed out or is focused on a card in the card store or story map. The stack slides into view whenever the user moves the mouse pointer to the right edge of the screen, and slides out of view again when the pointer moves away.

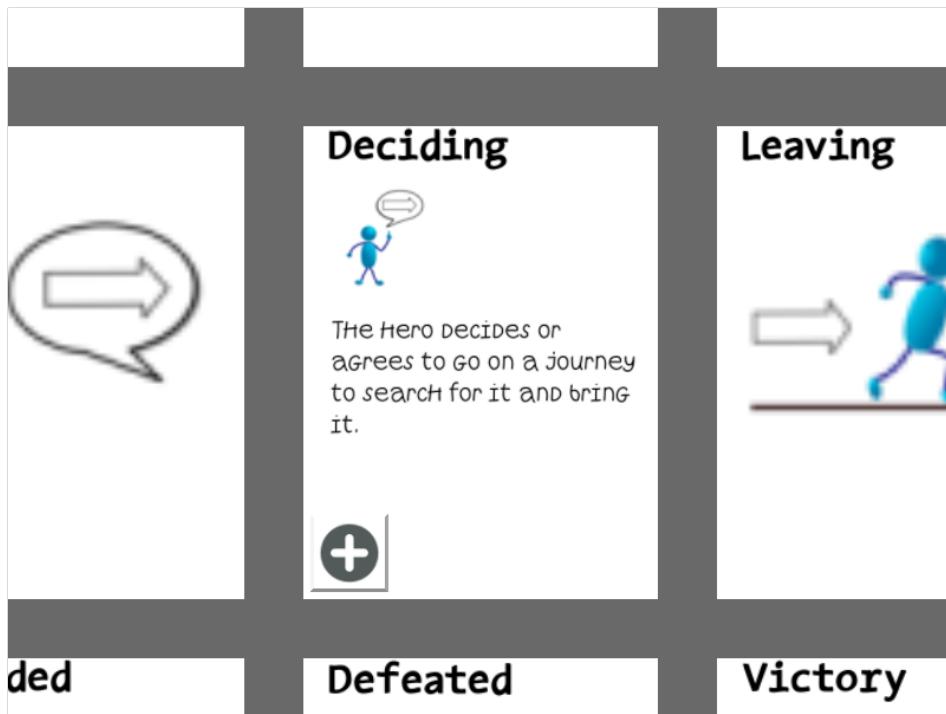


Figure 5.6: A screenshot of the prototype story maps application with the viewport focused on a Propp card in the card store. When focused a Propp card is revealed in greater semantic detail, with a longer text description of the card's Propp function and a row of buttons for acting on the card. The user can click on any of the eight adjacent cards and the viewport will pan to focus on that card instead.

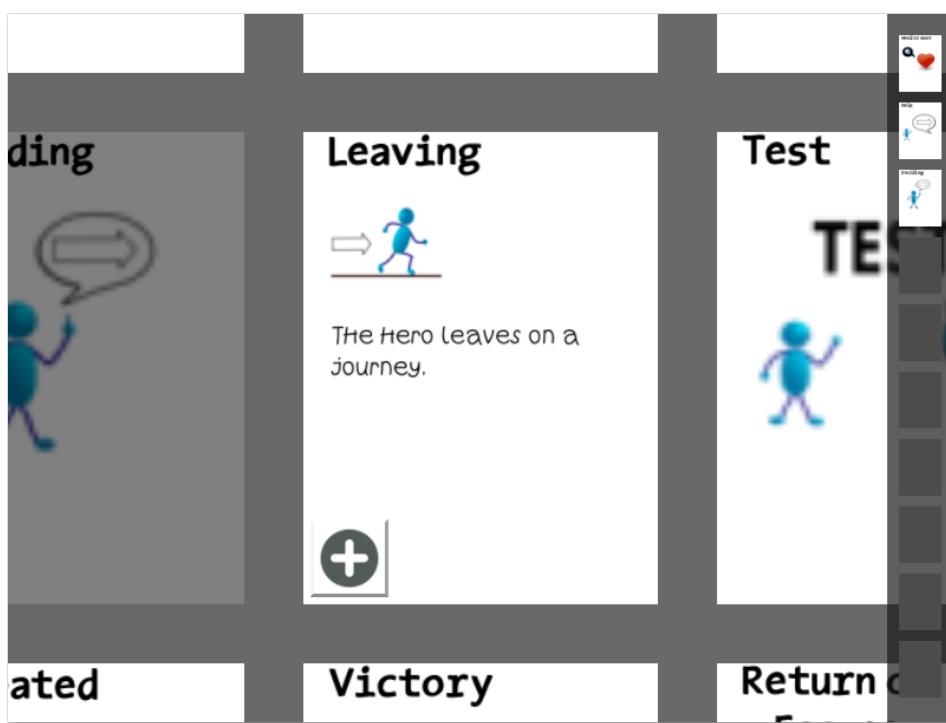


Figure 5.7: A screenshot of the prototype story maps application with the stack visible on the right side of the screen, holding three Propp cards.

The stack operates similarly to the clipboard in a traditional desktop environment, but instead of holding only one object at a time (with each new object that is added overwriting any currently held object) the stack can hold up to ten Propp cards at once. If the user tries to add a card to the stack when the stack is already full an overlay message asks the user to drag some cards out of the stack first. This approach avoids the possibility of a Propp card in the stack being unintentionally deleted when another Propp card replaces it in the stack, as can happen with a traditional clipboard.

#### 5.3.1.6 Writing on Propp cards in the Story Map

Figure 5.8 on the facing page is a screenshot of the prototype application with the viewport focused on a Propp card in the story map. When the viewport focuses on a Propp card in the story map the view is slightly different to when focused on a Propp card in the card store. The text on cards in the story map can be edited with the keyboard, so that the user can fill in her own story by replacing the text on each card in her story map. A focused card in the story map has a row of three buttons along its bottom edge, from left to right: *copy* and *paste* (the common text editing functions) and *remove*. *Copy* and *paste* operate on the editable text of the card and allow text to



Figure 5.8: A screenshot of the prototype story maps application with the viewport focused on a Propp card in the story map. The Propp card contains an editable text area, copy and paste buttons, and a '-' button that removes the card from the story map (sending it back to the card store).

be easily moved from one Propp card to another, *remove* is a quick way to remove the card from the story map (sending it back to the card store).

When a Propp card is removed from the story map, either by clicking its remove button or by dragging it to the stack or card store, the card retains any modifications that the user has made to its text. Propp cards are never deleted, only removed from the story map. They can always be retrieved again from the stack or card store with their text intact. This makes it difficult for the user to unintentionally destroy part of her story without being able to retrieve it again.

#### 5.3.1.7 Saving and Loading from the Toolbar

Finally, figure 5.9 on the next page is a screenshot of the prototype application with the toolbar in view. When the user moves the mouse pointer to the bottom edge of the screen the transparent toolbar slides into view. The toolbar slides out of view again when the user moves the mouse pointer away. From the toolbar the user can access buttons for saving and loading story maps. Story maps are also saved automatically



Figure 5.9: A screenshot of the prototype story maps application with the toolbar in view at the bottom of the screen. The toolbar slides into view when the user moves the mouse pointer to the bottom edge of the screen, and slides out of view again when the user moves the mouse pointer away.

every five minutes and whenever the application is closed.

### 5.3.2 Evaluation

A series of usability evaluations were carried out with the prototype implementation, the prototype being modified in response to the results of each evaluation before the next evaluation, eventually arriving at the final implementation presented in section 5.4 on page 164.

The usability evaluations began with usage simulations carried out by the researchers who, as expert users, attempted to simulate the behaviour of less experienced users in order to predict any problems that users would be likely to encounter, generating a list of usability problems to be addressed.

Next, four separate cooperative evaluations were conducted with two primary school teachers, one creative writing teacher and one pair of children as users. Each user was given the task of constructing and writing a story using the prototype, and asked to verbalise any problems that they encountered while carrying out the task. The researcher

observed the users and made notes, and asked the users questions or asked the users for suggestions in response to the researcher's observations or to the user's verbalisations.

Next, a formative evaluation was conducted in which four children aged 8-11 constructed and wrote stories using the prototype. A primary school teacher assisted.<sup>2</sup> The procedure used for this evaluation was a prototype of the procedure that would be used for the experimental study reported in chapter 7. The procedure was as follows: the teacher read a sample Proppian tale (*The Black Geese of Baba Yaga*) to the participants. The researcher showed the participants a story map for the sample tale in the story maps application on a projector, and stepped through the story map card-by-card with the participants. The researcher then demonstrated how to use the story maps application. Participants were then asked to construct and write their own stories using the story maps application. When the participants finished their stories there was a break for juice and biscuits, and then the teacher and researcher led a brief discussion about the positives and negatives of the prototype.

Finally, the prototype was tested in school conditions in a pilot of the experimental study that is reported in chapter 7.

### 5.3.2.1 Changes to the Prototype Implementation

Many minor modifications were made as the application evolved, tweaking the layout of user interface elements, changing button labels or making buttons larger, fixing bugs that were revealed, etc. For brevity this section will present only the main design changes that were made in response to the evaluations between the first prototype described above and the final implementation presented in section 5.4.

The *stack* (see section 5.3.1.5 on page 156) was removed. The stack was found to confuse users because it is not visible on screen until the user moves the mouse to the right edge of the screen. When a Propp card is added to the stack by clicking a button on the Propp card it disappears from screen and users do not realise where the card has gone. Also, some users tried to zoom in on cards in the stack in the same way as they could zoom in on cards elsewhere. This does not work because the stack is not part of the zoom world but is overlaid on the zoom world. Ideas were generated to mitigate these issues, but it was observed that users were easily able to move Propp cards by zooming in and out and drag-dropping them. The stack appears to be an unnecessary complication, so it was removed.

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<sup>2</sup>Thanks to Miss Fleet from Maddiston Primary School for her help.

A *story editor* was integrated into the application, taking over the function of writing the story. Users no longer write their story by writing on the Propp cards themselves. The story editor is closer to a traditional linear text editor or word processor, but integrates closely with the Propp cards and story map. The final implementation of the story editor is described in section 5.4.3. The story editor solves a number of problems that were encountered with the prototype approach:

1. The instructions on each Propp card (the name of its Propp function, the illustration, and the longer description of the Propp function) were fighting for space with the user's text for her story which was also to be written on the Propp card. In the first prototype implementation the user erased the instructional text on the Propp card to replace it with the text for her story. This caused problems when users forgot what the instructions had originally read. The story editor takes over the function of holding the user's story text, allowing the Propp cards to be reserved for the text that describes the Propp functions.
2. A number of users ran out of space while writing their text for some Propp cards. Users pointed out that the amount of text that they are likely to write varies from card to card depending on the Propp function represented, some functions demand more than others. The story editor solves this problem by allowing the text area for each Propp card to expand as necessary, the text no longer needs to be contained on the Propp card itself.
3. One teacher got lost while writing her story, forgetting which Propp cards she had placed next and so making a mistake in her story. This problem was also observed with children using paper Propp cards in the exploratory study. If the writer does not keep her story map as a whole in view but instead views only one Propp card at a time then she may make a mistake of this sort. One teacher pointed out that because the user has to zoom in and focus on each card one by one to write the text on that card, the story map as a whole is not on screen when the user is writing her story. Only the card currently at hand is on screen. With the story editor the entire story map remains on screen above the story editor while the editor is used to edit the text associated with each card.

The buttons on the Propp cards were removed. The *move to stack* ('+') button is no longer needed because the stack has been removed. The copy and paste buttons have been moved to the story editor, which has taken over the text editing function from the

Propp cards. The *remove from story map* ('-') button was a potential source of error when the user accidentally removes a card by clicking the button, it was removed in favour of requiring users to zoom out and drag-drop Propp cards back to the card store to remove them from the story map.

Although most users quickly discovered and used the ability to zoom into and out of Propp cards, in some cases users appeared to forget or not to realise that they could do this and constructed their story maps without zooming in to inspect cards first. They decided which cards to use based on the illustration and (primarily) the name of the card, without seeing the more detailed descriptions of each card's function. The result was a story that did not accurately follow the story map, misinterpreting many of the Propp functions. Rather than requiring users to left-click on a Propp card and have the viewport zoom in to focus on the card to see it in more detail, in the final implementation Propp cards were made to scale up and show themselves in greater semantic detail when the user simply moves the mouse over them. Scaling on mouse-over is more easily discoverable than left-clicking to zoom in, and allows one Propp card to be viewed in detail while the other cards are still on screen.

Teachers expressed the desire to see a 'final product' when the user has finished writing their story, in which the Propp cards were sorted neatly or in which the story is presented in a more traditional linear format (instead of having to pan from Propp card to Propp card in the story map to read the story by reading the text on each card). A preview window was added, along with the ability to export the story in HTML format and to print the story, see section 5.4.4 on page 173. The addition of these features also meets functional requirements 5 and 6 (export a story for further editing in a word processor and print a story, see section 5.2 on page 147).

Users suggested that children might need some assistance with sorting their Propp cards into the correct order in the story map. A 'Sort' button was added to the story map which users can use to automatically sort their cards into the correct order.

The interface gave some users the impression that they were required to fill all of the empty boxes in the story map with Propp cards, and teachers agreed that children might get this impression. The appearance of the story map was changed so that the underlying grid to which Propp cards are snapped is not visible, and the story map area was made smaller than the card store area so that not all Propp cards can be used in one story map.

The texts for the Propp cards were rewritten with advice from teachers. The original texts, intended to be child-friendly descriptions of Propp's functions, were consid-

ered by teachers to be too long and complicated and were described as ‘intimidating’ for children. Teachers pointed out that faced with such long and difficult sentences, children would be likely to give up on reading them and refer to the illustrations instead. Teachers suggested breaking the text up into short phrases and using structured text layouts (e.g. bullet-point lists) to ‘allow children to be systematic’ when considering what they have to do for each Propp card. New texts for the Propp cards were developed based on the clear and concise definitions of Propp’s functions that were developed in chapter 3. As well as its illustration each Propp card was given a one or two word name, a brief description derived from the definition of the Propp function, and a longer instructional text in the form of a bullet-point list, derived from the definitions of the function’s species.

The Propp cards (their fonts and illustrations), the layout and the colours of the application were redesigned with assistance from a designer and illustrator, helping to meet usability requirement 6: that the application should be attractive, pleasant to use and motivating (see section 5.2 on page 147).

Finally, a number of users and teachers expressed the desire for some sort of drafting area in which Propp cards could be arranged before moving them into the final story map area. A number of ideas were generated but because it would greatly complicate the design and raise new questions that would require further evaluations with users, this feature was *not* added.

Following these usability evaluations, the final implementation of the story maps application described in the next section is considered to meet the functional, data and usability requirements specified in section 5.2.

## 5.4 Final Implementation

The final version the story maps application was implemented in the Java programming language using the structured 2D graphics framework Piccolo 2D.<sup>3</sup> The overall design of the code was based on that of the prototype implementation. Java and Piccolo offer a number of technical advantages. Piccolo supports the development of zoomable user interfaces, taking care of many of the unique features of such interfaces, so using the Piccolo framework allowed for rapid development and modification of the application. Piccolo also supports integration with Java’s comprehensive user interface framework *Swing*, which supports the more common user interface elements of the application

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<sup>3</sup><http://www.piccolo2d.org/>

(buttons, menus, scrollbars, text editing, etc). Java applications are easy to distribute to users. A Java application can be published on the researcher's website as a JAR file for users to download and launch by double-clicking, or as a Java Web Start application that users can launch by clicking a link in their web browser. The researcher can also carry a JAR file containing the application on a USB thumb drive, which is useful when entering a school environment that is likely to have restricted or unreliable internet access. The tool must be usable on a number of different operating systems: those used by the researcher's computer, the home computers of teachers who helped test the application, the computers in the university computer lab where usability tests were conducted, and the computers in the different schools in which the pilot and main experimental studies were conducted. A JAR file or Java Web Start application will run on any operating system as long as a recent version of the Java Runtime Environment is installed. Finally, like the story maps application, both Java and Piccolo 2D are available as free software.

### 5.4.1 Propp Cards

New Propp cards for each of Propp's functions were developed for the application. Figure 5.10 on page 167 shows some Propp cards from the story maps application, appendix C contains the complete set of Propp cards used by the application. The illustrations for each Propp card were created for the story maps application by designer and illustrator Raymond Yuen<sup>4</sup> based on the researcher's texts for the cards.

A Propp card in the story maps application is an interactive object that can be dragged and dropped, and to which text can be added using the story editor (see section 5.4.3 on page 171). As well as an illustration each Propp card has a one or two word name derived from the name of the Propp function it represents, a one sentence description derived from the definition of the Propp function, and a longer instructional text derived from the species of the Propp function, where relevant.

Each Propp card has three levels of semantic detail. By default only the card's illustration and one or two word name are shown. When the user inspects the card by moving the mouse pointer over it the card scales up and the illustration and one-sentence description are shown, when the user moves the pointer away the card scales down again. Scaling up and down on mouse-over also serves to indicate that the Propp card is an interactive object and make the action of dragging the card with the left-

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<sup>4</sup><http://rayuen.com>

mouse button discoverable. When the card is viewed in the story editor the illustration, name, description and longer instructions are all shown. As suggested by teachers, the instructions are broken up into short phrases and structured using bullet-points, allowing children to be systematic when considering what they must do for a card and what options they have. Figure 5.11 on page 168 shows a Propp card at each level of semantic detail.

The Propp cards, their order and the name, description and instructions for each are specified in a JSON-formatted text file<sup>5</sup> that is read by the story maps application. This allows the text of the Propp cards to be tweaked, illustrations replaced, or the set of Propp cards available in the application to be changed or reordered easily without modifying or recompiling the application source code.

### 5.4.2 The Planning View

Figure 5.12 on page 169 is a screenshot of the opening screen of the application, the planning view. The user is presented with a selection of Propp cards to choose from in the green area at the top of the screen (the card store). The user can inspect each Propp card by moving her pointer over it to see it in more detail. By dragging and dropping Propp cards the user arranges the cards that she wants to use for her story in the initially empty grey area at the bottom of the screen (the story map).

Propp cards can be dragged from the card store to the story map, from the story map back into the card store, or rearranged within the story map. The position of Propp cards in the story map is determined by the user by drag-dropping. In the card store the cards always maintain Propp's overall sequence, when a card is dropped anywhere in the card store it snaps to its starting position in the card store. Figure 5.13 on page 170 shows the story map view after some Propp cards have been dragged from the card store into the story map. When a Propp card has been removed from the card store a faded copy of the card remains visible in the card store. This means that the user can see where a card she has moved came from, and when inspecting the remaining cards in the card store she can see which cards used to be between them so that the sequence of the Propp cards (which contributes to their meaning) is never broken in the card store.

Attached to the story map at the bottom of the window is the story map toolbar. The toolbar allows the user to enter a title for her story. The *Sort* button on the right of

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<sup>5</sup>JSON is an open standard data-interchange format that is easy for humans to read and write: <http://www.json.org>.

Figure 5.10: Some Propp cards from the final story maps application, shown at their lowest level of semantic detail. The Propp cards were illustrated by designer and illustrator Raymond Yuen (<http://rayyuen.com>).

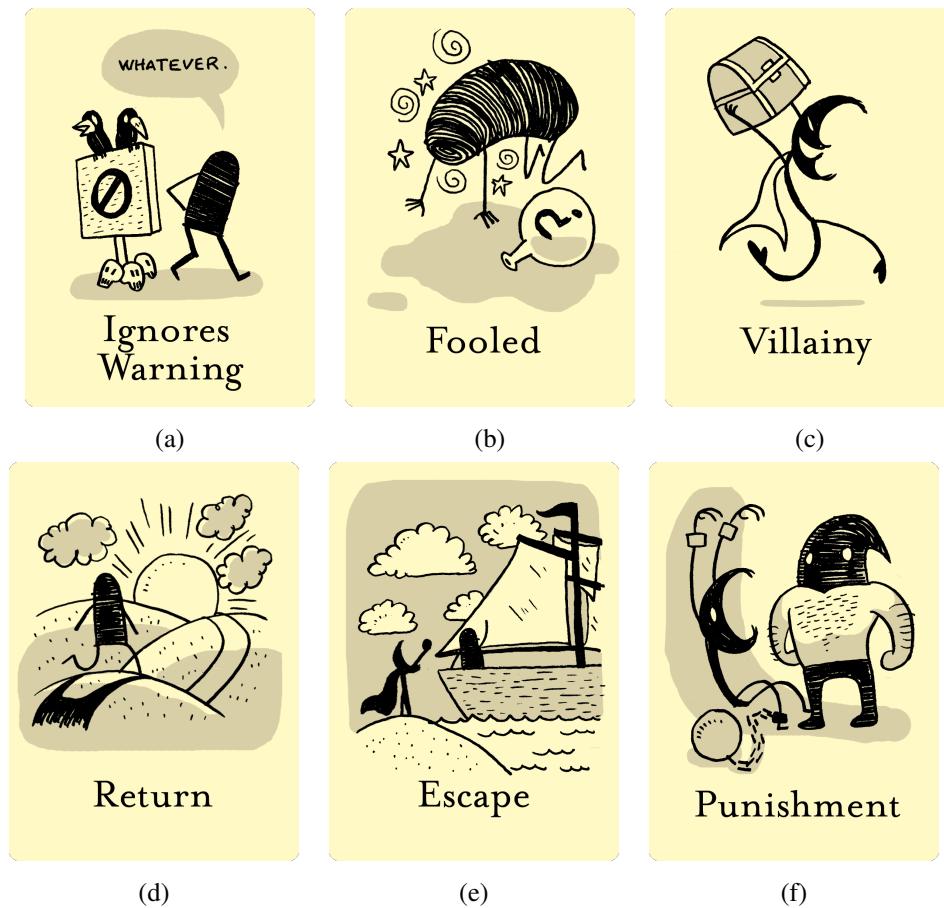


Figure 5.11: One of the Propp cards from the final story maps application shown at three levels of semantic detail.



(a) Normal.

(b) On mouse over.

Finds Out

The screenshot shows the "Finds Out" card in an editor interface. The card's title is at the top left. To its right is a detailed description: "The HERO finds out about the villainy." Below this is a list: "The hero could find out about the villainy because:" followed by a bulleted list: "• someone calls for help, or", "• someone tells the hero about it, or", "• someone asks the hero to help, or", and "• your own idea." At the bottom left of the card is a small thumbnail image of the card itself.

The hero finds out about the villainy.

The hero could find out about the villainy because:

- someone calls for help, or
- someone tells the hero about it, or
- someone asks the hero to help, or
- your own idea.

(c) In the editor view.

Figure 5.12: A screenshot of the planning view in the final story maps application.

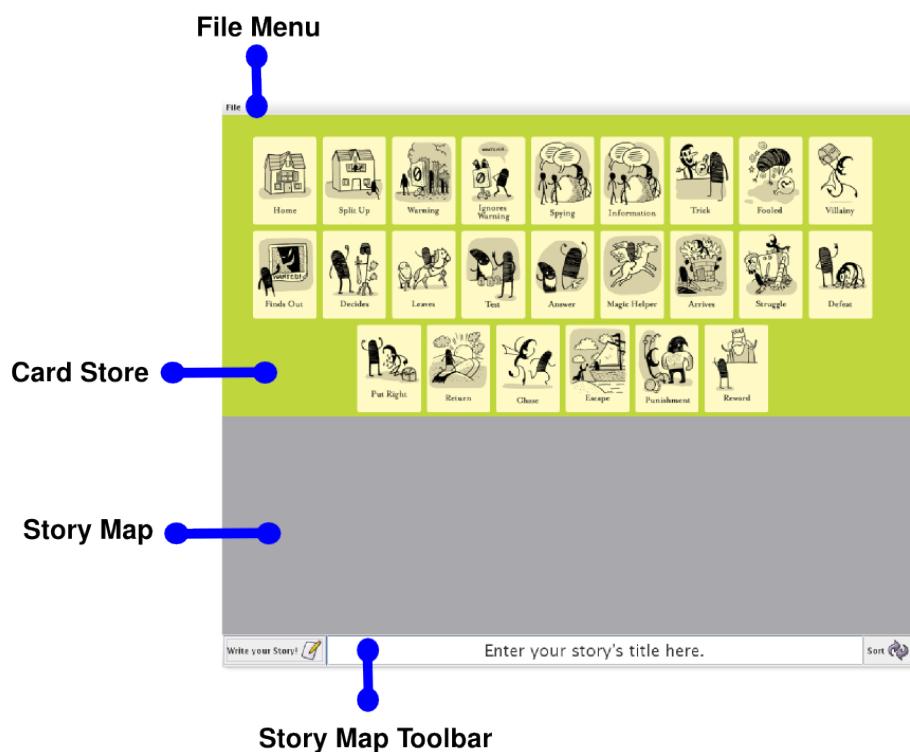


Figure 5.13: A screenshot of the planning view of the final story maps application after some Propp cards have been dragged from the card store (above) into the story map (below). A faded, non-interactive image of each moved Propp card is left behind in the card store.



the toolbar sorts the cards in the story map into Propp's overall sequence. The *Write your Story!* button on the left of the toolbar activates the story editor.

### 5.4.3 The Story Editor

Figure 5.14 on the following page is a screenshot of the story editor view. The story editor is activated when the user clicks the *Write your Story!* button. Figure 5.15 on page 173 illustrates the transition from the planning view to the editor view. In an animated transition the card store slides out of view above the top of the screen and the story editor slides into view from below. The story map moves from the bottom half of the screen to the top and remains in view. The toolbar attached to the bottom of the story map, previously at the bottom of the screen, is now in the middle of the screen. The label of the *Write your Story!* button on the story map toolbar has changed to *Go back to planning*. This button can be used to move between the planning and writing views at any time. As figure 5.15 on page 173 shows, conceptually the card store, story map and story editor are arranged in a column in the navigation space and moving between the two views consists of panning the camera up or down within this space. The use of animation makes the spatial relationships of the components intuitive to the user. The file menu is outside of the animation and remains at the top of the screen in both views.

In the top half of the story editor view is the user's story map. As in the planning view the user can see all of the cards in her story map and can use the mouse to inspect the cards or rearrange the cards within the story map by drag-dropping. If the user wants to remove a Propp card from her story map and put it back into the card store or wants to move a new card from the card store into her story map she must go back to the planning view to do so.

In the bottom half of the story editor view is the story editor itself. The story editor displays a single Propp card from the story map at a time. The card is displayed in the story editor at its highest level of semantic detail, with the full textual description of the card's Propp function. Below the card is a text area in which the user can enter her text for that card. The *Next* and *Prev* buttons to the right and left of the story editor bring up the next or previous card from the story map into the editor. The user can also click on a Propp card in her story map to show that card in the editor.

At the bottom of the story editor view is the editor toolbar. On the left hand side of the toolbar are buttons for the common text-editing functions cut, copy and paste.

Figure 5.14: A screenshot of the story editor view in the final story maps application.

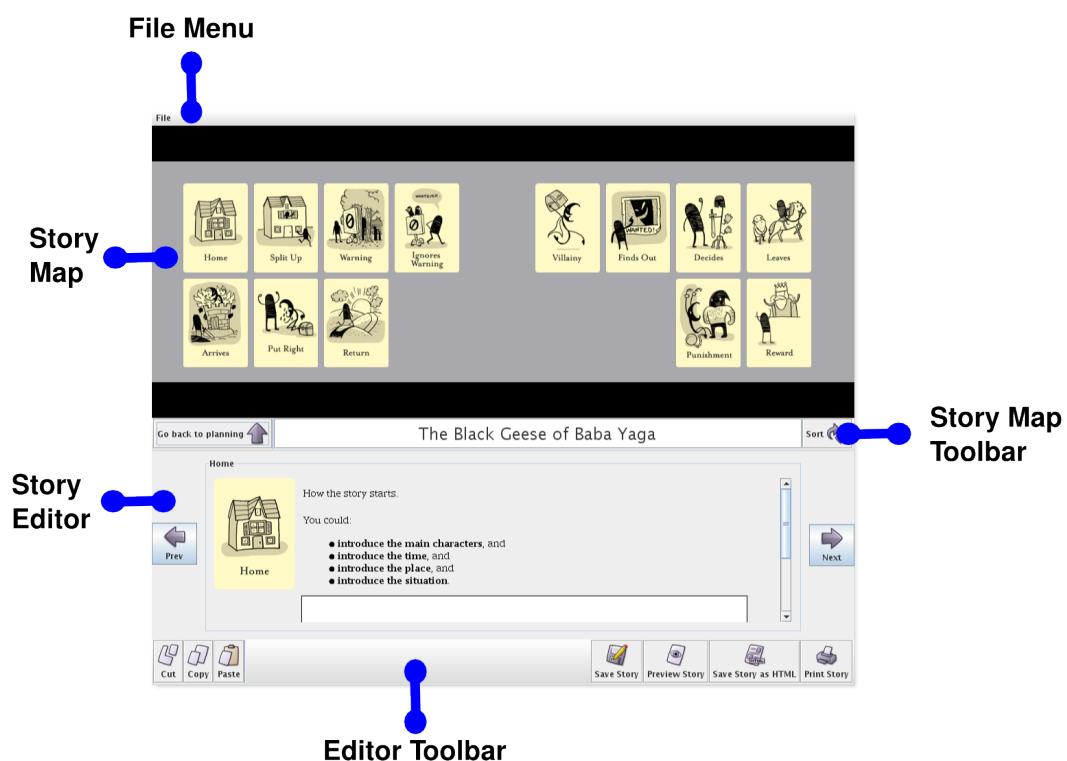
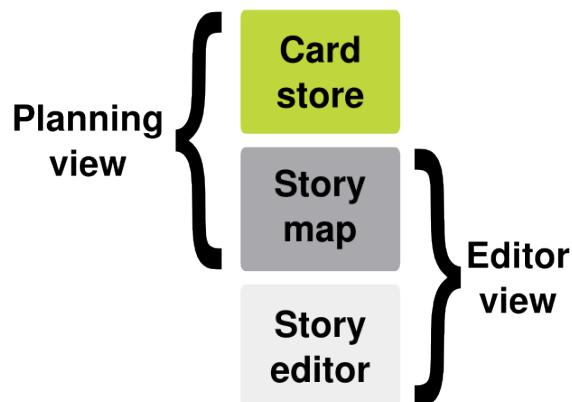


Figure 5.15: An illustration of the navigation space within which the card store, story map and story editor are contained. In the planning view the card store occupies the upper half of the user's viewport, the story map occupies the lower half, and the story editor is out of view. In the editor view the card store is out of view, the story map occupies the upper half of the viewport, and the story editor occupies the lower half of the viewport. The *Write your Story!/Go back to planning* button (located on a toolbar at the bottom of the story map) triggers an animated transition from the planning view to the editor view or back.

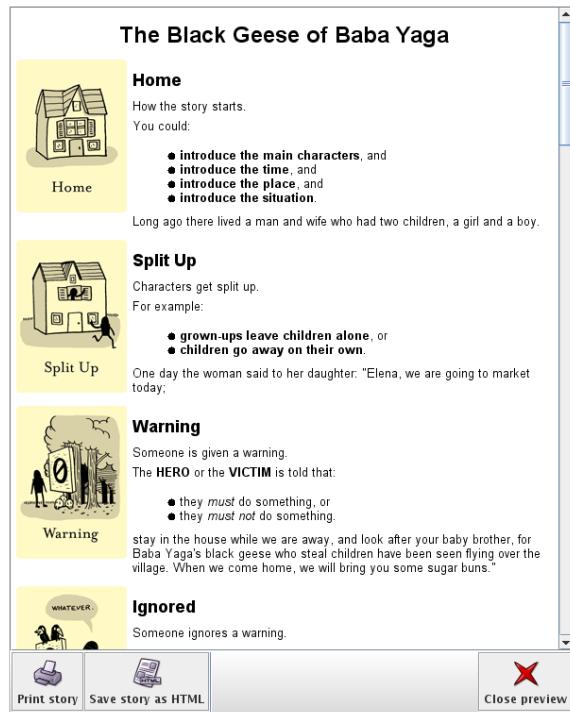


On the right hand side of the toolbar are four buttons: *Save Story* (clicking this button activates a file chooser dialogue for the user to select a location and file name to save a copy of her story to), *Preview Story* (clicking this button activates the preview window, see section 5.4.4), *Save Story as HTML* (clicking this button activates a file chooser dialogue for the user to select a location and file name to save an HTML copy of her story to) and *Print Story* (clicking this button activates a standard print dialogue).

#### 5.4.4 The Preview Window

Figure 5.16 on the following page is a screenshot of the preview window, a popup window that appears when the user clicks the *Preview Your Story* button in the *File* menu or on the story editor's toolbar. The window contains a preview of how the story will look when exported to HTML or printed. Story maps are printed with their title at the top and the Propp cards arranged vertically. To the right of each Propp card is the detailed description of that Propp card's function, followed by any text that the user has added to the Propp card. At the bottom of the preview window is a toolbar from which the user can print her story, export it to HTML, or close the preview window

Figure 5.16: A screenshot of the preview window in the final story maps application.



and return to her story map.

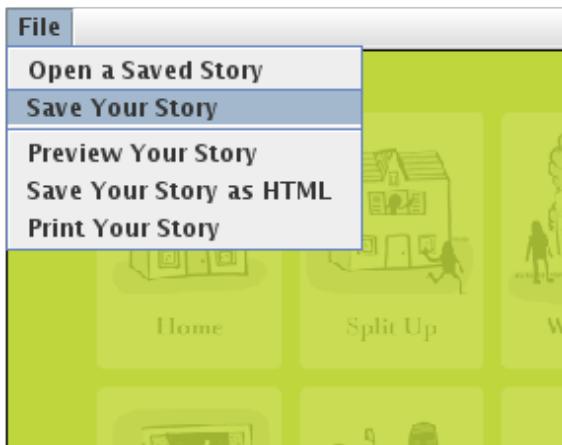
#### 5.4.5 The File Menu

The *File* menu (figure 5.17 on the next page) is always present in the top right corner of the application window. From the *File* menu the user can open a saved story map (a file chooser dialogue is activated for the user to locate her saved story map file), save her story map (a file chooser dialogue is activated for the user to select a location and file name to save a copy of her story to), preview her story (the preview window is activated), export her story to HTML (a file chooser dialogue is activated for the user to select a location and file name to save an HTML copy of her story to), or print her story (a standard print dialogue is activated).

#### 5.4.6 Saving and Loading

The user can save a copy of her story to a location of her choice by using the *Save your Story* button from the file menu or the story editor toolbar. However manual saving is *not* required because the application regularly saves its state automatically as the user works and when the application closes. Stories are saved using the story maps

Figure 5.17: A screenshot of the file menu in the final story maps application.



application's file format, and can be opened again using the *Open a Saved Story* item from the *File* menu. All aspects of the story maps application's state are saved: the Propp cards that the user has in her story map and their positions within the story map, any text that the user has added to any of the Propp cards, etc. The default location for saved stories that the user is presented with is the StoryMaps folder, which is created by the story maps application in the user's starting directory (in the user's home directory on Linux, in the user's My Documents folder on Microsoft Windows, etc.).

Primarily for research and development purposes, the story maps application automatically saves copies of story maps in an autosaved\_storymaps folder within the StoryMaps folder. Each time the story maps application is launched a subdirectory for the session is created in the autosaved\_storymaps folder, and copies of the user's story map are regularly saved in this directory as the user works and when the application closes. The names of the automatically saved files and their directories indicate the time and date at which they were created. A log file containing timestamped logs of the user's interactions in XML format is also saved in each session's directory alongside the automatically saved story maps.

## 5.5 Conclusion

The chapter has described the design, implementation and evaluation of a computational story authoring application based on Propp's morphology. The design of the application was based on the paper and card story writing tools that proved successful in the previous exploratory study, these foundations were described in section 5.1.

Formal requirements for the application were specified in section 5.2, and section 5.3 presented the implementation and evaluation of an initial prototype. Several significant modifications and many minor modifications were made to the prototype in response to evaluations with users, eventually arriving at the final implementation that was presented in section 5.4. This final implementation meets the requirements specified, and was used in the experimental study of children's story authoring that is reported in chapter 7.

Now that an initial story authoring application based on Propp's morphology has been designed, implemented and verified, it can form the basis of further work exploring the integration of more advanced features into the application.

# **Chapter 6**

## **Analysis of Narrative Structure in Children's Writing**

This chapter reports the development of a quantitative measure of narrative structure to be used in the experimental study reported in chapter 7. To answer the third thesis question: *Does using Propp's morphology affect the quality of the stories written? If so, in what ways?* the experimental study reported in chapter 7 compares stories written using the story maps application (see chapter 5) to stories written using a typical classroom story planning worksheet. This experiment requires a procedure for systematically comparing the narrative structures of stories written by children. The choice of story analysis tool is crucial to the validity of the study, because it embodies our notion of the construct being measured (Weigle, 2002, p.109).

This chapter begins by setting out the requirements for a story analysis tool (section 6.1) including a definition of the construct of *narrative structure* that is to be measured (section 6.1.1). Some of the available procedures and tools are then reviewed with reference to the requirements (section 6.2) and an analytic rating scale for narrative structure from Harris and Graham (1996) is selected (section 6.2.6). The selected rating scale was trialled on a set of test stories written by children using a writing task similar to those planned for the study, and was found to be inadequate. The scale was then iteratively modified based on the empirical test stories until considered adequate. Section 6.3 describes the inadequacies of the scale and details the method that was used to develop the scale and the changes that were made. Finally, an inter-rater reliability test of the modified scale was carried out with good results (section 6.3.2).

## 6.1 Requirements for a Story Analysis Tool

The requirements for the story analysis tool are as follows:

1. In order to answer the research question the tool must reveal both *whether or not* and *in what ways* the intervention affected the narrative structures of the stories written. It should record not only whether or not there is a significant difference between the narrative structures of two sets of stories, but in which aspects of narrative structure they differ and in which they do not.
2. Development and application of the tool must be *practical* with the resources available to the present study. There is limited time available, and the available rater and co-raters who must be able to apply the tool are non-experts. Expert teachers or experts in children's writing or creative writing will not be available to analyse the stories from the study. Instead, the researchers themselves will use the tool to analyse the stories and to carry out inter-rater reliability tests.
3. The tool must be *reliable* when applied by non-expert raters. The procedure for applying the tool should be specified clearly and in detail, avoiding difficult subjective decisions on the part of the raters.
4. The tool must be *valid*, it must adequately represent the construct of narrative structure that it is intended to measure. The study is concerned with narrative structure, and not with surface features of the story such as handwriting, spelling, grammar or word counts. *Narrative structure* will be defined in section 6.1.1 on the facing page.
5. The tool must be *sensitive* to relatively small differences between stories. Given that the study reported in chapter 7 has only a very brief intervention (a single story-writing session) any effect due to the intervention is likely to be small.

A suitable story analysis tool may be either quantitative or qualitative, but we note that the research question concerns whether or not and in what ways the intervention affects the stories written. The question of the *mechanisms* by which the intervention affected the stories might best be investigated by in-depth qualitative analysis and case studies, and is left for further research. The study reported in chapter 7 is expected to generate hypotheses for such further analysis.

### 6.1.1 Narrative Structure

To identify a suitable tool for the analysis of narrative structure in children's writing, a clear definition of what is meant by *narrative structure* is required. A definition of fairy tale narrative structure as described by Propp's morphology is not suitable because it would bias the results. Stories written using a writing tool based on Propp's morphology are likely to evidence just those features of narrative structure that such a construct would describe. Instead, an independent construct of narrative structure is required. At this stage an exhaustive review of definitions and models of narrative in the literature is neither necessary or practical, but a brief review of some of the models most often discussed in the context of the analysis of stories will be useful. In this section we consider four models of narrative structure: Mandler and Johnson (1977)'s schema derived from traditional folktales, Freytag (1894)'s model of narrative structure in ancient Greek and Shakespearean theatre, Labov and Waletzky (1967)'s model derived from oral, personal narratives, and Propp's morphology (Propp, 1968). Based on this review a definition of narrative structure that will be applied to the study reported in chapter 7 is arrived at.

Mandler and Johnson (1977) studied traditional folktales and arrived at a formal grammar that they claim "adequately describes the underlying structure of many folktales, fables and myths" (Mandler and Johnson, 1977, p.114). Mandler and Johnson (1977) used their model to conduct a developmental study of narrative recall. The model has been applied in several studies of story understanding, story recall, or children's learning of narrative structure. For example, Kroll and Anson (1984) found the model useful in analysing the structure of fictional narratives written by 9-year-old schoolchildren, and Riley (1993) used the model in a study of narrative comprehension.

In Mandler and Johnson (1977)'s model the components of a narrative structure are described by six main categories:

1. *Setting*. Introduction of the protagonist and other characters, the time and locale, and any other information that the listener needs to understand.
2. *Beginning*. One or more events that have the function of causing the protagonist to respond in some way, forming the development.
3. *Reaction*. The protagonist's reaction to the beginning and establishment of a goal.

4. *Attempt* by the protagonist to achieve the goal.
5. *Outcome*. The success or failure and immediate consequence of the attempt.
6. *Ending*. The long range consequence of the action or the added emphasis.

From his analysis of ancient Greek and Shakespearean drama Freytag (1894) arrived at a five-part model of narrative structure:

1. First, the *exposition* provides any necessary background information such as the setting (place and time), “early hints of the coming conflict,” introduction of the protagonist, antagonist and basic conflict, the nationality and life relations of the hero, the environment and an indication of the mood of the piece.
2. Next is the *inciting moment*: “the incident without which there would be no story” that sets the remainder of the story in motion by providing “the exciting force,” “the compelling force,” “the motive force for the action.”

Freytag (1894) describes the exciting force: “in the soul of the hero, there arises a feeling or volition which becomes the occasion of what follows; or the counter-play resolves to use its lever to set the hero in motion.”

3. In the *rising action* the basic conflict is complicated by the introduction of secondary conflicts and adversaries, obstacles between the protagonist and their goal.
4. The *climax* is the turning point, when the solution to the conflict is given.
5. The *falling action* is “the part of a story . . . following the climax and showing effects of the climax,” the conflict between protagonist and antagonist unravels, the protagonist wins or loses against the antagonist.
6. Finally, the drama ends with a *resolution* or conclusion in which the protagonist is either better off (in the case of a comedy) or worse off (in the case of a tragedy) than at the outset.

Labov and Waletzky (1967) recorded and studied a large number of oral narratives of personal experience from ordinary people (not highly skilled storytellers or highly literate people). From their analysis of these oral narratives they arrived at an ideal model of narrative structure against which any particular narrative can be assessed

for effectiveness and completeness of structure. Labov and Waletzky (1967)'s model is widely used in a number of different fields and is probably the best known model of narrative (Cortazzi and Jin, 2000, p.108). As with Mandler and Johnson (1977)'s model, several studies have used Labov and Waletzky (1967)'s model to analyse children's narratives (Taylor, 1986; Wilkinson, 1986; Hicks, 1990).<sup>1</sup>

Labov and Waletzky (1967) claim that a fully formed narrative has a six part structure:

1. The *originating function* or abstract summarises the point in advance or states a general proposition that the narrative will exemplify.
2. The *orientation* gives the setting: people, time, place, situation, etc.
3. The *complication* is a series of events that includes a problem, dilemma or change.
4. The *evaluation*, in which the story teller gives the narrative its significance by emphasising the relative importance of some narrative units over others.
5. The *resolution* is the outcome, result or solution.
6. The *coda* is "...a functional device for returning the verbal perspective to the present moment" that concludes the narrative, such as "I packed up and got out" or "and that was that," "and ever since then I haven't seen the guy," etc.

Finally, the plot functions of Propp's morphology can be categorised into seven parts (Propp, 1968, p.119):

1. The *initial situation* in which the characters (including the protagonist and antagonist) and their situation are introduced, and prophecies and forewarnings may be given, among other elements.
2. The *preparatory section* which prepares the way for, creates the possibility of, or facilitates the complication.
3. The *complication* in which the villain commits an act of villainy and the hero establishes their primary goal.

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<sup>1</sup>Cortazzi and Jin (2000, p.108) lists many studies from different fields that have applied Labov and Waletzky (1967)'s model.

4. The *meeting with the donor* in which the hero receives the magical agent.
5. The *action* in which the hero and helper struggle with and overcome the villain, the crisis is resolved, and the hero returns home.
6. The *beginning of the second move*, in which a new villainy occurs and the action is repeated anew.
7. The *continuation of the second move*, in which the hero competes with and defeats the false hero, the villain or false hero is punished and the hero is rewarded.

Comparing these four models of narrative structure, it is not surprising to find a high degree of correlation between Mandler and Johnson (1977)'s schema and Propp's morphology, since both are derived from traditional folktales. Also unsurprising is that Freytag (1894) and Labov and Waletzky (1967)'s models, being derived from different forms of narrative, do not correspond as well. Labov and Waletzky (1967)'s model contains the least structural detail, having merely a series of events called the complication where the other models have a number of distinct structural elements. Nonetheless, there is considerable overlap between all four models.

The setting in Mandler and Johnson (1977), exposition in Freytag (1894), orientation in Labov and Waletzky (1967) and initial situation in Propp are, clearly, the same element. The beginning in Mandler and Johnson (1977) (in which one or more events occurs that provoke a response from the protagonist) is equivalent to the preparatory section in Propp, and is part of the inciting moment in Freytag (1894) and part of the complication in Labov and Waletzky (1967). The protagonist's reaction and establishment of a goal in Mandler and Johnson (1977) corresponds to the complication in Propp, and is again part of the inciting moment in Freytag (1894) and part of the complication in Labov and Waletzky (1967). The attempt in Mandler and Johnson (1977) corresponds to the action in Propp, the rising action in Freytag (1894), and is part of the complication in Labov and Waletzky (1967). The outcome and ending in Mandler and Johnson (1977) correspond to functions such as the defeat of the villain, liquidation of the crisis, punishment of the villain and reward of the hero, etc. which are parts of the action and continuation of the second move in Propp, and correspond to the falling action and resolution in Freytag (1894).

Based on this comparison a definition of the construct of *narrative structure* can be derived. The following elements define a fully formed narrative structure:

1. A protagonist.

2. An antagonist.
3. A setting and initial situation.
4. A build up: a series of one or more events that leads to the complication.
5. A complication: an inciting moment which causes the protagonist to establish a goal.
6. The protagonist's attempt to achieve the goal.
7. An ending containing the immediate consequences of the action (success or failure in achieving the goal) and the longer range consequences or other form of conclusion.

Tools and procedures for analysing the narrative structures of stories can now be assessed for validity against this definition of the construct.

## 6.2 Procedures for the Analysis of Children's Writing

A survey of the literature will find a huge number of procedures for the analysis of children's writing, although actual instruments (as opposed to general descriptions) designed for the analysis of narrative structure in particular (as opposed to writing in general) are relatively fewer. The following review is not intended to be exhaustive, but instead assesses several of the most promising procedures for the analysis of narrative structure in children's writing and selects an analytic scale from Harris and Graham (1996) for use in the study reported in chapter 7.

### 6.2.1 Assessment of Children's Narrative Writing in Scottish and English Schools

#### 6.2.1.1 Learning and Teaching Scotland's 5-14 Guidelines

Learning and Teaching Scotland's *5-14 Guidelines*<sup>2</sup> cover the assessment of the Scottish curriculum in primary schools. The *5-14 Guidelines for English Language* break English language learning into four outcomes: *listening, talking, reading* and *writing*, of which *writing* is of interest to the current study. The *writing* outcome is further

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<sup>2</sup><http://www.ltscotland.org.uk/5to14/>

Table 6.1: Learning and Teaching Scotland's attainment targets for imaginative writing.

**Level A** Write a brief, imaginative story.

**Level B** Write a brief, imaginative story or poem or dialogue, with discernible organisation and using adequate vocabulary.

**Level C** Write a brief, imaginative story, poem or play, using appropriate organisation and vocabulary.

**Level D** Write imaginative pieces in various genres, using appropriate organisation and vocabulary.

**Level E** Write imaginative pieces in various genres, making some use of appropriate literary conventions.

subdivided into seven strands: *functional writing, personal writing, imaginative writing, punctuation and structure, spelling, handwriting and presentation, and knowledge about language*. Of these, *imaginative writing* is relevant to the present study. Teachers assign each student a grade from A-E (E being the most advanced level) for each strand, following attainment targets provided in the 5-14 Guidelines. Table 6.1 shows the attainment targets for the imaginative writing strand. The attainment targets are very general, they are intended as guidelines to be used to assess children's progress over periods of years. Additionally, the 5-14 Guidelines for English Language contains a programme of study for each strand. The programmes of study are designed to assist schools in planning and writing their own detailed policies within the levels specified by the attainment targets. Table 6.2 on the facing page shows the programme of study for imaginative writing.

For the present study, the 5-14 Guidelines do not meet the requirement of sensitivity, the study requires a much more detailed and specific analysis.

### 6.2.1.2 The Primary Curriculum

Assessment of the English national curriculum in primary schools conforms to *attainment targets* set out in the *primary curriculum*.<sup>3</sup> There are no attainment targets specific to narrative writing, only attainment targets for writing generally (see table

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<sup>3</sup><http://curriculum.qca.org.uk/>, key stage 2 covers the age-range being studied (7-11).

Table 6.2: Learning and Teaching Scotland's programme of study for imaginative writing.

**Level A** The teacher will stimulate excitement and enthusiasm for writing. A character or animal, perhaps linked to a reading programme or theme, may become a focus for imagined events; story tapes, broadcasts, role-play, expressive activities etc. can be starting points for imaginative explorations. Teachers will, by reading stories to pupils, develop their awareness of sequence by, for example, looking at beginnings, middles and endings.

**Level B** Teachers will help pupils select, draft what they wish to say, by questioning, giving a model (eg how will the story start?) and by discussing appropriate vocabulary. Group discussion of first draft can help clarify effectiveness. The teacher can draw pupils' attention to aspects of the story they know from reading, eg plot, character, dialogue and setting. Poetry writing depends on wide experience of listening to and reading poems, with discussion of structures and effects. At this stage content, rhythm and vocabulary are more important than rhyme.

**Level C** The teacher will help pupils to develop their imaginative writing by providing stimulating contexts and giving them an awareness of the importance of character, setting the scene and action. At this stage, pupils will be asked to look at events from the points of view of different characters. Pupils' writing of poetry will be aided by their reading aloud and occasional verse-speaking.

**Level D** New effects can be achieved by showing pupils how to turn basic story ideas into plays, radio, TV or film scripts or by having the story told in role, for example by a news reader. This will help pupils to discover the need for a flexible and varied vocabulary. From their reading, pupils can be made aware of differences in effects created by first or third person narrative, and the effects possible with present and past tense narrative.

**Level E** Pupils can now draw on knowledge from what they have heard and read, to use in their own imaginative writing. The teacher will use careful questioning to help pupils see the need for filling out the texture of stories in character development and setting. The notions of openings, turning points, resolutions can be introduced. Sections of stories can be written, discussed, redrafted, before being brought together to build longer, more fully shaped works.

6.3). As with Learning and Teaching Scotland's guidelines the levels are defined in very broad terms and additionally contain many criteria that are of no relevance to the present study. The attainment targets of the new primary curriculum (which becomes statutory in 2011) are similar.

### 6.2.2 Qualitative Analysis using Models of Narrative

Many studies have analysed children's story writing, recall or understanding using models of narrative. A good example of the approach is (Kroll and Anson, 1984). Kroll and Anson (1984) used the story grammar from Mandler and Johnson (1977) to analyse 25 stories written by 9-year-old schoolchildren and give a detailed description of the procedure and the features that it can and cannot identify in the stories analysed.

Analysis of stories using a story grammar is a formal procedure that shows how the stories are structured and can be applied consistently across a collection of stories (Kroll and Anson, 1984, p.157). The analysis produces an illustration of the underlying structure of each story that reveals which parts of narrative structure (according to the story grammar used) are present and absent in the story, and illustrates the degree of complexity of the story's narrative structure. The analysis can identify two types of feature in the stories analysed:

1. *General patterns of organisation.* For example, Kroll and Anson (1984, p.164) identified three main structural patterns in the stories they studied: stories in which the writer strings together events in a linear fashion with little causal connection; stories in which events are connected by embedding episodes within episodes and one action leads to or causes another; and longer and more detailed stories containing both linearly arranged and embedded episodes.
2. *Structural elements missing from particular stories.* When stories deviate from the story grammar 'gaps' in their underlying structures are revealed. For example, when a protagonist's internal response to a story event is omitted (but can still be understood from the protagonist's subsequent actions), or when an episode in a story is underdeveloped with specific events that might be developed further (Kroll and Anson, 1984, p.170).

Additionally, the procedure can be used to give a detailed description and comparison of particular stories. Kroll and Anson (1984, p.173) give an in-depth comparison

Table 6.3: English Primary Curriculum attainment targets for writing. Key stage 2 (ages 7-11) covers levels 2-5, with pupils expected to achieve level 4 by the end of key stage 2.

**Level 2** Pupils' writing communicates meaning in both narrative and non-narrative forms, using appropriate and interesting vocabulary, and showing some awareness of the reader. Ideas are developed in a sequence of sentences, sometimes demarcated by capital letters and full stops. Simple, monosyllabic words are usually spelt correctly, and where there are inaccuracies the alternative is phonetically plausible. In handwriting, letters are accurately formed and consistent in size.

**Level 3** Pupils' writing is often organised, imaginative and clear. The main features of different forms of writing are used appropriately, beginning to be adapted to different readers. Sequences of sentences extend ideas logically and words are chosen for variety and interest. The basic grammatical structure of sentences is usually correct. Spelling is usually accurate, including that of common, polysyllabic words. Punctuation to mark sentences - full stops, capital letters and question marks - is used accurately. Handwriting is joined and legible.

**Level 4** Pupils' writing in a range of forms is lively and thoughtful. Ideas are often sustained and developed in interesting ways and organised appropriately for the purpose of the reader. Vocabulary choices are often adventurous and words are used for effect. Pupils are beginning to use grammatically complex sentences, extending meaning. Spelling, including that of polysyllabic words that conform to regular patterns, is generally accurate. Full stops, capital letters and question marks are used correctly, and pupils are beginning to use punctuation within the sentence. Handwriting style is fluent, joined and legible.

**Level 5** Pupils' writing is varied and interesting, conveying meaning clearly in a range of forms for different readers, using a more formal style where appropriate. Vocabulary choices are imaginative and words are used precisely. Simple and complex sentences are organised into paragraphs. Words with complex regular patterns are usually spelt correctly. A range of punctuation, including commas, apostrophes and inverted commas, is usually used accurately. Handwriting is joined, clear and fluent and, where appropriate, is adapted to a range of tasks.

of two stories, contrasting a linear story lacking internal reactions to previous events with a highly embedded story containing many reactions.

However, Kroll and Anson (1984) considered their findings based on the grammar to be “very tentative” because “the process of diagramming children’s stories is often fraught with decisions which are subjective to some extent” (Kroll and Anson, 1984, p.164). The illustration produced for a particular story depends heavily on the analyst’s interpretation of the story. Kroll and Anson (1984) also found that the story grammar analysis had only a limited relationship to overall story quality as judged by holistic ratings (for a description of holistic rating see section 6.2.3). Although structurally incomplete stories were less satisfying, the types of story structure that the grammar identified (linear, embedded and mixed) did not equate with overall story quality. There were good and bad stories with each type of structure. Complex structure can contribute to story effectiveness if used well, but good stories also require good characterisation, use of special linguistic devices to achieve particular effects, etc.

Nonetheless, Kroll and Anson (1984) conclude that diagramming stories using a story grammar is “a very useful aid for appreciating the strengths and weaknesses of children’s stories,” giving insights into how a story has been developed and which alternative structures the author might explore (Kroll and Anson, 1984, p.178). Although structural analysis will (of course) not reveal everything that is important about children’s narratives, it is sometimes illuminating and is “a single band in the full spectrum of elements that make up a child’s story” (Kroll and Anson, 1984, p.182).

Analysis using a predefined model of narrative is a top-down approach. Narrative structure according to the chosen story model is imposed on the stories analysed. The hope is that the stories will differ significantly in some of the structural aspects that the chosen model of narrative measures, but the analysis may miss aspects of the story structures that are not captured by the model. Sharples (1985) presents a bottom-up approach to qualitative analysis of story structure by diagramming. The approach is similar to the use of a narrative model but allows structures to emerge from the stories analysed. Sharples’ procedure (Sharples, 1985, p.33) is first to divide the text into its constituent clauses and then to construct an *associative network* in which the nodes are clauses from the text and the arcs connecting the nodes are their functional relationships. A number of types of arc are available, including: detail, compare, contrast, then, implies, cause, result, if/then, and others. If the story under consideration evidences a new type of arc then it should be added to the set. The patterns produced

by diagramming the stories provide evidence of the writer's composing strategies, revealing features similar to those that Kroll and Anson (1984) identified using a story grammar:

"a 'what next' strategy results in a *chain* story structure, consisting of a series of clauses, each describing a simple event and linked by a temporal connective, such as 'then,' 'next' or 'after that' ... The 'limited plan' strategy produces a *tangled* story structure, with more schemas and interconnections than a chain narrative, but missing events, premises or conclusions that are vital to the plot." (Sharples, 1985, p.34)

As in Kroll and Anson (1984)'s study, parallel and embedded as opposed to linear structures are identified.

On analysing some of the stories from our study we found that, as with analysis using a model of narrative, the diagramming of stories using associative networks is highly subjective. The choice of which particular type of arc to use to connect two clauses was often particularly interpretive. Conclusions based on such analyses would therefore be tentative, although the overall patterns of the diagrams may be more important than the details.

Qualitative analysis using a model of narrative or associative networks is a promising approach for the present study, with the potential to identify specific differences between the narrative structures of stories and to detect small differences between stories. However, given the time available to the study it will not be practical to apply such an analysis to every story collected. The approach is therefore rejected for the present study, but may be a useful in a detailed analysis of a subset of the stories in further work.

### 6.2.3 Holistic Rating Scales

A holistic rating scale is a quantitative scale in which a single numeric score is assigned to each story based on an overall impression of the story (Weigle, 2002, p.112). Each script is read quickly and judged against a rating scale to assign it a score. The rating scale defines each possible score that may be given to a script, for each score briefly outlining in general terms the characteristics of a script at that level. In addition, a set of example scripts for each score are provided to help train raters to use the rating scale. A holistic rating scale can be designed to focus attention on particular aspects of the writing that are of most interest (such as narrative structure).

A typical holistic scale for narrative structure was used by Fitzgerald and Teasley (1983) in a study of the effect of instruction in narrative structure on children's writing. Participants identified as lacking a keen sense of narrative structure were selected and assigned to either a group that received special instruction in narrative or a control group. Instruction in narrative took place in sixteen 30-45 minute sessions across a seven week period. The children wrote several stories at different points during the study, and a five-point holistic scale for story structure was used to analyse the stories. The scale was a modification of one used by Stein and Glenn (1977). Each story is assigned to one of five categories:

1. Descriptive sequence (no clear goal; causal connections between statements rare).
2. Reactive sequence (no clear goal; causal connections between several statements).
3. Abbreviated episode (goal stated explicitly or easily inferred; certain categories, but not all categories, stated (e.g. a beginning, implied goal, outcome sequence would be an abbreviated episode)).
4. Complete episode (goal stated explicitly or easily inferred; all categories other than goal and ending explicitly stated).
5. Complex story (goal stated explicitly or easily inferred; multiple episodes present).

Using this scale Fitzgerald and Teasley (1983) reported a significant difference between treatment groups favouring the story structure group, showing that "instruction in narrative structure did have a strong positive effect on organization in children's writing" (Fitzgerald and Teasley, 1983, p.26). After instruction the story structure group tended to write stories that were organised most like abbreviated episodes, whilst the control group still tended to write reactive sequences (Fitzgerald and Teasley, 1983, p.20).

Holistic scoring has the practical advantage that it is quick and easy to apply, so can be used to rate a large number of stories. But a holistic scale may not be appropriate for the present study. First, it seems doubtful that the intervention will produce a difference measurable by such broad categories as used in the above scale. Fitzgerald and Teasley (1983)'s intervention had sixteen sessions whereas the present study has only one session. Second, too little information is recorded by a single score assigned

to a story. Such scores may identify whether or not an intervention affects the narrative structures of the stories written, but they will do little to identify *in what ways* the intervention affected and did not affect the narrative structures.

#### 6.2.4 Primary Trait Scoring

Primary trait scoring (Lloyd-Jones, 1977) is a quantitative method that uses a detailed and specific scoring rubric developed for a particular writing assignment, and judges how successfully each script has carried out the assignment (Weigle, 2002, p.110). The scoring rubric contains a number of different criteria developed for the writing assignment, such as use of dialogue, point of view and tense. For each criterion a number of levels (labelled 0, 1, 2...) are defined, and the rater assigns each script to one of the defined levels for each criterion. The level definitions have been developed using example texts produced in response to the writing task, and refer both to the writing task and to specific features found in the responses. For example, consider this scale for the *point of view* criterion of a scoring rubric from (Weigle, 2002, p.111):

#### POINT OF VIEW

- 0 Point of view cannot be determined, or does not control point of view.
- 1 Point of view is consistently one of the five children. Include “If I were one of the children...” and recalling participation as one of the children
- 2 Point of view is consistently one of an observer. When an observer joins the children , the point of view is still “2” because the observer makes a sixth person playing. Include papers with minimal evidence even when difficult to tell which point of view is being taken.

The associated writing task asks participants to write a story about five children playing and an observer watching them. These specific elements from the writing task and features of scripts generated in response to the writing task are used in the definitions of the levels.

As well as the rating scale itself, sample scripts at each level are provided along with explanations of why each sample script was scored as it was.

Primary trait scoring “has the potential of providing rich information about students’ abilities, provided that enough samples of writing are collected from each student” (Weigle, 2002, p.110), and a primary trait scoring rubric can be applied by “any

bright and verbal person" (Lloyd-Jones, 1977). But creating a rubric "requires patient labour, frequent trial readings, and substantial theoretical background—on average, sixty to eighty hours of professional time per exercise, not counting the time required to administer the proposed exercise to get samples, nor the time required to try out the proposed guide" (Lloyd-Jones, 1977).

Unfortunately a suitable writing task and associated primary trait scoring rubric for narrative structure has not been identified. Creating a new primary trait scoring rubric for a new writing exercise is beyond the resources available to this study, so the approach is rejected.

### **6.2.5 Analytic Rating Scales**

An analytic rating scale is a quantitative scale that scores each script on several criteria separately, assigning several scores to each script. Compared to primary trait scoring, the criteria and levels of an analytic scoring rubric are more general and are not defined with reference to a particular writing task. Compared to a holistic scale, an analytic scale has several criteria rather than one, so provides more detailed data. Separated criteria may be easier for inexperienced raters to apply, analytic scoring is better equipped than holistic scoring to score scripts that perform unequally on different criteria, and analytic scoring may be more reliable than holistic scoring (Weigle, 2002, p.120). However, an analytic rating scale takes more time to apply than a holistic scale, as many separate decisions must be made to score each script (Weigle, 2002, p.120). If a suitable analytic scoring rubric can be found or developed, then analytic scoring may be the most suitable approach for the current study.

A great many analytic scales have been developed for large-scale (e.g. national or state) assessment of children's writing. An example of the type is Glasswell et al. (2001, p.21). The report presents a set of scoring rubrics for different functions of writing, one of which is "to inform or entertain through imaginative narrative." This scale assesses four aspects of children's imaginative narrative: audience awareness and purpose, content inclusion, coherence: sequencing ideas and linking, and language resources for achieving the purpose. For each of these categories a story is assigned to one of three levels. Like most analytic scales to be found in the literature, this scale is not appropriate to the present study. First, the scale does not measure narrative structure in particular. Second, the categories of the scale are far too broad, they are intended to measure children's progress over a long period of time rather than to detect

an effect from a single session.

### 6.2.6 A More Detailed Analytic Scale

The study reported in Kigotho (2004) used a modified version of an analytic measure from Harris and Graham (1996) designed for scoring the inclusion and quality of the parts of a story. Kigotho applied the measure to stories written by 15-18 year-olds in an intervention study that asked whether explicit teaching of the structure of narrative could enable participants to write better stories. Kigotho's analysis showed that the six-week teaching intervention "served to improve the structure of children's stories in a global sense" (Kigotho, 2004, p.25) (that is, it improved the structure as measured by summing the scores for each of the measure's 19 criteria for each story) and showed significant improvement in scores for several of the specific criteria (Kigotho, 2004, p.27). Kigotho concludes that "A significant finding is that the intervention appeared to assist the students in writing structurally better narratives: that is they wrote stories that had a conflict, and the conflict was resolved and hence there was a reduced incidence of non-stories and recounts" (Kigotho, 2004, p.30).

Unfortunately Kigotho (2004)'s modifications to Harris and Graham (1996)'s measure are not reported in sufficient detail to be reused. Instead we returned to the original measure as provided in Harris and Graham (1996). This original measure is an analytic rating scale in which stories are rated according to eight criteria covering a broad range of aspects of story including main character, locale, precipitating event, the goal of the main character, the actions that the main character initiates in order to achieve the goal, the ending, and the emotional reactions of the main character. For each of these criteria a scale is given on which the rater must score the story. Most of the scales have three levels, each with a descriptor and some with brief examples, measuring the absence or presence of the element and how much detail the element is described with (for example a main character who is described in detail will score higher than one who is presented with little detail). Some of the criteria deviate from this general form. The result of rating a story is a score for each individual criterion as well as a summed overall score.

Of the procedures reviewed, this detailed analytic scale seems the most appropriate to the present study. The scale meets each of the requirements given earlier well:

1. The scale should be capable of answering the research question. By measuring several aspects of narrative structure separately the data recorded should reveal

not only whether or not there is a significant difference between two sets of stories, but which particular aspects of the narrative structures differ and which do not.

2. Application of the scale with the resources available to the present study should be practical. Although it takes longer to rate a story using an analytic scale with a number of criteria than to assign a single holistic rating, an analytic scale should be quicker to apply than diagramming using a model of narrative or associative networks. Also, the scale should be usable by non-experts because each of its separate criteria are clear and relatively simple. Applying these separate criteria should require less expertise than considering all aspects of the narrative structure together to assign a single holistic rating, and should be less subjective than diagramming stories using a model of narrative or associative networks.
3. The scale should be reliable. As discussed, analytic scoring may be more reliable and less subjective than holistic scoring or diagramming. Particularly because non-expert raters are to be used, the clarity and detailed specification of the scale should be important for reliability.
4. The scale should have validity. The scale measures in detail the construct of narrative structure that is of interest, recording the presence or absence and level of detail of a number of structural components.

A comparison of Harris and Graham (1996)'s scale to the seven part construct of narrative structure as defined in section 6.1.1 on page 179 finds a high degree of correspondence. The scale's *main character* criterion corresponds to the protagonist part; the *locale* and *time* criteria fit into the setting part; the *starter event* criterion corresponds to the complication or inciting moment part; the *goal* criterion also fits into the definition of the complication part, and the *action* and *ending* criteria correspond to the attempt and ending parts. Missing from the scale are the antagonist and build up parts (but see section 6.3.1 on page 197). The scale's *reaction* criterion (which concerns the emotional reactions of the main character) does not correspond to any part of the construct, and in many criteria the scale measures not merely the presence or absence of a structural element but its level of descriptive detail, which is not discussed in the construct. These additional elements, however, may provide interesting results and should do no harm.

5. The scale should have sufficient sensitivity. Relative to most of the other procedures reviewed, this tool should be sensitive to small differences between stories, because the use of many separate criteria provides a more fine-grained analysis. Qualitative analysis using a model of narrative or associative networks is the only procedure reviewed that may be more sensitive to small or subtle structural differences between stories.

Given this assessment, the decision was taken to use Harris and Graham (1996)'s analytic rating scale for the present study.

### 6.3 Development of the Quantitative Measure of Narrative Structure

Having decided to use Harris and Graham (1996)'s analytic rating scale for the present study, the scale was tested by applying it to stories written by children during the story maps application usability studies (see section 5.3.2 on page 160) and during the Maddiston Primary pilot (see section 7.3 on page 225) study and was found to be insufficient. The main problems with the measure are:

- Some terms are not defined, e.g. 'main character', making the measure unreliable.
- Imprecise words and unclear or insufficient examples are often used to define the levels on the scales used by the measure, making the scales unreliable and causing scores to tend toward the mid-ratings because the rater is not sure when to apply the lower or higher ratings.

For an analytic scoring procedure it is particularly important that the scoring rubric be explicit and detailed, with the criteria and their levels clearly defined, without vague or indefinable criteria that will lead to highly subjective scoring (Weigle, 2002, p.115).

- The measure is not calibrated to the expected range of variation in our data set. Some of the descriptors and examples used to define the higher levels on scales may be unlikely to be matched by stories written by the age group being studied, again causing the scores to tend towards mid-ratings. The level descriptors need to be revised to calibrate the scales to the expected range of variation, particularly

by replacing the examples used with empirical examples from the age group being studied.

- The measure is not sensitive enough, new levels need to be added to several of the scales to account for the full range of variance.
- In some places a single unidimensional scale is used to measure more than one dimension of variation, as when score 2 is assigned for the *starter event* criterion if the starter event is “complex, unusual or well-described”. These scales need to be split into separate scales for each variable being measured.

To address these problems the measure was refined and calibrated using stories from the Maddiston pilot ('the test data'). The stories from the pre-test phase of the pilot study were used as they are an unbiased and independent set of data. These stories were written by children who had not seen Propp's morphology or the story maps application and were written on paper without using Propp cards. Being from the pilot study the stories are not part of the data set from the main study that will be scored using the final version of the measure.

Weigle (2002, p.125) explains that scale descriptors for rating scales may be developed in one of two ways. If descriptors are developed *a priori*, then the ability to be measured is defined in advance and a number of levels of attainment ranging from none to complete mastery are described. The scale measures a writer's ability in absolute terms. The drawback of this approach is that it tends to produce scale descriptors that use imprecise distinctions between levels: excellent, very good, good, etc. Reliable application of such a scale may require experienced raters. If scale descriptors are developed *empirically* then they are generated by examining actual scripts gathered on a prototype writing task from participants with the range of writing proficiencies to be studied. By examination the characteristics that differentiate the scripts are defined and rank ordered by quality. A scale developed in this way measures a writer's ability relative to other writers in the population being studied.

We do not know how Harris and Graham (1996)'s scale was developed, but the use of imprecise distinctions between levels suggests an *a priori* approach. Harris and Graham (1996)'s scale was taken as a starting point and an empirical approach was used to refine the scale, rather than empirically developing a new scale from scratch.

Our approach to modifying Harris and Graham (1996)'s measure was as follows:

- After identifying the general problems with the measure we considered the mea-

sure one criterion at a time, evaluating each criterion by seeing how well it applied to the test data and refining each criterion in response to the data until we were happy that the criterion was reliable and sensitive enough.

- Descriptors on each criterion's rating scale were added, deleted or modified until it was felt that the scale could be applied cleanly to all of the stories in the test data.
- The general approach to modifying each criterion was: where important terms are left undefined derive suitable definitions from the test data; where a single scale measures multiple dimensions split it into one scale for each dimension, and discard any dimensions that are not of interest; rank each of the test data stories according to the now more precisely defined criterion and determine how many distinct levels are present in the ranked examples and how each level should be described; finally add examples from the test data to the descriptor for each level.
- We aimed to produce a five-point scale (0–4) for each criterion, but resolved that longer scales would be used if the test data demanded it and shorter scales would be used if the test data could not support five levels.

Weigle (2002, p.123) explains that the number of points on a rating scale should be based on the number of distinctions that raters can reliably make, the range of performances that can be reasonably expected from the population of test takers, and the use to which the ratings will be put.

### 6.3.1 Modifications made to Harris & Graham's measure

This section will consider each of the measure's criteria in turn, for each summarising the issues that were revealed by applying the criterion to the pretest stories and the modifications that were made in response.

#### 6.3.1.1 The 'Main Character' criterion

The *main character* criterion measures the absence or presence of a main character and whether or not the main character is described in detail:

0 No main character is established

- 1 A main character is presented, however, he/she is just a name on a page. Very little information or detail about the main character is provided.
- 2 A main character is presented and is described in such detail that he/she is always ‘real’ for you.

Harris and Graham (1996, Appendix B, p.225)

The immediate problem that a rater has when applying this criterion is that it is often not trivial to decide which character is the ‘main’ character, and the scale doesn’t provide a more precise definition. A few examples from the pretest stories will illustrate the difficulty. *Two Monkeys and a Big Bad Wolf* follows two monkeys Timmy and Coco. Coco is kidnapped by the wolf, Timmy rescues him, the wolf pursues them and the two monkeys work together to escape. The story gives equal attention to Timmy and Coco. Stories such as this, which have a protagonist (Timmy) and a victim (Coco) are very common in the pre-test data.<sup>4</sup> In *The Tiger and Bear Go Missing* Timmy the tiger goes out looking for food and gets lost, Ben the bear goes out to find Timmy but gets lost himself, they find each other and then work together to get home. In *The Evil Bear Becomes King* the writer spends as much time describing the villain Evil Bear as he does describing the heroes, this also occurs in several of the pretest stories. *The Missing Animal* follows the victim Pat for the first half of the story and then follows a team of protagonists who work together to rescue Pat for the second half, and the villain in the story is described in more detail than any of the other characters. In *Shaska and Kylan for the Crown* Shaska and Kylan must decide which of the two of them will have the crown, and a series of characters (three in total) work together to bring about a fair agreement, no one of these five characters seems obviously more central than the others.

One option would be to simply expand the criterion to cover ‘the main characters’ rather than a single ‘main character.’ This would avoid the need to strictly decide which character is the ‘main’ character and would allow the story to be scored according to whichever character(s) are described in most detail.

Kigotho modified this criterion by splitting it into two, *protagonist* and *antagonist*, each of which is rated as absent, present or elaborate, but the terms protagonist, antagonist and elaborate are not defined in Kigotho (2004) so it is not clear exactly how the scale would be applied. Similarly to Kigotho, we observed that some of the pretest stories have both a protagonist and an antagonist while some have a protagonist

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<sup>4</sup>Timmy and Coco also switch roles in the middle of the story.

only and we wanted to record this variation. We therefore split the *main character* criterion into *protagonist* and *antagonist* criteria and defined each of these terms. We added a binary field to each criteria to record whether or not multiple protagonists or antagonists are present, as this was a variable we observed in the pretest data.<sup>5</sup>

A second problem with the scale is the use of imprecise terms to define the levels (“just a name on a page,” “very little information or detail,” “he/she is always ‘real’ for you”) and the lack of examples to clarify the meaning of each level. We added examples from the pre-test data to the level descriptors and, in the case of level 2, we simplified and tightened up the wording. Defining the levels using empirical examples from authors in the age-range we are studying also helps to calibrate the scale to the degree of variation we expect to see in our data: we want the best stories to reach the highest level on the scale and the worst examples to be scored at the lowest level.

Lastly, the three-level scale is not sensitive enough. Three levels are not enough to account for all of the variation found in the pretest stories. When the pretest stories are grouped into the three levels, significant variation can be seen within levels. We stretched the scale to five levels, which we believe covers the range of variation in the pretest data.

Our final *protagonist* and *antagonist* criteria are as follows:

#### *Protagonist*

The protagonist is the main character of the story or, if there seems to be more than one main character, the protagonist is the character who establishes a goal as a result of the starter event and initiates action to achieve the goal.

- 0 No protagonist is established.
- 1 ...
- 2 A protagonist is presented: however, he/she is just a name on a page.  
Very little information or detail about the protagonist is provided: “a boy called Billy” or “Humphrey the hamster.”
- 3 ...
- 4 A protagonist is presented and described in detail (name and 3 or more details).

“A little lonely rabbit called Eric Robinson who lives in an empty cottage. No one would ever talk to Eric. Eric was very frightened of foxes because they had killed a lot of his family.”

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<sup>5</sup>The fields labelled ‘A’ in the protagonist and antagonist criteria below. Although data were collected for these binary fields, they were not used in the data analysis presented in the next chapter.

A The story contains multiple protagonists.

#### *Antagonist*

The antagonist is the main character or characters who oppose the protagonist.

- 0 No antagonist is established.
- 1 ...
- 2 An antagonist is presented: however, he/she is just a name on a page. Very little information or detail about the antagonist is provided: “a wolf” or “Max the dog.”
- 3 ...
- 4 An antagonist is presented and described in detail (name and 3 or more details).

“Evil Bear was the King of Bear Kingdom. He was always trying to kill Mini Monkey and Cool Koala because they always foiled his plans to blow up Bear Kingdom because nobody respected him.”

“In the distance was a fierce, tall, angry-looking fox. Eric was very frightened of foxes because they had killed a lot of his family. The fox laughed deviously.”

A The story contains multiple antagonists.

#### **6.3.1.2 The ‘Locale’ criterion**

The *locale* criterion records the location of the story and how well the location is described:

- 0 No locale or place is mentioned.
- 1 Locale given, but little description offered—“the town of Atlanta.”
- 2 Locale given, with more complete description offered or unusual locale is chosen—“the town of Atlanta which sits between two rivers and covers a space of three square miles.”—“The new planet, Andromeda.”

(Harris and Graham, 1996, Appendix B, p.225)

A number of modifications were made to this scale based on the pretest data. A ranking of the locations in the pretest stories according to their level of descriptive detail shows that the pretest data supports three distinct levels of detail, not two, so

the scale has been expanded adding an extra level, and examples from the pretest data have been added to the description of each level.

It is not clear whether the criterion is intended to record only the initial or overall locale, or whether locations visited by the characters throughout the story also apply, so it has been clarified that the criterion applies to all locations.

Testing the criterion on the pretest stories revealed that the stories sometimes contain both a *major locale* and one or more *minor locales*. A major locale is the overall setting, such as “in a land far away” or “in a forest called Bear Kingdom.” In the pretest stories major locales are always given near the beginning of the story, and there is never more than one major locale. Not all of the pretest stories have a major locale. A minor locale is a more specific location within the setting given by the major locale. Often the protagonist’s home is described: “a tree house built on a big tree,” “a house made of wood.” The villain’s lair is also a common location: “Ice Fortress,” “a laboratory”, “a cave.” Some stories contain other locations which are visited by the characters during the events of the story, such as a forest, a village, etc. The stories differ in the presence or absence of minor locales and in the number of minor locales.

Splitting the criterion into major and minor locales mirrors Kigotho’s modification, which introduced major and minor *settings* that covered place, time and the introduction of characters among other elements (Kigotho, 2004, Appendix 1).

Attempting to modify the scale so that it records the presence or absence of a major locale and the presence or absence and number of minor locales reveals two difficulties. First, whenever a story in the pretest data has both major and minor locales it is clear which is the major locale, but in cases where a story has only one locale it is not clear whether the locale should be considered as a major or a minor locale. Locations such as “the forest” could appear as either a major or a minor locale depending on their relation to the other locales of the story, when in isolation a location like this cannot be classified as one or the other. Second, when there are multiple minor locales it can be difficult to reliably count the exact number of locales present, as counting depends on how far the rater wishes to decompose locations into individual units for counting. For example, is “the house” counted as a single locale, or do “the kitchen” and “the front room” count as two different locales because each is used as the setting for different actions? The following modified scale accounts for both problems, avoiding the need to classify an isolated location as major or minor and simply recording the presence or

absence of multiple minor locales without requiring the rater to count them:<sup>6</sup>

- 0 No locations or places are mentioned.
  - 1 At least one simple location is given—"a house," "a castle," etc.
  - 2 At least one location is described with a little detail—"they lived in a giant mansion in the woods near the river," "their tree house was built in a big tree" or "a little empty cottage in the forest."
  - 3 At least one location is described in greater detail—"In a dark, scary house in a creaky wood" or "a house made of wood with wooden chairs, wooden tables, wooden beds and bedsheets made of leaves."
- A There is both a major location and at least one minor location.
  - B There is more than one minor location.

#### **6.3.1.3 The 'Time' criterion**

The *time* criterion measures the absence or presence and level of detail of the time at which the events of the story occur:

- 0 No time given.
- 1 Time given, but traditional in reference—"once upon a time"—"a long time ago."
- 2 Time given, but unusual in reference or more complete description—"March 31st at 3:00 in the afternoon"—"a long time ago, before men walked the earth."

(Harris and Graham, 1996, Appendix B, p.226)

These three levels are sufficient to measure the variation present in the pretest stories, but testing the criterion on the pretest stories reveals that, as with locale, both major and minor times are present. Again, it is not clear whether Harris and Graham (1996)'s original scale is intended to refer to the major time only or to apply also to minor times throughout the story. We clarify that the scale applies to all time references

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<sup>6</sup>The binary fields labelled 'A' and 'B' on the modified scale record whether or not there are both a major and a minor location and whether or not there are multiple minor locations. Although data were collected for these binary fields, they were not used in the analysis presented in the next chapter.

throughout the story, and add two new fields to the scale following the same pattern as used to extend the *locale* criterion:<sup>7</sup>

- 0 No time given.
- 1 Time given, but traditional in reference—"once upon a time"—"a long time ago."
- 2 Time given, but unusual in reference or more complete description—"March 31st at 3:00 in the afternoon"—"a long time ago, before men walked the earth."
  - A Both a major time and at least one minor time are present.
  - B More than one minor time is present.

#### 6.3.1.4 The 'Starter Event' criterion

The *starter event* criterion records the absence or presence of a precipitating event, and whether it is "complex, unusual or well-described":

- 0 The precipitating event which causes the main character to establish a goal is not presented.
- 1 The precipitating event which causes the main character to establish a goal is presented. The precipitating event can be a natural occurrence (a landslide), an internal response (loneliness), or an external action (the dragon stole the jewel).
- 2 Add one point if the precipitating event is complex, unusual or well-described—"A meteor hit the mountain, and then started a landslide which hit the village. As a result the man lost everything that he owned"—"His mother left him home day after day. As a result, Johnny was lonely."

Harris and Graham (1996, Appendix B, p.226)

This criterion has a number of significant problems. If a rater assigns level 2 to a story the scale does not record whether level 2 was assigned because the starter event was complex, unusual or well-described. It seems desirable to record each separately.

The scale is difficult to apply reliably because it uses the imprecise terms *complex*, *unusual* and *well-described*, and it is not clear whether the examples given for level

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<sup>7</sup>Although data was collected for the two new binary fields labelled 'A' and 'B' on the scale, they were not used in the analysis presented in the next chapter.

2 are intended as examples of complex, unusual or well-described starter events, or some combination of the three. To apply the scale reliably it is crucial that the terms be clearly defined and that clear examples of each are given. Examples at different levels of the scale are also needed to calibrate the scale to the range of variation expected from the stories we are rating.

The scale is not sensitive enough, three levels are not enough to measure all of the variation that can be observed in the pretest data.

Finally, the scale cannot account for stories that contain multiple starter events. Such stories are possible, Propp's morphology allows for them and there is one such example in the pretest data.

It was decided to split the scale into two separate scales to measure the complexity of the starter event and how well-described the starter event is respectively. The third dimension, how unusual the starter event is, was discarded because *unusual* could not be defined reliably in the context of stories written by children who were free to choose or invent their own genres, characters, settings and plots.

### **Defining 'complex'**

We noticed that almost all of the stories in the pretest data contain *preparatory events*, distinct events that are causally connected to the starter event and that precede the starter event chronologically. For example, in *Two Monkeys and a Big Bad Wolf* Timmy and Coco are asleep in their tree house which is in a very high tree, Coco falls out of bed and hits his head, then a wolf grabs Coco and takes him away. The wolf's kidnapping of Coco is the starter event, the fall from the tree house is a preparatory event.<sup>8</sup> There are many examples of simple, one-event preparations like this. In *The Evil Bear Becomes King* Kool Koala goes out (on his own) for his morning walk and then gets kidnapped. In *Penguin and Panda Cause Problems* Pat goes home to get dinner and walks through the forest on his own, where he gets attacked. In *The Tiger and Bear Go Missing* Timmy goes out looking for food in the woods near the river and then gets lost, and so on. Simple preparations in the pretest stories almost always conform to Propp's function *absentation*. More complex examples contain more than one causal connection and are less likely to conform to a specific Propp function. In *Big Monkey Rescue* it is raining outside, so the animals are bored, so Jo decides to play a prank on Max, the prank makes Max furious so he puts Jo in a cooking pot and begins

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<sup>8</sup>The fact that they were asleep in their tree house and that the tree house is in a tall tree, more a circumstance than an event, is also a contributing factor.

reading a recipe for monkey stew. Multiple causal connections are not always in series but can be in parallel. In *The Missing Animal* Pat goes into the forest (on his own) to find food, Bad the Baboon also happens to be in the forest looking for food, the two things together contribute to the starter event: Bad kidnaps Pat and takes him back to his cave to eat him. This preparation has the same form as some of the simpler preparations mentioned, but it provides an explanation for the villain's being in the forest as well as for the victim's. Finally, in rare cases the preparation can be very complex and elaborate, such as in *The Dare that Went Wrong* which features an escalating series of dares between two characters eventually culminating (after perhaps six distinct causal connections) in the crime of setting the village shop on fire, which acts as the starter event of the story.

These preparatory events correspond to the first seven functions (after the initial situation) in Propp's morphology, what Propp calls the *preparatory part* of a tale:

“Absentation, the violation of an interdiction, delivery, the success of a deceit, all prepare the way for this function [Villainy], create its possibility of occurrence, or simply facilitate its happening. Therefore, the first seven functions may be regarded as the *preparatory part* of the tale, whereas the complication is begun by an act of villainy. (Propp, 1968, p.31)

The examples of “complex, unusual or well-described” starter events given by Harris and Graham (1996)'s scale seem to be examples of starter events with some preparatory events. Neither of the examples contain any descriptive details so we assume that these are meant as examples of “complex” starter events rather than “well-described” ones,<sup>9</sup> that is: what Harris and Graham (1996) mean by *complex* seems to be *includes some preparatory events*.

Adding a new criterion for preparatory events, distinct from the criterion for the starter event, was attempted but we found it difficult to strictly distinguish between preparatory events and description of the starter event itself. The starter event may, of course, be decomposed into multiple events as far as the writer or rater wishes to imagine, and it becomes difficult to decide whether a distinct event is a preparatory event or part of the starter event.

We therefore decided to define all preparatory events as part of the starter event and to define a starter event that includes some preparatory events as a complex starter event.

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<sup>9</sup>The first example, with a meteor hitting a mountain, is probably is also meant as “unusual.”

It is tempting to define complexity by counting the number of causal connections, with zero complexity defined as no causal connections leading up to the starter event, a simple preparation as a single causal connection, and so on. This approach was found to be problematic because it is difficult to count the number of causal connections reliably. A rater must not only decide what to count and what not to count as a causal connection, but also how far to decompose the events into distinct causal connections. For example, Jo plays a prank on Max so Max decides to cook Jo might be counted as a single causal connection, or it might be decomposed further: Jo plays a prank on Max, so Max gets angry, so Max decides to cook Jo, so Max puts Jo in the cooking pot. This problem with counting tends to occur whenever there is more than one causal connection. To avoid this issue we rely on examples rather than strict rules to guide the rater.

The following scale was derived by ranking all of the pretest stories in order of the causal complexity of their starter events, determining how many levels of variation were expressed between the stories, and then choosing clear examples of each level. The resulting scale is a five-level scale, so is more sensitive than the original three-level scale and accounts for all of the distinct levels of variation that we judged to be present in the pretest data.

#### *Starter event: causal complexity*

The starter event is the precipitating event which causes the protagonist to establish a goal. The precipitating event can be a natural occurrence (a landslide), an internal response (loneliness), or an external action (the dragon stole the jewel).

Causal complexity refers to the events leading up to the starter event that prepare the way for, make possible or facilitate the starter event.

0 No starter event is presented.

1 A starter event is presented and is a single isolated event:

“When Mistletoe woke up she realised Bluestar was missing.”

2 A simple series of events brings about the starter event.

“One day Timmy went out looking for food. Suddenly Timmy got lost.”

“One day Cool Koala went for his morning walk. A man grabbed him.”

“Jimmy went to his house to get dinner. He was walking through the forest and got ambushed.”

3 ...

4 A complex series of events brings about the starter event.

They were walking down the street and Peddy the pigeon says “Do you want to play dares?” “Ok” said Sparks, “I dare you to go into the barber’s and dance for ten seconds.” So Peddy done it. He came back out and Peddy dares Sparky to set the shop on fire. “Ok” said Sparky, so he done it. There was flames blazing through the windows.

### **Defining ‘well-described’**

The second dimension of the starter event criterion measures how ‘well-described’ the starter event is. We define ‘well-described’ as referring to the descriptive details that are explicitly given in the text. The pretest stories contain several different types of descriptive detail: reported speech, location or name of a place, details of the action (how it happened), adjectives and adverbs, indications of emotional responses, time and others. It is tempting to define the levels by counting the number of descriptive details and the number of different types of descriptive detail present, but this approach has the same problem as with causal connections: the rater must not only decide what to count and what not to count as a descriptive detail of a particular type, but how far to decompose descriptions into distinct descriptive details for counting. Since this counting process cannot be strictly defined we rely instead on examples to define the amount of detail at each level.

The same approach as used to derive the scale for causal complexity was applied: the starter events from the pretest stories were ranked in order of their descriptive detail, the number of distinct levels expressed by the data was judged, and examples from the data were used to define each level. Again the result was a more sensitive five-level scale.<sup>10</sup>

#### *Starter event: descriptive detail*

Descriptive details can be reported speech, location or name of a place, details of the action (how it happened), adjectives and adverbs, indications of emotional responses, time or other.

- 0 No starter event is presented.
- 1 A starter event is presented but no descriptive details are given.  
“Roxy the cat went outside and went missing.”
- 2 . A starter event is presented and one or two simple descriptive details are given.

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<sup>10</sup>The binary field labelled ‘A’ on the scale, which records whether or not there are multiple starter events, was not used in the analysis presented in the next chapter.

"Coco fell out of his tree and hit his head. It was bleeding. A wolf grabbed Coco with his big sharp teeth. The wolf took Coco away."

3 ...

- 4 The starter event is well described: several descriptive details are given and details of different types are used.

So one day Pat went out to find some food. But from the middle of nowhere Bad the Baboon was hiding behind a tree. He was looking for something to eat too. So he sneaked behind trees trying to get to him. He was two trees away from him. He was as fast as lightning. Now one tree away from him, then he was right behind him. "GOT YOU!" shouted Bad, "now I've got something to eat." So they walked to his tunnel.

- A There is more than one starter event.

#### 6.3.1.5 The 'Goal' Criterion

The *Goal* criterion records the presence or absence of a goal, how clearly articulated the goal is, and whether or not multiple goals are present:

##### *Goal*

- 0 The goal or purpose of the ~~main character~~ protagonist is not established.
- 1 The goal or purpose of the ~~main character~~ protagonist is established, but not clearly articulated—"Bill set off to do something."
- 2 The goal or purpose of the ~~main character~~ protagonist is clearly articulated—"Bill decided he would rescue his friend."
- 3 Add one additional point if two or more goals are clearly articulated.

(Harris and Graham, 1996, Appendix B, p.226, Harris and Graham (1996)'s *main character* replaced with *protagonist*.)

The pretest stories were ranked according to this scale and no significant problems were found. It was decided to leave the scale unchanged, other than to replace "main character" with "protagonist". The four-level scale seems to account for all of the variation present in the pretest stories, with none of the stories reaching level 3.

A problem that occurs when applying the scale is how to deal with stories that never explicitly articulate the protagonist's goal, but where the goal seems clear to the reader from the sequence of events, and so may not need to be articulated. It was decided that level 2 must refer to goals that are explicitly articulated, goals that are left implicit should be assigned to level 1.

An obvious question to ask is whether the scale should attempt to record multiple goals that are not clearly articulated. We believe that counting unclear or implied goals is problematic and so the scale is correct to record multiple goals only when they are clearly articulated.

Another possible extension would be to broaden or multiply the criterion to record the goals of characters other than the protagonist, particularly the antagonist, but based on what could be observed in the pretest stories we did not think this extension was necessary.

#### 6.3.1.6 The ‘Action’ criterion

The *Action* criterion refers to the actions that the main character undertakes in order to achieve the goal, it is a complex scale that differs in form from the others:

- 0 The actions that the ~~main character~~ protagonist initiates in order to achieve the goal are not presented.
- 1 What the ~~main character~~ protagonist does in order to achieve the main goals is presented.

2-4 Add one point for each of the following:

- A Actions or events happen in a logical order (i.e., they are not inconsistent).
- B Ingenuity or originality are used to solve situations or predicaments—“Bill made a laser reflector to capture his enemy.”
- C If there is more than one well-defined episode. For example, if the ~~main character~~ protagonist tries one action and is unsuccessful (storms the castle but has to retreat due to boiling oil) and then tries another action (tries to sneak in through a tunnel), add one point. Similarly, if the ~~main character~~ protagonist goes to one place during his travels and then to another, add one point.

(Harris and Graham, 1996, Appendix B, p. 226, Harris and Graham (1996)’s *main character* replaced with protagonist.)

Applying this criterion to the pretest stories reveals a number of problems. Unlike other criteria (main character, starter event), the scale does not record how detailed or well-described the presentation of the action is, though the pretest stories vary widely in this respect. Point A, *actions or events happen in a logical order*, seems like a

criterion that applies to the story as a whole, it is not clear why it was grouped under action only. The terms “ingenuity or originality” and “more than one well-defined episode” are imprecise.

We decided to extend the criterion to measure the amount of descriptive detail that the action is described with, modelling our modification on our previous *Starter event, descriptive detail* scale, and additionally to move the point for “actions or events happen in a logical order” into a separate criterion that applies to the entire story. We left the points for ingenuity or originality and for multiple episodes as they are, although we have doubts about their reliability.<sup>11</sup>

To calibrate the scale and define the levels we ranked all of the action sections of the pretest stories according to the amount of descriptive detail, and used this ranking to determine the number of levels and to find examples for each level. The result was a five-point scale similar to the scale for the starter event criterion:

#### *Action*

Action refers to the action(s) that the protagonist initiates in order to achieve the main goal(s).

Descriptive details can be reported speech, location or name of a place, details of the action (how it happened), adjectives and adverbs, indications of emotional responses, time or other.

0 The actions are not presented.

1 The actions are presented but no descriptive details are given.

“Billy was walking through the forest and saw Jimmy getting attacked so Billy went to save Jimmy. The attackers started to run away. Jimmy and Billy went home for dinner.”

2 The actions are presented and one or two simple descriptive details are given.

“Timmy woke up and Coco was gone. Timmy got out of his bed and went to look for Coco. He saw a wolf about to eat Coco, Timmy quickly took Coco and ran away. Timmy fell over and Coco had to save him, they both ran up a big tree they jumped from tree to tree and got to their tree house where the wolf could not get them.”

3 ...

4 The actions are presented and are well-described: several descriptive details are given and details of different types are used.

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<sup>11</sup>These two binary fields, labelled ‘A’ and ‘B’ on the scale, were not used in the analysis presented in the next chapter.

Cara started to make her way to the pink gem castle to get magic from the Queen of Animaltopia. Cara reached the gigantic castle, with confidence she knocked on the door of steel. “Who is there?” a deep voice bellowed. “Me, Cara the Confident Crocodile, I’m here to buy magic to help my friend.” “Well...” said the voice, “...the queen asks you to come in” and the door opened...

- A Ingenuity or originality are used to solve situations or predicaments—“Bill made a laser-reflector to capture his enemy.”
- B There is more than one well defined episode. For example, the protagonist tries one action and is unsuccessful (storms the castle but has to retreat due to boiling oil) and then tries another (tries to sneak through in a tunnel). Or the protagonist goes to one place during his travels and then another.

The score for this criterion is likely to correspond closely to the length of the relevant piece of writing, a piece of writing that breaks down the action describing it in smaller units and uses several different descriptive details of different types is bound to be longer than one that uses no descriptive details.

Point A from the original *Action* criterion (“actions or events happen in a logical order”) was expanded to produce a new *Coherence* criterion applying to the entire story:

#### *Coherence*

- 0 Actions or events happen in a mostly or completely illogical order, there are many significant inconsistencies.
- 1 ...
- 2 Actions or events happen in a mostly logical order, there are few significant inconsistencies.
- 3 ...
- 4 Actions or events happen in a completely logical order, there are no significant inconsistencies.

Almost all of the pretest stories score a clear 4 on this criterion, with only a few stories showing some minor inconsistencies.

##### **6.3.1.7 The ‘Ending’ criterion**

The ending criterion records whether or not the precipitating force of the story is finally resolved:

- 0 No real ending, lack of conclusion, or story seems unfinished. In other words, the long-range consequences of the main character's protagonist's actions are not resolved.
- 1 Long-range consequences of the main character's protagonist's actions are resolved, but the ending or conclusion is fairly common—"They lived happily ever after—Billy slew the dragon and rescued the princess."
- 2 Long-range consequences of the main character's protagonist's actions are resolved. In addition, the conclusion or ending is unusual, or the ending contains a moral—"This is how he got the name Eagle Arrow—It just goes to show that crime doesn't pay."—"The prince was killed, and so was his horse."

(Harris and Graham, 1996, Appendix B, p.227)

Applying this scale to the pretest data reveals that the definition of level 2 is too restrictive. Some of the pretest stories contain endings that include the villain being punished in some way. In *The Emperor Penguin* after Johnny rescues Joe from the cage that Emperor Penguin has trapped him in they shoot the villainous penguin in the foot with a heat ray and then trap him in his own cage. In *The Evil Bear Becomes King* after the victim has been rescued the victim and protagonist work together to destroy Evil Bear's castle using his own cannon.

Alternatively, the ending of *The Bird and Groom* contains an extended wedding scene involving two of the protagonists. Other types of ending material can easily be imagined. It seems desirable to record these instances as they clearly differ from stories that simply end with the resolution of the initial crisis, but the punishment of the villain or rewarding of the hero do not fit under the definition of level 2 as "unusual" or "contains a moral."

Simple ending phrases of the type described by level 1, "they all went home", "they all lived happily ever after," etc. are common in the pretest stories, but there are also some endings that are more original but not as detailed as the extended punishments and rewards described above. In *Two Monkeys and a Big Bad Wolf* the monkeys escape from the wolf and get home safely, and the next morning Coco wakes up with a sore head. In *Monkey Trouble* the monkeys gain super powers which they use to escape from captivity, and then they go home and become superheroes. These examples suggest that a new level could be added between 1 and 2.

We decided to broaden the definition of level 2 and to insert a new level between 1 and 2 to account for the full range of variance observed in the pretest stories. Again the pretest stories were ranked according to their endings to determine the definitions and find examples for each level. The result is the following new scale:

- 0 No real ending, lack of conclusion, or story seems unfinished. In other words, the long range-consequences of the protagonist's actions are not resolved.
- 1 Long-range consequences of the protagonist's actions are resolved, but the ending or conclusion is fairly common—"They lived happily ever after—Billy slew the dragon and rescued the princess."
- 2 ...
- 3 Long-range consequences of the protagonist's actions are resolved and the conclusion or ending is more interesting: it is unusual, contains a moral, reveals the fates of the characters (e.g. the villain is punished or the hero is rewarded), brings closure to the story or wraps up loose ends, hints at a sequel, etc.

The Emperor ran away in case he died. Joe picked out his heat ray and shot the Emperor in the foot as a joke. Now the Emperor was hopping and he was going very slow so Joe ran and caught him. Johnny said "Put him in his own cage, he he", "Ok buddy." "Let me go now!" shouted the Emperor.

#### 6.3.1.8 The 'Reaction' criterion

The reaction criterion measures the emotional reactions expressed by the main character throughout the story. The original scale refers to the main character only but this seems like an arbitrary restriction, we have broadened it to apply to emotional reactions expressed by any of the characters:

*Reaction (expressed anywhere in the story)*

- 0 The emotional reactions of the main character the characters are not presented.
- 1 Some emotional feelings expressed by the main character the characters.—"The boy was happy with what he had done."
- 2 Emotional feelings of the main character the characters expressed with depth.— "I hated everyone in that black moment. I felt hot anger. Why did they have to humiliate me?"

Figure 6.1: A “rough but useful guide to the degree of relationship indicated by the size of the coefficients” (Connolly and Sluckin, 1971, p.154)

**0.90-1.00** Very high correlation; very strong relationship.

**0.70-0.90** High correlation: marked relationship.

**0.40-0.70** Moderate correlation; substantial relationship.

**0.20-0.40** Low correlation: a definite relationship but a small one.

**less than 0.20** A slight correlation: relationship so small as to be negligible.

(Harris and Graham, 1996, Appendix B, p.227)

Ranking of the pretest stories shows that this three-level scale is enough. About half of the stories score 0 on the scale and half 1, only one story (*The Jealous Tuna*) contains emotional reactions of greater depth. When rating the stories scoring was restricted to explicit descriptions of emotional states and reactions, any implied emotions that the reader may interpret in the story should not be counted.

### 6.3.2 Inter-Rater Reliability Test

Two independent raters took part in an inter-rater reliability test of the quantitative measure of narrative structure. As training, the raters read a guide to applying the measure (appendix E) and then rated two stories. The stories were chosen at random from the data from the Collingwood Primary School study (see chapter 7). Both raters were given the same two stories for training and rated them in the same order.

After training, the raters rated five more stories each for the inter-rater reliability test. Again both raters were given the same five stories, chosen at random from the Collingwood Primary School study, and rated them in the same order. The researcher’s ratings for these five stories were compared to the ratings of each of the independent raters using Kendall’s tau  $\beta$  and Spearman’s rho. Correlation coefficients from these comparisons were judged against a guide from Connolly and Sluckin (1971, p.154) (figure 6.1).

Table 6.4 on the facing page shows the inter-rater correlation coefficients between each independent rater (rater one and rater two) and the researcher. For some of the

Table 6.4: Inter-rater correlation coefficients for the quantitative measure of narrative structure.

\* Significant at  $p = 0.05$ , (two-tailed).

Criterion	Rater One		Rater Two	
	Kendall's tau $\beta$	Spearman's rho	Kendall's tau $\beta$	Spearman's rho
Protagonist	.825	.865	.722	.761
Antagonist	.612	.612	.756	.791
Locale	.756	.791	.668	.707
Time	.756	.791	.612	.612
Causal complexity	.354	.433	.118	.135
Descriptive detail	-.143	-.125	.617	.645
Goal	.167	.167	.866	.913*
Action	.825	.892*	.816	.889*
Ending	.866	.913*	.354	.406
Reaction	.707	.745	.401	.412

criteria there are moderate or high correlations between both independent raters and the researcher, and for all criteria there is an at least moderate correlation between one of the independent raters and the researcher. But for some of the criteria the correlation between one of the two independent raters and the researcher is negligible or low. The independent rater with the negligible or low correlation varies between criteria.

Correlation coefficients could not be computed for the *coherence* criterion because the researcher rated all five stories for this criterion the same, making the variable a constant.

The *protagonist*, *locale* and *action* criteria show a high degree of correlation between each independent rater and the researcher. For the *action* criterion, correlations between each independent rater and the researcher are statistically significant ( $p = 0.05$ , two-tailed). The *antagonist* and *time* criteria show a moderate correlation between one independent rater and the researcher, and a high correlation between the other independent rater and the researcher.

For the *reaction* criterion there is a low correlation between rater two and the researcher, but a high correlation between rater one and the researcher.

For the *goal* criterion there is a negligible correlation between rater one and the researcher, but a very high correlation between rater two and the researcher. The cor-

relation between rater two and the researcher is statistically significant ( $p = 0.05$ , two-tailed).

For the *ending* criterion there is a low correlation between rater two and the researcher, and a very high correlation between rater one and the researcher. The correlation between rater one and the researcher is statistically significant ( $p = 0.05$ , two-tailed).

For the *causal complexity* criterion the correlation between rater two and the researcher is negligible, while the correlation between rater one and the researcher is moderate.

Finally, for the *descriptive detail* criterion the correlation between rater one and the researcher is negligible, while the correlation between rater two and the researcher is moderate.

Based on these correlations, it was decided to go head with the quantitative measure of narrative structure for the study reported in chapter 7.

## 6.4 Conclusion

This chapter has set out the requirements for a story analysis tool and defined the construct of narrative structure that is to be measured. The available procedures and tools for the analysis of narrative structure in children's stories were reviewed, each was assessed against the requirements, and an analytic rating scale from Harris and Graham (1996) was selected for use in the study to follow. The scale was trialled on a set of stories written by children, shortcomings were identified, and the scale was then significantly modified based on the trial data. An inter-rater reliability test of the modified scale was carried out with good results. This new measuring instrument is now ready to be applied to the stories from the study reported in chapter 7.

# **Chapter 7**

## **Experimental Study**

This chapter reports an experimental study that compares stories written using the story maps application developed in chapter 5 to stories written using a typical classroom story planning worksheet. The comparison was made using the quantitative measure of narrative structure developed in chapter 6. The research question was: *Does using the story maps application affect the quality of the stories written? If so, in what ways?*

Section 7.1 describes the experimental design for the study. Section 7.2 presents specific hypotheses. Section 7.3 presents the design of and discusses the results from a smaller pilot study that was carried out before the main study. Section 7.4 describes the methods for the main study in detail. Section 7.5 presents and analyses the quantitative results from the study, and section 7.6 discusses the implications of the results and the further work that they identify. Finally, section 7.7 summarises the conclusions of the study.

### **7.1 Research Design**

A three-week empirical study was carried out in an English primary school.<sup>1</sup> A *pretest-posttest control group design* was used (Campbell and Stanley, 1963, p. 13). A smaller pilot study was first conducted in a Scottish primary school<sup>2</sup> to trial the research design and materials (particularly to test the story maps application under school and research design conditions). In response to the results of the pilot, study changes were made to the procedures and materials for the final study, but the overall pretest-posttest control

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<sup>1</sup>Thanks to Collingwood Primary School, Newcastle, for participation and to the school's deputy head teacher Mrs Hammond for her help.

<sup>2</sup>Thanks to Miss Fleet for her help and to her class from Maddiston Primary School, Falkirk, for their participation.

group design remained.

## 7.2 Research Questions and Hypotheses

The general research question for the study is: *Does using the story maps application improve the narrative structure of the stories written? If so, in what ways does using the story maps application improve the narrative structure of the stories written?*

The expectation is that using the story maps application will improve certain aspects of the stories written but will not affect other aspects. The plot structure of the stories should improve: the story maps application should encourage stories to have a clear build up, precipitating event, protagonist's goal, action and resolution, because such a plot structure is embodied by Propp's functions and their sequence. The story maps application should encourage the stories to contain characters that act in clear and consistent roles such as protagonist and antagonist, because such roles are embodied by the spheres of action contained in Propp's functions. The coherence of the stories should improve, because Propp's functions embody a logically and artistically sound sequence and flow of events. It is *not* expected that the story maps application will affect the description of characters or settings and their attributes, or that it will affect the expression of characters' emotions, because characters, settings and their attributes are not represented as first class objects in the model. The following subsections will operationalise these general hypotheses, considering each criterion of the quantitative measure in turn.

### 7.2.1 Hypothesis for the ‘Protagonist’ Criterion

The hypothesis is that there will *not* be a significant difference between the scores of the treatment and control groups for the protagonist criterion.

The protagonist criterion first records whether or not the story contains a protagonist and second, if the story does contain a protagonist, with what level of detail the protagonist is described. A score of 0 on the protagonist criterion records a story with no protagonist, and scores of 1-4 represent stories with protagonists described in increasing amounts of detail.

In most Proppian stories the character role of *hero* in Propp's morphology is a protagonist, and the hero is explicitly mentioned in the instructions on 12 of the 24 story cards used for this study (the hero may also be used in the implementation of

other story cards, but this is not explicitly required by the instructions on the cards). Participants are free to choose which cards to use and which not to use in their stories, but given that the hero appears on half of the cards and on many of the most important cards, it is very likely that the participant will choose some story cards that explicitly mention the hero. If the participant then implements these story cards correctly in their story then the story will contain a protagonist. We might therefore expect that using the story maps application would reduce the occurrence of 0 scores for the protagonist criterion (stories with no protagonist), and increase the occurrence of greater-than-zero scores. However very few stories, whether written using the story maps application or not, have no protagonist. Every story from the pilot study contains a protagonist. Given the very broad definition of protagonist used by the rating scale (“the main character of the story”), it is very unlikely that a participant will write a story without a protagonist. Since there is no room for improvement, we do not expect to find a difference between the control group and the treatment group in the occurrence of stories with no protagonist.

Since characters and their attributes are not represented as first-class objects in the story maps application (character roles are merely mentioned on the story cards which represent Propp functions) we do not expect that using the story maps application will increase the level of detail with which characters are described in the stories written. Therefore we do not expect the treatment to affect where protagonist criterion ratings fall within the range 1-4.

### 7.2.2 Hypothesis for the ‘Antagonist’ Criterion

The first hypothesis for the antagonist criterion is that the treatment will reduce the incidence of stories with no antagonist (0 scores for the antagonist criterion). The incidence of 0 scores is expected to decrease more over time for the treatment group than for the control group. The second hypothesis is that the treatment will *not* affect the level of detail with which antagonists are described when they are present in a story (it will not affect where antagonist criterion scores fall within the range 1-4).

The antagonist criterion has the same form as the protagonist criterion. A 0 score records a story with no antagonist, scores of 1-4 record stories with antagonists described with increasing amounts of detail. The scale’s definition of antagonist is tighter than its definition of protagonist, “The antagonist is the main character or characters who oppose the protagonist,” and unlike protagonist there are many stories from the

pilot study that do not have an antagonist.

In most Proppian stories the role of *villain* in Propp's morphology represents an antagonist, and the villain is mentioned explicitly on 11 of the 24 cards used in this study, including many of the most important cards. The villain may be used in the realisation of other story cards as well, but they do not require it. It is very likely that a participant will choose some of the villain's cards for her story, and if she then implements those cards correctly in her story it is very likely that her story will have an antagonist. We therefore expect the treatment to decrease the occurrence of 0 scores for the antagonist criterion, and increase the occurrence of greater-than-zero scores.

If a story does contain an antagonist, we do not expect the treatment to affect the story's rating for antagonist within the range 1-4. As with the protagonist, because characters and their attributes are not represented as first-class objects in the story maps application we do not expect that the treatment will increase the level of detail with which characters are described in the story.

### 7.2.3 Hypothesis for the ‘Locale’ Criterion

The first hypothesis for the locale criterion is that the treatment will reduce the incidence of stories in which no locations are mentioned (0 scores for the locale criterion). The incidence of 0 scores is expected to decrease more over time for the treatment group than for the control group. The second hypothesis is that the treatment will *not* affect the level of detail with which locations are described when they are present in a story (it will not affect where locale criterion scores fall within the range 1-3).

The instructions on the first Propp card in the story maps application, “*How the story starts*”, tell the writer that they may wish to introduce the location for the story. If participants follow this instruction, the incidence of 0 scores (stories in which no locations are mentioned) should decrease. However, since locations and their attributes are not represented as first-class objects in the story maps application we do not expect the treatment to affect the amount of further locations being given throughout the story, nor of descriptive details of locations being presented, so the treatment will not affect scores within the range 1-3.

### 7.2.4 Hypothesis for the ‘Time’ Criterion

The first hypothesis for the time criterion is that the treatment will reduce the incidence of stories in which no time is given (0 scores for the time criterion). The incidence of

0 scores is expected to decrease more over time for the treatment group than for the control group. The second hypothesis is that the treatment will *not* make the times reported more unusual in reference or more completely described (it will not affect where time criterion scores fall within the range 1-2). As with the locale criterion, the first Propp card in the story maps application suggests to the writer that they may wish to introduce the time of the story. This instruction should reduce the incidence of 0 scores for the time criterion, but the story maps application will not increase the incidence of 2 scores (time given but unusual in reference or more complete description) over 1 scores (time given, but traditional in reference).

### 7.2.5 Hypothesis for the ‘Starter event, causal complexity’ Criterion

The hypothesis is that the treatment group’s scores for the causal complexity criterion will improve more over time than those of the control group.

The causal complexity criterion records the complexity of the causal links that prepare the way for, make possible or facilitate the starter event. After the first story card in the story maps application (*Home*, “How the story starts”) there is a sequence of seven cards leading up to the *Villainy* card (“The villain does something bad”) which, if used as intended, are likely to contribute to the causal complexity rating of a story: “Characters get split up,” “Someone gets a warning,” “Someone ignores a warning,” “Someone tries to get some information,” “The villain tries to get the victim to do something” and “The victim does what the villain wants.” The seven Propp functions represented by these story cards are the functions that Propp termed the “preparation” of the story (Propp, 1968, p31).

The causal connections are not stated explicitly in the instructions on the story cards, but the function of these seven story cards is to enable the villainy to occur. For example, “Characters get split up” (e.g. parents leave children at home on their own) may be used to place the villain’s victim in a vulnerable state. The pair “Someone tries to get some information” and “Someone gets the information they want” may be used to provide the villain with a crucial piece of information that enables the villainy to take place (e.g. the villain learns the location of the victim).

A participant may choose not to use any of these seven cards in her story, or she may use the cards in a way that does not contribute to the causal complexity of her story, but if she does choose some of the seven cards and realises them as we expect in

her story then her story will contain some causal complexity leading up to the starter event.

The proportion of story cards in the story maps application that may contribute to causal complexity is much lower than the proportion that contribute to the antagonist criterion, and the causal connections between the preparation and the villainy are not as clear as the role of the villain. So we would expect the effect of the treatment on causal complexity ratings to be much smaller than its effect on ratings for the antagonist criterion.

### 7.2.6 Hypothesis for the ‘Starter event, descriptive detail’ Criterion

The first hypothesis for the descriptive detail criterion is that the treatment will reduce the incidence of stories lacking a starter event (0 scores for the descriptive detail criterion). The second hypothesis is that the treatment will *not* affect where scores fall within the range 1-4 for stories that do have a starter event.

The descriptive detail criterion records the amount of descriptive detail that is used to describe the starter event. A story with no starter event (and therefore, by definition, no descriptive detail) is scored 0. A story containing a starter event but with no descriptive details attached to the starter event is scored 1. Stories with starter events described with varying degrees of detail are scored 2 (simple description) to 4 (well described). Descriptive details are phrases that modify or complement the description of the starter event: reported speech, details of the action, adjectives and adverbs, etc.

The Propp card *Villainy* in the story maps application represents a starter event. Villainy is the most important Propp function, around which many of the other functions revolve. It seems very likely that participants will use the villainy card in their stories and that therefore their stories will contain a starter event, so the treatment is expected to reduce the incidence of stories lacking a starter event. However because the story maps application has no direct support for descriptive details, we do not expect the intervention to affect the amount of descriptive detail with which the starter event is described.

### 7.2.7 Hypothesis for the ‘Goal’ Criterion

The hypothesis is that the treatment group’s scores for the goal criterion will improve more over time than the control group’s scores.

The goal criterion records whether a goal for the protagonist is established and

clearly articulated, and if a first goal is clearly articulated whether or not any further goals are clearly articulated. A 0 score indicates no goal, 1 indicates that a goal is established by the protagonist but not clearly articulated to the reader, 2 indicates that a goal is both established by the protagonist and clearly articulated to the reader, and 3 indicates that more than one goal is established by the protagonist and clearly articulated to the reader.

A number of the Propp cards in the story maps application represent goal-directed actions initiated by the hero (“The hero leaves on a journey to put right the villainy,” “The hero confronts the villain using cleverness or combat,” “The hero sets out to return home”). The hero may initiate goal-directed actions for other Propp cards as well, but they do not explicitly require it. However, the use of these functions in a participant’s story does not guarantee that the hero’s goal will be explicitly established (a 2 score for the goal criterion) rather than left implicit (a 1 score) or even unclear. The function of the Propp card *Decides* in the story maps application (“The hero decides to put right the villainy”) is explicitly to establish the hero’s primary goal. If a participant chooses to use this card in her story map and implements the function correctly in her story, then her protagonist will have an established and clearly articulated goal. Additionally, there are a number of Propp cards in the story maps application that present opportunities for further goals to be established for the protagonist (a 3 score for the goal criterion), either as sub-goals (e.g. when the hero meets the donor, and by passing the donor’s test acquires a magical agent that will assist in the quest) or as independent goals (e.g. when the hero sets out to return home, or when the hero escapes from the villain’s pursuit).

### 7.2.8 Hypothesis for the ‘Action’ Criterion

The hypothesis is that the treatment group’s scores for the action criterion will improve more over time than the control group’s scores.

The action criterion records the presence or absence of “the action(s) that the protagonist initiates in order to achieve the main goal(s)” and the level of detail with which these actions are described. As discussed, the main goal of the hero in a Proppian tale is established by the Propp card *Decides*. Following the *Decides* card a number of Propp cards represent the actions taken by the hero to achieve the goal: “The hero leaves on a journey,” “The hero gets to the destination,” “The hero struggles with the villain” and “The villain is defeated”, leading up to the “The villainy is put right” in which the

crisis is resolved and the hero's goal achieved. Since participants are likely to use some of these cards in their stories, the incidence of 0 scores for the action criterion (stories in which the actions are not presented) should be decreased. Additionally, it seems likely that participants will use a number of the action cards in their story resulting in an extended description of the hero's actions, so the application should encourage higher rather than lower scores for the action criterion.

### 7.2.9 Hypothesis for the 'Ending' Criterion

The hypothesis is that the treatment group's scores for the ending criterion will improve more over time than the control group's scores.

The ending criterion records whether or not the long-range consequences of the protagonist's actions are resolved, and if they are whether the conclusion or ending is common or more interesting. A number of Propp cards in the story maps application should contribute to scores for the ending criterion, if used correctly: "*The villain is defeated*", "*The villainy is put right*", "*The hero sets out to return home*", "*The villain is punished*" and "*The hero gets a reward*".

### 7.2.10 Hypothesis for the 'Reaction' Criterion

The hypotheses is that there will *not* be a significant difference between treatment group and control group scores for the reaction criterion. The story maps application contains no direct support for representing the emotional reactions of characters.

### 7.2.11 Hypothesis for the 'Coherence' Criterion

The hypothesis is that there will *not* be a significant difference between treatment group and control group scores for the coherence criterion. The coherence criterion is a broad-grained measure of the coherence of a story, intended to discover whether the story maps application helps or hinders participants in writing coherent stories. However, in the pilot study stories with obvious incoherences that would be picked up by this measure were rare, most stories attained the highest score for this criterion. Since there is no room for improvement, we do not expect to see a difference between the groups.

## 7.3 Pilot Study

### 7.3.1 Pilot Study Participants

One entire class (20 participants aged 8-10, with roughly equal numbers male and female) took part in the pilot. Each participant was assigned at random to either the control or the treatment condition.

### 7.3.2 Pilot Study Procedures and Materials

Each participant wrote three stories for the study, one each during the pretest, control or treatment condition, and posttest. The class teacher set a series of fairytale story topics for the participants to write about during the study. For the pretest participants were asked to write stories involving animals, for the control condition and intervention they were asked to write stories involving small children, and for the posttest they were asked to write stories involving old people. The three stories written by each participant were collected and bound for the class's contribution to the school's book week.<sup>3</sup>

**7.3.2.0.1 Pretest** The pretest was conducted in normal class time by the class teacher. The entire class took part in the pretest at the same time. The teacher gave the class a fifteen minute verbal lesson about folktales (figure 7.1 on the next page), and then informed participants that today they were going to write their own original stories involving animals. Participants were given fifteen minutes to plan their stories using a typical classroom story-planning worksheet. The worksheet was the same as used in the final study (see figure 7.7 on page 240). Participants wrote their stories on paper immediately after planning.

**7.3.2.0.2 Control Condition** The control condition was also conducted by the class teacher in normal classroom time, all of the control participants taking part at the same time, while the researcher conducted the treatment condition in the computer lab. The control condition used the same procedure and materials as in the pretest, beginning with a recap of the teacher's folktale lesson.

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<sup>3</sup>During book week, students produce bound books with covers containing their own stories and parents buy the books from the school.

Figure 7.1: Outline of the class teacher's fifteen-minute verbal lesson on folktales, used in the pilot study.

- What a folktale is
  - Fantasy tales (magic, talking animals...)
  - Consequences of actions, help to come to terms with life situations
  - Word of mouth
- Characters
  - Recap of what the class already knows about characters
  - Descriptions:
    - \* Physical
    - \* Personality
    - \* Background (perhaps reasons for doing something)
- Settings
  - Depends on mood/theme
    - \* What impressions the tale is trying to convey
  - Transitions between settings
- Plot
  - Beginning, middle, end
  - Problem/solution
  - Include feelings
  - Consider audience

**7.3.2.0.3 Treatment Condition** During the first week of the study, after the pretest, the teacher showed the treatment participants a ten-minute video created by the researcher. The video was an early version of that used in the final study (figure 7.6 on page 238), it introduces the story maps application and the ideas of Vladimir Propp, and then gives an example Proppian folktale and a story map of the example tale. The teacher told participants to pay attention to the video because they would be asked questions about it afterwards.

While the teacher conducted the control condition in the classroom, the researcher conducted the treatment condition in the computer lab. All treatment participants took part in the treatment condition at the same time. One hour of computer lab time was assigned for the treatment. The teacher reminded participants that today they were going to be writing fairy tales involving small children, the researcher introduced himself and gave a brief demonstration of how to use the story maps application, and then participants began planning their stories. Stories were planned and typed on the computers using the story maps application.

**7.3.2.0.4 Posttest** The posttest was conducted by the class teacher in normal classroom time in the third week of the study, using the same procedure and worksheet as in the pretest and control condition. All participants took part in the posttest at the same time.

### 7.3.3 Pilot Study Results

The intention was to pilot test the data analysis also, by rating the pretest, control, treatment and posttest stories from the pilot study. Unfortunately the school had to delay the pilot study so that the posttest of the pilot study was carried out during the same week as the pretest of the main study. It was therefore not possible to try out the analysis on the stories from the pilot study before conducting the main study. Nonetheless, crucial lessons were learned from the experience of the pilot study. The pretest stories from the pilot study were eventually used to develop the measure that was used to assess the stories from the main study (see section 6.3 on page 195).

### 7.3.4 Discussion of the Pilot Study

#### Observations

The participants had no problems using the story maps application during the pilot study, but it was observed that writing stories using the application takes much longer than expected. The plan was for the researcher to introduce the application and participants to plan and write their stories all within a one-hour session. In reality, none of the participants were able to finish their stories in this time, most were only about half finished. The teacher assigned the participants more computer time in class later in the week to finish writing their stories using the application.

After the pilot treatment condition the researcher and the class teacher discussed why the participants had taken so long to finish their stories. The pretest, control condition and posttest stories for the pilot study, which were written on paper in class, were all completed in about 30 minutes, while the treatment condition stories written using the story maps application took an hour or longer to complete. There are a number of factors that may have contributed to the slower writing pace of the treatment condition:

1. The children are much slower at typing than they are at writing with a pencil.
2. The task of writing to follow Propp cards may be more difficult and time-consuming than writing to follow a typical classroom story plan, since writers have to both create a coherent story *and* follow their Propp cards.
3. Immediately before the treatment condition the teacher warned the participants that she wanted their punctuation to be correct. This may have distracted the participants if they find punctuation difficult, and because punctuation characters are more difficult to enter using a computer keyboard. During the treatment several participants asked the researcher for help inputting punctuation characters.
4. The participants may have had difficulty thinking of ideas for their stories. The instructions given to the participants were quite minimal. The researcher gave an introduction to the story maps application, and then the teacher reminded the participants that this week they were going to be writing fairy tales that involve small children. In the previous week the teacher had given a lesson on fairy tales, and the participants had been shown a video from the researcher that included a reading of a Proppian fairy tale.

The researcher noticed that many of the participants were very slow to begin writing their stories, and several minutes into the writing time one of the participants asked the researcher “What are we supposed to be writing about?”

### **Modifications to the Methodology for the Final Study**

In response to problems encountered in the pilot study, a number of changes were made to the methodology for the final study. The primary aim of the modifications to the methodology is to get participants to complete their stories within the time available for the study, because incomplete stories cannot be scored using the quantitative measure of narrative structure.

Because a single computer suite was time-shared between all of the school’s classes, it was not possible for the pretest, control condition and posttest stories to be typed using a word processor. The situation was the same at the school where the final study was to be conducted. Instead the non-treatment stories were written on paper under normal classroom conditions. But the story maps application and the treatment condition were designed to use typing instead of writing, because it was observed in the previous study that writing with a pencil is a laborious and time-consuming effort for the children, and because writing a story in the story maps application allows the user to switch between writing their story and modifying their story map at any time. An iterative story-writing process of planning, then writing, then planning some more is enabled, instead of requiring the plan to be completed before the writing begins. However, the pilot study showed that while the children find writing to be slow, they find typing to be much slower!

The researcher consulted with the teacher from the school where the final study was to be carried out, who agreed that the school’s students would find typing much more difficult than writing, and pointed out that students at the school get very little typing practice.

Additionally, it was realised that whether stories are typed or written is a variable that may have a significant effect on the resulting stories, and therefore typed stories cannot be directly compared to written stories. In the main study the participants would have to either type all of the stories or write all of the stories. Typing would require much greater access to the school’s computer suite, and would require much more time from the participants. From the experience of the pilot, participants are expected to take at least twice as long to type stories as to write them, and for the main study three stories each are required from 40 participants.

It was decided that in the main study all of the stories should be written on paper. For the treatment condition the story maps application would be used by the participants as a story planning tool, producing printed story maps which they can then use to write their stories on paper.

Other changes to the research design were:

- The video introduction should be given immediately before story writing during the intervention.

To better motivate the treatment condition participants and give them ideas for their stories, the video introduction to the story maps application will be given as part of the treatment session instead of a week earlier. Additionally, this will allow parts of the introduction to be delivered interactively by the researcher, such as when explaining the story map for the example story and how to use the story maps application.

- The story maps application should restrict the number of cards that participants can use.

The version of the application used in the pilot study gave users enough space for their story map to use all of the cards in the system if they chose to. Most treatment participants in the pilot study chose about 20 cards, which is much more story cards than they had time for when it came to writing their story.

To try and reduce the amount of time needed to write stories, the application was modified so that the story map area was only big enough to hold at most 18 of the 24 story cards in the system. Since the example story (and story map) used for the study has 18 cards, this was the minimum amount of story map space required for this study. As well as limiting the length of story plans, restricting the number of cards allowed might result in more thoughtful planning, as users have to choose only a few cards from a selection of many.<sup>4</sup>

- All story writing sessions (pretest, control, treatment and posttest) should begin with a group idea-generating exercise as used in the exploratory study, so that participants have a clear idea of what they are going to write about and are motivated to begin writing.

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<sup>4</sup>Further research might consider what effect reducing the size of the story map space much further (down to 10 cards or less) would have.

Table 7.1: Sexes and ages of participants.

	Male	Female		8	9	10	11	Mean
Control	10	10	Control	2	1	11	6	10.05
Treatment	13	7	Treatment	0	7	4	9	10.1

(a) Participants by sex.

(b) Participants by age.

- More time is needed for the treatment session. Despite design changes intended to reduce the time needed to write stories, we should anticipate that during the treatment participants may need more than an hour to finish their stories. In all sessions (pretest, control, treatment and posttest) participants will be given extra time to finish their stories if needed, although it is not anticipated that this extra time will be needed other than during the treatment condition.

## 7.4 Methods

### 7.4.1 Participants

For the final study, 40 participants aged 8-11 were selected at random from four classes of the school (the four classes with pupils within the age-range being studied). Before the start of the study signed consent forms were collected from each participant and from a parent or guardian of each participant. Minus absences, each participant wrote three original stories for the study, one each during the pretest, control or treatment condition and posttest. After the pretest, 20 pupils were assigned to the control condition and 20 to the treatment condition, at random. Table 7.1 shows the distribution of participants into the control and treatment conditions by sex and age.

### 7.4.2 Procedures and Materials

The school made its library room available for the study. Each stage of the study (pretest, control and treatment conditions, and posttest) was broken up into several story writing sessions, with about five participants taking part in each session. For each session participants left their usual classes and came to the library. All sessions were conducted by the researcher. Since the library contains only one computer, the study also had time-limited access to part of the school's computer suite so that several

Figure 7.2: The control participants feedback questions.

- What is easy about writing stories?
- What is difficult about writing stories?
- What helps you to write a story?

Figure 7.3: The treatment participants feedback questions.

- What did you like about the story maps computer program?
- What did you dislike about it?
- Are you happy with the story you wrote? Why/why not?
- What was easy about using story maps? How did it help you?
- What was hard about it?
- What would you change about story maps?

treatment condition participants could use the story maps application at a time.

Following the posttest sessions, the participant's usual teachers gave each participant either the control participants' feedback form (figure 7.2) or the treatment participants' feedback form (figure 7.3), which participants filled in during normal class time and not in the researcher's presence. The teachers returned the forms to the researcher.

In the week following the study the control condition participants were given a chance to plan stories using the story maps application, but these stories were not collected by the researcher.

The school was given a copy of the story maps application for teachers to use, and participants were given certificates of participation (appendix F) and information about the story maps application to take home, including a URL from which the application can be retrieved for use at home.

#### 7.4.2.1 The Pretest

The pretest was carried out in five separate sessions conducted during the first week of the study. Both the control group and the treatment group participated in the same pretest procedure:

1. Each participant wrote down their name, age and sex.
2. Aided by an illustration of the research design, the researcher gave a verbal introduction to the study and the role of the current session as a pretest, explaining that the aim of the study was to find out how well the story maps application works by comparing stories written by children with and without using the application, and before and after using it. The researcher emphasised that the participants were not being tested and could give no right or wrong answers, they were helping the researcher to test the story maps application.
3. The researcher explained that in this session the participants were going to write stories about whatever they want, using their own characters and ideas.
4. Each participant was given an identical copy of the pretest story-writing instruction sheet, then the researcher introduced the participants to the instruction sheet. The instruction sheet was developed prior to the study by the researcher, with help from the teacher. It was based on existing story writing materials used by Collingwood and Maddiston Primary Schools and designed to be typical of the story writing instructions used in the two primary schools. The first page of the two-page instruction sheet (figure 7.4 on the following page) contained six questions to think about when writing the story. The researcher read each of the questions to the group, and the participants were asked to read the questions back to themselves before beginning their story. The researcher suggested that the participants might want to think about the questions when planning their stories in their heads and when writing, for example if they got stuck.  
The second page (figure 7.5 on page 235) contained a list of story titles taken from a selection of the tales collected by Afanas'ev (Afanas'ev and Jakobson, 1946). The researcher explained that these titles might help to give the participants ideas for their stories, and that they could use one of these titles for their story but they did not have to.
5. The participants were then asked to begin writing their stories.

Figure 7.4: The pretest instruction sheet, page 1 *Writing Your Story*

## Writing your story

Think about:

- Who is in your story? People? Animals? Think about opposites: good v. evil, stupid v. clever.
- Where does your story begin?
- What happens to create a problem?
- What happens then? Is there a journey? Where? How do they get there, through a wood, across a river, etc etc?
- Is there a magical element to help sort things out?
- How does it end? Does the hero get anything?

Figure 7.5: The pretest instruction sheet, page 2 *Story Titles*

## story Titles

The Wondrous Wonder, The Marvellous Marvel  
The Castle of The Fly  
The Enchanted Ring  
The Magic Shirt  
The Princess Who Wanted to solve Riddles  
The Speedy Messenger  
The Magic Box  
The Singing Tree and The Talking Bird  
The Fox and The Woodpecker  
The Wolf and The Goat  
The Wise Little Girl  
The Sheep, the Fox and the Wolf  
The Man Who Did Not Know Fear  
King Bear  
The One-Eyed Evil  
The Foolish Wolf  
The Bear, the Dog and the Cat  
The Thief  
The Vampire  
The Enchanted Princess  
The Raven and The Lobster  
Prince Ivan, the Firebird, and the Gray Wolf

#### 7.4.2.2 The Treatment Condition

The treatment condition was conducted in four sessions in the second week of the study. The process for each session was:

1. Each participant wrote down their name, age and sex.
2. The researcher reminded the participants of the purpose of the study and this session's role within it, using the same illustration and explanation as used in the pretest.
3. The participants watched a ten-minute video introduction to the story maps application (figure 7.6 on page 238), and then the researcher answered the participants' questions and asked the participants questions about the video.

The content of the video was:

- Screenshot of the story maps application:
  - The story maps application is a computer program for planning and writing stories.
  - You can use the story maps application to make a story about whatever you want, using your own characters and ideas.
- Photograph of Vladimir Propp, followed by several images designed to help explain Propp's ideas.
  - story maps is based on the ideas of Russian scientist Vladimir Propp
  - Propp's *big idea* was that, although the details change, the same sorts of things happen in the plots of different stories. (Examples are given to explain this point.)
  - Propp studied his collection of fairy tales and found 31 things that happen in many stories. He called these his 31 “functions.”
- Demonstration video of story maps application:
  - In story maps each Propp function is a Story Card.
  - You plan your story by choosing which cards to have and which to leave out.
  - (At this point a demonstration of the application is given, demonstrating each of the application's basic interactions.)

4. The participants listened to a recording of a Proppian fairy tale, *The Black Geese of Baba Yaga*.
5. With the story maps application displayed on an overhead projector, the researcher loaded a pre-constructed story map for *The Black Geese of Baba Yaga* and stepped through the story map card-by-card. The researcher asked the participants what part of the story they had just heard each card corresponded to.
6. Participants were told that they were going to plan and write their own stories using the story maps application, and were reminded to create their own original stories and not copy the example story they had just seen.
7. The researcher and the participants moved to the computer suite and each participant began planning his or her story using the story maps application. Once the story plans were complete, each participant entered a story title and printed out their story map.
8. The participants took their printed story maps back into the library and wrote their stories on paper, referring to their story maps as a reference. Participants were encouraged to refer to their story maps while writing, and to tick off story cards on their story maps as they completed them (this advice was not always followed).

Although they could not insert new cards or reorder cards on the printed story maps, participants were allowed to cross out story cards from their story maps if they changed their minds while writing (participants have a tendency to choose far more cards in the planning stage than they can manage in the writing stage).

#### 7.4.2.3 The Control Condition

The control condition was conducted in three sessions in the second week of the study. The procedure for the control sessions was:

1. Each participant wrote down their name, age and sex.
2. The researcher reminded the participants' of the research design and this session's role in it, using the same illustration and explanation as in the pretest and treatment condition.

Figure 7.6: Outline script of the introduction video for the story maps application.



3. Each participant was given a copy of the control condition story planning worksheet (figure 7.7 on the next page). This worksheet, taken from Riley and Reedy (2000, p.82), is a story planning framework of the type typically used in primary schools. The aim of such worksheets is to help pupils develop an explicit awareness of the components of narrative, they are “a powerful way of focusing attention on the elements needed when composing a story” (Riley and Reedy, 2000, p.80). Story writing materials collected from the primary schools involved in the pilot and main studies are teacher-customised versions of this type of story planning worksheet, similar that shown in Riley and Reedy (2000, figure 5.6, p.83).

The researcher explained the worksheet to the participants, and asked the participants if they had made story plans before and what kind of story planning they had done.

4. The researcher explained that the participants were going to be planning and then writing their own original stories, and that they could write about whatever they wanted, using their own ideas and characters.
5. The participants then planned their stories using their worksheets.
6. Once they had finished their plan and decided on a title for their story, participants began to write their stories in a separate sheet of paper.

#### **7.4.2.4 The Posttest**

The posttest was conducted in five sessions in the third week of the study. The procedure and materials for the posttest were the same as used in the pretest (but with different suggested story titles on the instruction sheet).

#### **7.4.2.5 Data Collection**

The following data were collected during the study:

- Name, age and sex of each participant.
- Three stories, written on paper, from each participant (minus absences): pretest, control or treatment condition and posttest. Where a participant was absent from a session or could not stay for the entire session attempts were made to fit them

Figure 7.7: The control condition story planning worksheet, (Riley and Reedy, 2000, p.82).

Who is in your story? Where does your story begin?	What happens to create a problem?	What happens then?	How does it end?

into an alternative session, so that the final number of absences was as low as possible (three absences in total, out of 120 stories).

- A control or treatment feedback form from each participant.
- Notes taken by the researcher throughout the study.

## 7.5 Results

Because the data from our rating scale are ordinal the Mann-Whitney  $U$  test, a non-parametric test, was used to test for statistically significant differences between sets of ratings. The Mann-Whitney  $U$  test is one of the most powerful of the non-parametric tests, and is a useful alternative to the parametric  $t$  test (Siegel, 1956, p.116). To judge whether the Mann-Whitney  $U$  value from a particular comparison is significant or not a table of critical values of  $U$  in the Mann-Whitney test is used from Siegel (1956, Appendix, table K, p.276), an  $\alpha$  of .05 is chosen for one-tailed tests and .10 for two-tailed tests. If an observed difference meets a tighter  $\alpha$  of .025, .01 or .001 for one-tailed tests or .05, .02 or .002 for two-tailed tests this is reported. When two sets of story ratings are compared using the Mann-Whitney  $U$  test and a significant difference is found, the mean rank and sum of ranks of the two sets are compared to determine which tended to be higher.

Figure 7.8 on the following page illustrates our approach to the analysis of the quantitative data from the rating scale. There are six sets of rated stories (illustrated as six circles): the pretest stories of the control group and of the treatment group, the control condition and treatment condition stories, and the posttest stories of each group. Each set contains 20 rated stories, minus missing data (see 7.5.1 on the next page). As well as comparing the raw ratings, we can compute gain scores for each criterion. A participant's gain scores measure how much that participant's ratings for each criterion have improved or declined over time. For example, to compute the pretest–posttest gain scores for a particular participant we would subtract that participant's pretest rating for each criterion from her posttest rating for the same criterion, producing a pretest–posttest gain score for each criterion. We consider four sets of gain scores (illustrated as four triangles in the figure): the pretest–control condition gain scores of the control group participants, the pretest–treatment condition gain scores of the treatment group participants, and the pretest–posttest gain scores of each group (we do not consider control/treatment–posttest gain scores).

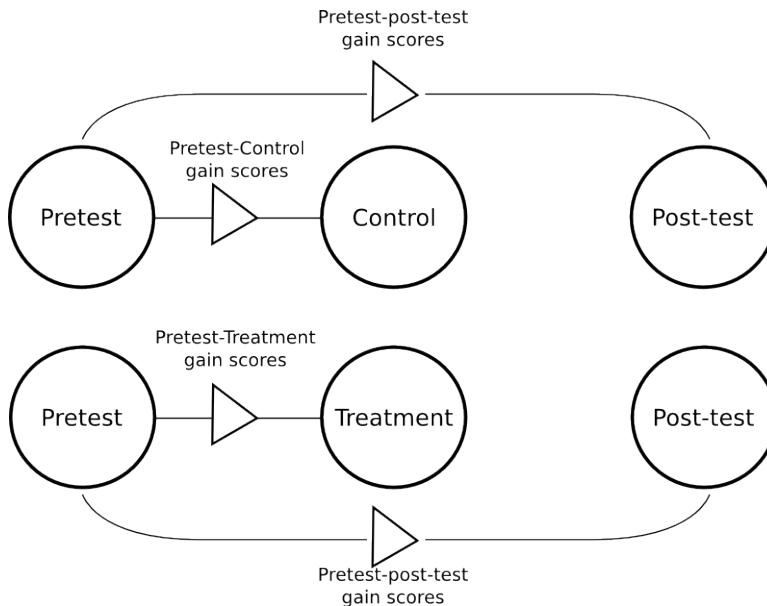


Figure 7.8: The structure of the data analysis.

Given this data structure several within-groups and between-groups comparisons can be made for each criterion of our rating scale using the Mann-Whitney  $U$  test. Between-groups, we can compare the pretest-treatment condition gain scores to the pretest-control condition gain scores, we can compare the pretest-posttest gain scores of the two groups, and we can compare the raw scores of the two groups at pretest, control/treatment condition and posttest. Within-groups, we can compare pretest scores to control/treatment condition scores, and we can compare pretest scores to posttest scores. Finally, we can examine plots of the scores and gain scores. The following sections present the results that are necessary to confirm or refute each hypothesis.

### 7.5.1 Missing Data

Some of the 120 stories could not be rated because the participant was absent and no story was collected, because the story was judged to be incomplete, or because the story was judged to be a non-story and therefore not rateable using the rating scale.<sup>5</sup>

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<sup>5</sup>The quantitative measure of narrative structure necessarily embodies a certain construct of narrative, as being a sequence of events with some or all of the elements protagonist, antagonist, setting, precipitating event, goal, action, resolution, etc. A few stories from the data simply do not conform to this construct but are ‘stories’ of a different type. They are, for example, recounts, or anecdotes, or they are comical stories in which a main character, lacking any apparent goal or antagonist, experiences a series of bizarre and deliberately random events, or they are descriptions of actions that lack any narrative structure as defined by the measure. In the researcher’s judgement it is incorrect to define these as unsuccessful attempts at ‘narratives’ as defined by the quantitative measure and assign a very low or 0 score. Some of these ‘non-stories’ are actually very good. It is more accurate to say that the measure

Table 7.2: Absences, incomplete stories and non-stories.

	Pretest	Test	Posttest		Pretest	Test	Posttest
Control	0	2	0	Control	2	1	2
Treatment	1	0	0	Treatment	4	1	2
(a) Absences				(b) Incomplete stories			
	Pretest	Test	Posttest		Pretest	Test	Posttest
Control	1	2	3	Control	2	1	2
Treatment	1	0	2	Treatment	4	1	2
(c) Non-stories							

Table 7.2 gives the numbers of absences, incomplete stories and non-stories for each group at each stage of the study.

There is an unfortunate domino effect due to missing data: if a participant does not have a pretest rating then that participant's test and posttest ratings cannot be used in the analysis because the baseline is missing. Similarly, if a participant has a missing control or treatment condition rating, that participant's pretest and posttest ratings are meaningless for our analysis. Finally if a participant has a missing posttest rating then that participant's pre-test and control or treatment condition ratings cannot be used in those comparisons that involve the posttest.

All participants with a missing pretest or control/treatment condition rating (7 participants from the control group and 6 participants from the treatment group) were excluded from all plots and statistics that follow. Participants with any missing rating (pretest, control/treatment condition or posttest) were excluded from plots or statistics involving the posttest (9 participants from the control group and 7 participants from the treatment group). Table 7.3 on the next page describes the remaining participants in each group by sex and age.

### 7.5.2 Results for the ‘Protagonist’ Criterion

The hypothesis for the protagonist criterion was that there would be no significant differences between the scores of the control group and the treatment group. Table 7.4 on page 245 shows the results of between-groups comparisons of the gain scores for

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cannot account for these instances, and exclude them from the study.

Table 7.3: Sexes and ages of participants, corrected for missing data.

	Male	Female		8	9	10	11	Mean	
Control	7	6	Control	1	0	8	4	10.15	
Treatment	7	7	Treatment	0	6	3	5	9.93	
(a) Sexes of participants included in plots and statistics <i>not</i> involving the posttest.					(b) Ages of participants included in plots and statistics <i>not</i> involving the posttest.				
	Male	Female		8	9	10	11	Mean	
Control	6	5	Control	0	0	8	3	10.27	
Treatment	7	6	Treatment	0	5	3	5	10.0	
(c) Sexes of participants included in plots and statistics involving the posttest.					(d) Ages of participants included in plots and statistics involving the posttest.				

the protagonist criterion, using the Mann-Whitney  $U$  test. The comparisons find no significant differences between the gain scores of the two groups. The hypothesis that there would be no difference is a null hypothesis and so cannot be proven, but the data do not refute the hypothesis.

Figure 7.9 on the next page plots the scores for the protagonist criterion at each stage of the study. As expected, no story from either group at any stage has a 0 rating (no protagonist), so there was no room for improvement in the incidence of stories containing protagonists over stories lacking protagonists. The figure reveals that no ceiling effect is present, both the control group and the treatment group scores at pretest *did* leave room for improvement in how well described the protagonists were.

Table 7.5 on page 247 shows the results of within-groups comparisons of the scores for the protagonist criterion, using the Mann-Whitney  $U$  test. Both groups' scores fell significantly from pretest to control/treatment condition, but appear to recover again at posttest. In the comparison of the control condition scores to the pretest scores of the same participants, the Mann-Whitney  $U$  value of 44.000 indicates a significant difference at  $\alpha < 0.05$  (two-tailed), and the lower mean rank and sum of ranks at control condition shows that the control condition scores were lower than the pretest. Similarly the treatment condition scores are significantly lower than the treatment group's pretest scores ( $\alpha < 0.05$ , two-tailed). These significant differences were not maintained at posttest, the pretest-posttest comparisons for both the control group and the

Table 7.4: Between-groups comparisons of the gain-scores for the ‘protagonist’ criterion.

	N	Mean Rank	Sum of Ranks	Mann-Whitney U
Pretest-control/treatment	Control	13	14.23	185.00
	Treatment	14	13.79	193.00
Pretest–posttest	Control	11	11.91	131.00
	Treatment	13	13.00	169.00

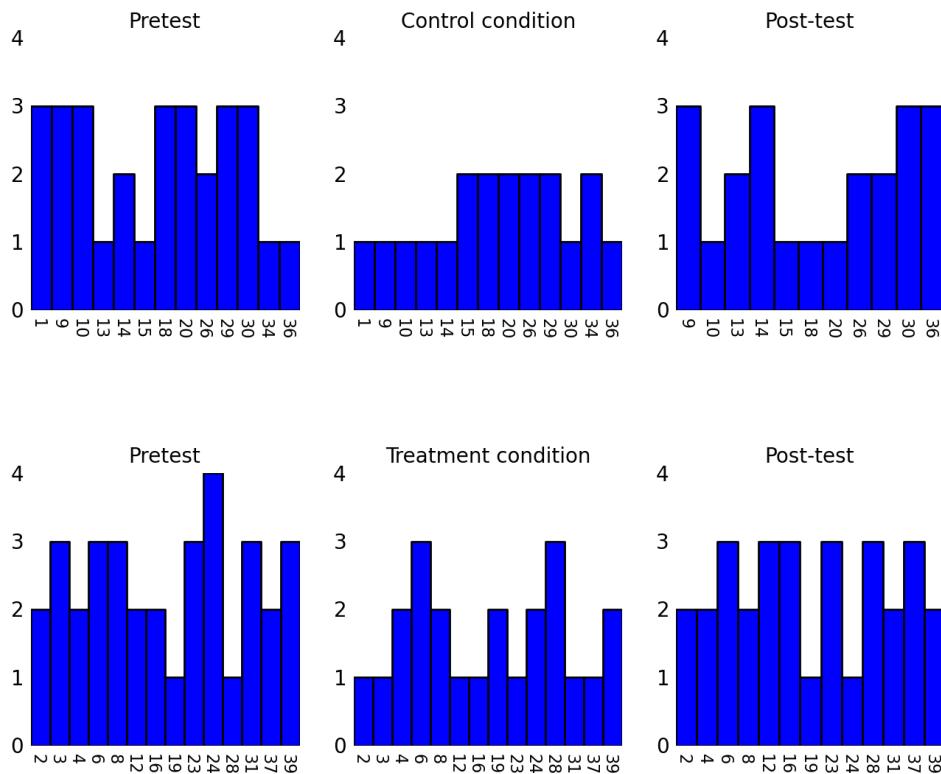


Figure 7.9: Protagonist criterion scores for the control group (top) and the treatment group (bottom). Bars represent individual stories.

treatment group find no significant differences.

In conclusion, the quantitative results for the protagonist criterion support the hypothesis that the story maps application does not affect the amount of descriptive detail with which protagonists are described.

### 7.5.3 Results for the ‘Antagonist’ Criterion

The first hypothesis for the antagonist criterion was that the incidence of 0 scores would decline more over time for the treatment group than for the control group. The second hypothesis was that the treatment would *not* affect where antagonist criterion scores fall within the range 1-4.

#### Pretest–control/treatment condition

Table 7.6 on the next page shows the results of between-groups comparisons of the gain scores for the antagonist criterion, using the Mann-Whitney *U* test. As hypothesised, the pretest-treatment condition gain scores are significantly higher than the pretest-control condition gain scores ( $\alpha < 0.001$ , one-tailed).

Table 7.7 on the facing page shows the results of within-groups comparisons of the scores for the antagonist criterion using the Mann-Whitney *U* test. As hypothesised, the treatment group’s scores improved significantly from pretest to treatment condition ( $\alpha < 0.001$ , one-tailed). The control group’s scores did not change significantly from pretest to control condition.

Examination of the treatment group’s scores (figure 7.10 on page 248) further supports the hypotheses. At pretest many of the treatment group participants wrote stories without an antagonist, then at treatment condition when using the story maps application every one of the same participants wrote a story with an antagonist. Many of the treatment condition stories have a score of 1 (an antagonist with no descriptive detail) suggesting that, as hypothesised, the story maps application encourages the presence of an antagonist in the story but does not encourage descriptive details about the antagonist to be given. Nonetheless, a few of the treatment condition stories were rated as having well-described antagonists (scores of 3 or 4) whilst none of the treatment group’s pretest stories scored higher than 2.

So far the results appear to confirm the hypotheses. However, table 7.8 on page 253 shows the results of between-groups comparisons of the raw scores for the antagonist criterion using the Mann-Whitney *U* test. Unexpectedly, the *pretest* scores of the con-

Table 7.5: Within-groups comparisons of the scores for the 'protagonist' criterion.

\* Significant at  $\alpha < 0.05$  (two-tailed).

		N	Mean Rank	Sum of Ranks	Mann-Whitney U
Control	Pretest	13	16.62	216.00	44.000*
	Control	13	10.38	135.00	
	Pretest	11	12.45	137.00	50.000
	posttest	11	10.55	116.00	
Treatment	Pretest	14	17.96	251.50	49.500*
	Treatment	14	11.04	154.50	
	Pretest	13	13.73	178.50	81.500
	posttest	13	13.27	172.50	

Table 7.6: Between-groups comparisons of the gain-scores for the 'antagonist' criterion.

\* Significant at  $\alpha < 0.001$  (one-tailed).

\*\* Significant at  $\alpha < 0.05$  (one-tailed).

		N	Mean Rank	Sum of Ranks	Mann-Whitney U
Pretest-control/treatment	Control	13	8.88	115.50	24.500*
	Treatment	14	18.75	262.50	
Pretest-posttest	Control	11	9.64	106.00	40.000**
	Treatment	13	14.92	194.00	

Table 7.7: Within-groups comparisons of the scores for the 'antagonist' criterion.

\* Significant at  $\alpha < 0.001$  (one-tailed).

		N	Mean Rank	Sum of Ranks	Mann-Whitney U
Control	Pretest	13	15.35	199.50	60.500
	Control	13	11.65	151.50	
	Pretest	11	12.32	135.50	51.500
	posttest	11	10.68	117.50	
Treatment	Pretest	14	9.71	136.00	31.000*
	Treatment	14	19.29	270.00	
	Pretest	13	11.23	146.00	55.000
	posttest	13	15.77	205.00	

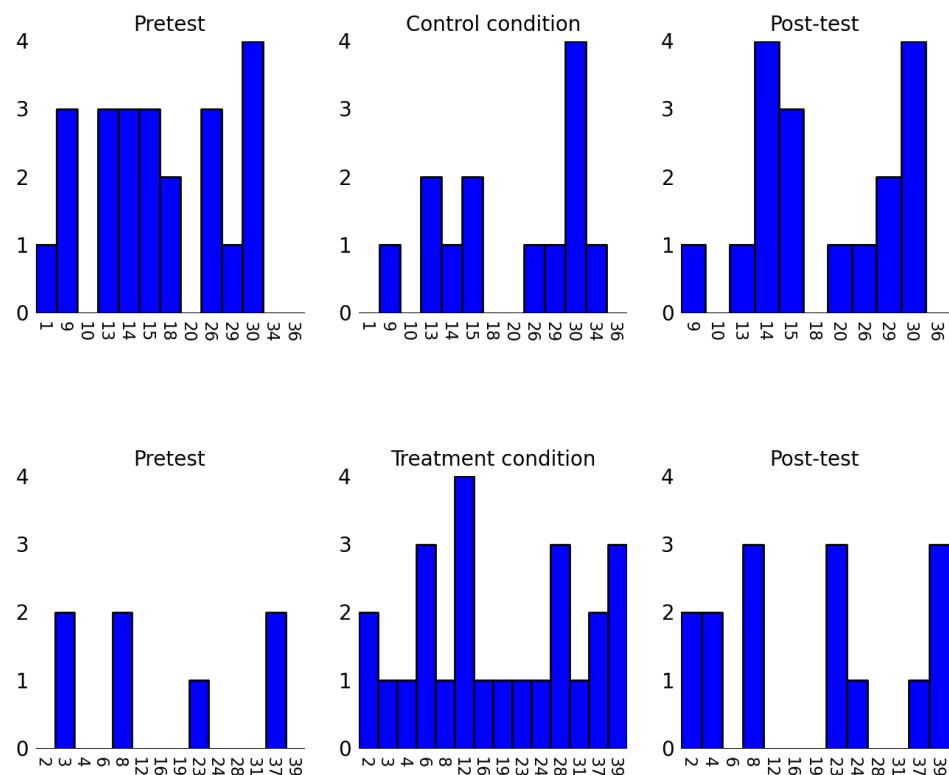


Figure 7.10: Antagonist criterion scores for the control group (top) and the treatment group (bottom). Bars represent individual stories.

trol group are significantly higher than those of the treatment group ( $\alpha < 0.05$ , two-tailed). At control/treatment condition the situation is reversed, the *treatment* condition scores are significantly *higher* than the control condition scores ( $\alpha < 0.05$ , one-tailed). The treatment group scores have not just caught up with the control group scores after scoring lower at pretest, they have overtaken them. At posttest the scores of the two groups converge. The comparison of the treatment group's posttest scores to the control group's posttest scores finds no significant difference.

Figure 7.10 on the preceding page plots the antagonist criterion scores of each group at each stage of the study. The difference between the two groups at pretest is striking: the treatment group has a very high proportion of 0 scores (stories without an antagonist) and no 3 or 4 scores (stories with well-described antagonists), whilst the control group has very few 0 scores and more 3 or 4 scores. At treatment condition *all* of the treatment group's 0 scores have disappeared. The control group does not follow the same pattern: the controls have more 0 scores at control condition than at pre-test.

Because the pretest ratings of the treatment group participants are significantly lower than those of the control group participants, *selection bias* arises as a rival hypothesis that could explain the significant difference between the gain scores of the control and treatment groups. It may be that participants with low pretest scores have higher pretest-control/treatment gain scores, regardless of whether they belong to the control group or the treatment group. The treatment group's significantly higher gain scores may not be due to the treatment, but rather due to the fact that the more of the participants with low scores at pretest are in the treatment group. Such an effect could be produced by *regression toward the mean*, due to random chance only we would expect more of those participants with low pretest scores to improve at control or treatment condition. Regression toward the mean would also predict that more of those participants with high pretest scores would score lower at control or treatment condition than they did at pretest.

Examination of the ratings for the antagonist criterion (figure 7.10 on the facing page) reveals that the ten treatment group participants with positive pretest-treatment gain scores are exactly the same ten participants with 0 scores at pretest. None of the four treatment group participants with greater-than-zero scores at pretest improved at treatment condition. This supports both our experimental hypothesis and the regression to the mean hypothesis. The regression toward the mean hypothesis also predicts that treatment group participants with high pretest scores would decline at treatment condition, but this would not contradict our experimental hypothesis, and the predic-

tion cannot be tested because the treatment group has only four pretest scores greater than 0 and none greater than 2.

The regression toward the mean hypothesis predicts that control group participants with low pretest scores will tend to improve at control condition and participants with high pretest scores will tend to decline at control condition. The control group's scores do *not* appear to support this prediction. Although many control group participants had high scores (3 or 4) at pretest and declined at control condition, participants with low pretest scores did not tend to improve at control condition. Of the four control group participants that scored 0 at pretest only one improved at control condition, and of the two control group participants that scored 1 at pretest neither improved at control condition. The pattern suggests a global dampening of control group participants' scores from pretest to control condition, as might be produced by demoralisation: participants with high scores at pretest tended to fall at control condition, whilst participants with low pretest scores tended to stay the same because they could not fall any lower. However, the number of control group participants with low pretest scores is too few to strongly refute the regression toward the mean hypothesis.

The regression to the mean hypothesis rests on the assumption that there is a significant degree of chance involved in the antagonist criterion ratings. It seems reasonable that chance would affect scores for the level of detail of antagonists, affecting where scores fall within the range 1-4 for stories that have an antagonist, and producing a regression toward the mean. It does not seem as clear that chance would have a significant effect on whether stories are rated 0 (no antagonist) or greater than zero (stories with an antagonist). Whether or not a story contains an antagonist is a binary rather than an ordinal criterion. As an explanation for the ten treatment group participants' whose stories had no antagonist at pretest then had an antagonist at treatment condition, the hypothesis that the treatment produced the difference is more convincing.

### **Pretest-posttest**

As hypothesised, the treatment group's pretest-posttest gain scores were significantly higher than the control group's ( $\alpha < 0.05$  one-tailed, table 7.6 on page 247).

However, within-groups comparisons of the scores for the antagonist criterion (table 7.7 on page 247) find no significant difference between the treatment group's pretest and posttest scores. Without a significant within-groups pretest-posttest difference for the treatment group, the rival hypothesis that control group *demoralisation* is as responsible for the difference between the gain scores as treatment group im-

provement cannot be refuted.<sup>6</sup>

Due to the significant difference between the pretest scores of the two groups, *selection bias* again arises as a rival hypothesis explaining the difference between the pretest-posttest gain scores of the two groups. Given that the treatment group has more participants with low pretest scores, *regression toward the mean* could produce the observed pattern in which control group scores decline and treatment group scores improve over time, and this rival hypothesis cannot be refuted. The pretest-posttest pattern in the treatment group's ratings is less clear than at pretest-treatment condition, and looks likely to have been produced by regression toward the mean.

## Conclusion

We argue that the story maps application *did* affect the scores for the antagonist criterion as hypothesised. From pretest to control/treatment condition, the treatment group's scores improved more over time than those of the control group. The change in the scores was as hypothesised, the story maps application ensured that stories contained antagonists, but did not affect the level of detail with which the antagonists were described. However this conclusion must be qualified due to the unexpected difference between the pretest ratings of the groups, which introduces *regression to the mean* as a rival hypothesis. The pattern of the data does not appear to support regression to the mean, but the data are too few to strongly refute the hypothesis.

Additionally, we conclude that the treatment did *not* significantly affect the *post-test* scores for the antagonist criterion. Although there is a significant difference between the pretest-posttest gain scores of the two groups, there is not a significant within-groups pretest-posttest difference for the treatment group's scores. The between-groups difference in pretest-posttest gains appears more likely to be due to regression toward the mean than due to the experimental treatment.

### 7.5.4 Results for the ‘Locale’ Criterion

The first hypothesis for the locale criterion was that the incidence of 0 scores would decrease more over time for the treatment group than for the control group. The scores for the locale criterion (figure 7.11 on the next page) do not support the hypothesis,

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<sup>6</sup>However we note that the Mann-Whitney  $U$  value for the treatment group pretest–posttest comparison is very nearly significant ( $U=55$ , and the critical value is 51), and the posttest has a markedly higher mean rank and sum of ranks in this comparison. The failure to find a statistically significant difference at posttest is probably due to the low number of data (just 26 data points).

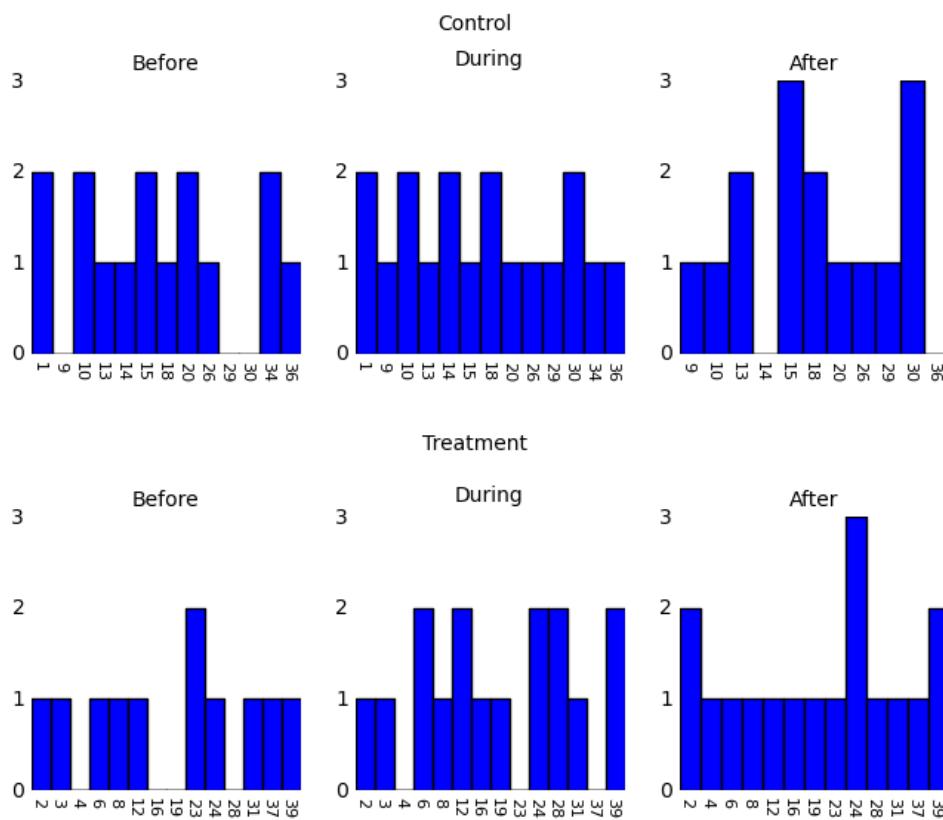


Figure 7.11: ‘Locale’ criterion scores for the control group (top) and the treatment group (bottom). Bars represent individual stories.

but the number of participants with 0 scores at pretest are too few to strongly refute it. Only three participants in the control group and four in the treatment group have 0 scores at pretest.

The second hypothesis was that the treatment would not affect scores within the range 1-3. A hypothesis of no difference cannot be proven, but the data do not refute the hypothesis. Between-groups comparisons of the gain scores for the locale criterion using the Mann-Whitney  $U$  test (table 7.9 on the facing page) find no significant differences. No ceiling effect was present (figure 7.11), the pretest scores of both the treatment group and the control group did leave room for improvement in the amount of detail with which locations were described.

### 7.5.5 Results for the ‘Time’ Criterion

The first hypothesis for the time criterion was that the incidence of 0 scores would decrease more over time for the treatment group than for the control group. There are too few data to confirm or refute the first hypothesis, only two participants in the

Table 7.8: Between-groups comparisons of the scores for the ‘antagonist’ criterion.

\* Significant at  $\alpha < 0.05$  (two-tailed).

\*\* Significant at  $\alpha < 0.05$  (one-tailed).

		N	Mean Rank	Sum of Ranks	Mann-Whitney <i>U</i>
Pretest	Control	13	17.58	228.50	44.500*
	Treatment	14	10.68	149.50	
Control/treatment	Control	13	10.96	142.50	51.500**
	Treatment	14	16.82	235.50	
posttest	Control	11	13.59	149.50	59.500
	Treatment	13	11.58	150.50	

Table 7.9: Between-groups comparisons of the gain-scores for the ‘locale’ criterion.

		N	Mean Rank	Sum of Ranks	Mann-Whitney <i>U</i>
Pretest–control/treatment	Control	13	13.19	171.50	80.500
	Treatment	14	14.75	206.50	
Pretest–posttest	Control	11	11.77	129.50	71.000
	Treatment	13	13.12	170.50	

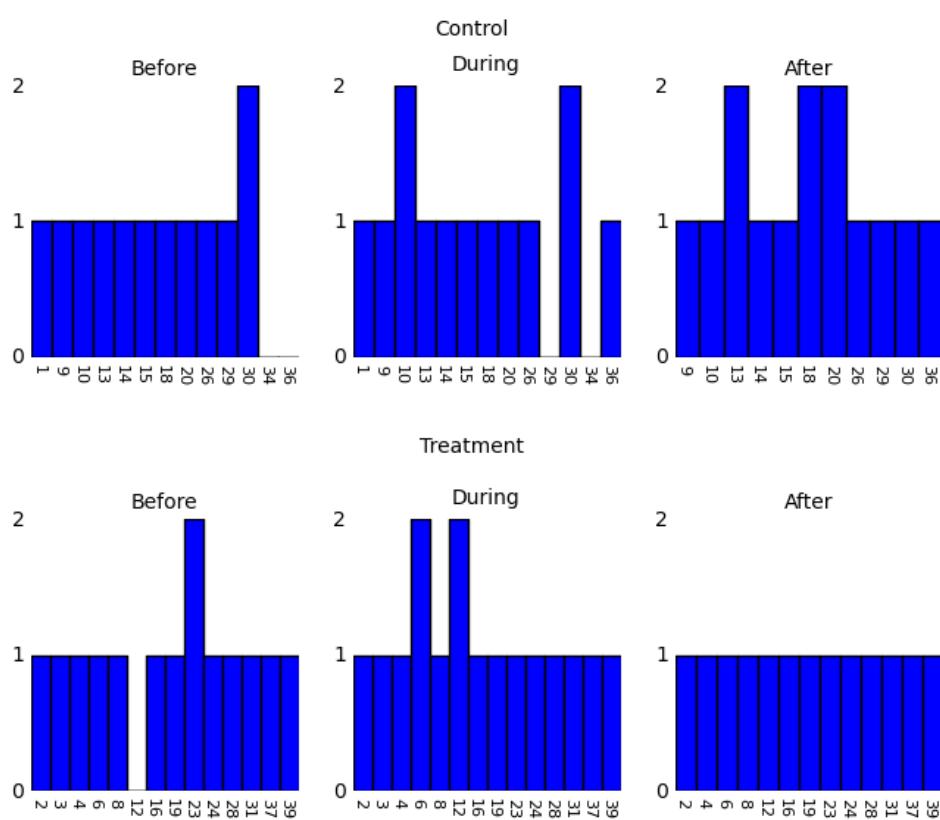


Figure 7.12: ‘Time’ criterion scores for the control group (top) and the treatment group (bottom). Bars represent individual stories.

control group and one in the treatment group scored 0 at pretest (figure 7.12).

The second hypothesis was that the treatment would *not* affect where time criterion scores fall within the range 1-2. A hypothesis of no difference cannot be proven, but the results do not refute the hypothesis. A between-groups comparison of the gain scores for the time criterion (table 7.10 on page 256) finds no significant difference between the groups.

Figure 7.12 reveals that almost all stories throughout the study were scored 1 for the time criterion, they gave a traditional temporal reference such as “once upon a time,” “a long time ago,” “one day,” etc. Very few stories scored 0 (no time given) or 2 (unusual or more complete temporal reference).

### 7.5.6 Results for the ‘Causal Complexity’ Criterion

The hypothesis was that the treatment group’s scores for the causal complexity criterion would improve more over time than the control group’s.

### Pretest-control/treatment condition

Table 7.11 on the next page shows the results of a between-groups comparison of the gain scores for the causal complexity criterion, using the Mann-Whitney *U* test. As hypothesised the pretest-treatment condition gain scores are significantly higher than the pretest-control condition gain scores ( $\alpha < 0.001$ , one-tailed).

Table 7.12 on the following page shows the results of within-groups comparisons of the scores for the ‘causal complexity’ criterion using the Mann-Whitney *U* test. As hypothesised, the treatment group’s scores improved significantly from pretest to treatment condition ( $\alpha < 0.001$ , one-tailed). The control group’s scores declined from pretest to control condition ( $\alpha < 0.10$ , two-tailed).

The rival hypothesis that control group *demoralisation* accounts for the difference between the groups because the control group’s scores declined significantly over time is refuted, because the treatment group’s scores also *improved* significantly from pretest to treatment condition. If the control group’s scores had not declined, there would still be a significant difference between the groups.

Figure 7.13 on page 257 plots the ‘causal complexity’ scores for each group at each stage of the study. The pattern that the figure shows is the same as that for the ‘antagonist’ criterion. At pretest the treatment group has a very high proportion of 1 scores, whereas the control group has few 1 scores and more 3 scores. On the rating scale for causal complexity (appendix D), 0 records a story which has no starter event and therefore, by definition, cannot have any causal complexity, “No starter event is presented”. A 1 score records a story that has a starter event but no causal complexity, “A starter event is presented and is a single isolated event.” Of all the stories considered there is only a single 0 score, from the control group at control condition. This was to be expected as stories without a starter event are very rare. A 1 score for causal complexity is equivalent to a 0 score (story with no antagonist) for the antagonist criterion, so the high portion of 1 scores from the treatment group at pretest mirrors the high portion of 0 scores at pretest for the antagonist criterion. As with the antagonist criterion, the treatment group’s 1 scores disappear during the treatment condition, the treatment group has only a single 1 score at treatment condition. At posttest the treatment group scores revert to their pretest pattern, with a high portion of 1 scores, and look similar to the control group’s posttest scores. As with the antagonist criterion, the control group does not follow the same pattern as the treatment group: the control group has more 1 scores at control condition than at pretest.

Table 7.10: Between-groups comparisons of the gain-scores for the 'time' criterion.

		N	Mean Rank	Sum of Ranks	Mann-Whitney U
Pretest-control/treatment	Control	13	13.96	181.50	90.500
	Treatment	14	14.04	196.50	
Pretest-posttest	Control	11	14.14	155.50	52.000
	Treatment	13	11.12	144.50	

Table 7.11: Between-groups comparisons of the gain-scores for the 'causal complexity' criterion.

\* Significant at  $\alpha < 0.001$  (one-tailed).

		N	Mean Rank	Sum of Ranks	Mann-Whitney U
Pretest-control/treatment	Control	13	9.12	118.50	27.500*
	Treatment	14	18.54	259.50	
Pretest-posttest	Control	11	10.18	112.00	46.000
	Treatment	13	14.46	188.00	

Table 7.12: Within-groups comparisons of the scores for the 'causal complexity' criterion.

\* Significant at  $\alpha < 0.10$  (two-tailed).

\*\* Significant at  $\alpha < 0.02$  (two-tailed).

\*\*\* Significant at  $\alpha < 0.001$  (one-tailed).

		N	Mean Rank	Sum of Ranks	Mann-Whitney U
Control	Pretest	13	16.46	214.00	46.000*
	Control	13	10.54	137.00	
	Pretest	11	15.09	166.00	21.000**
	posttest	11	7.91	87.00	
Treatment	Pretest	14	9.43	132.00	27.000***
	Treatment	14	19.57	274.00	
	Pretest	13	14.85	193.00	67.000
	posttest	13	12.15	158.00	

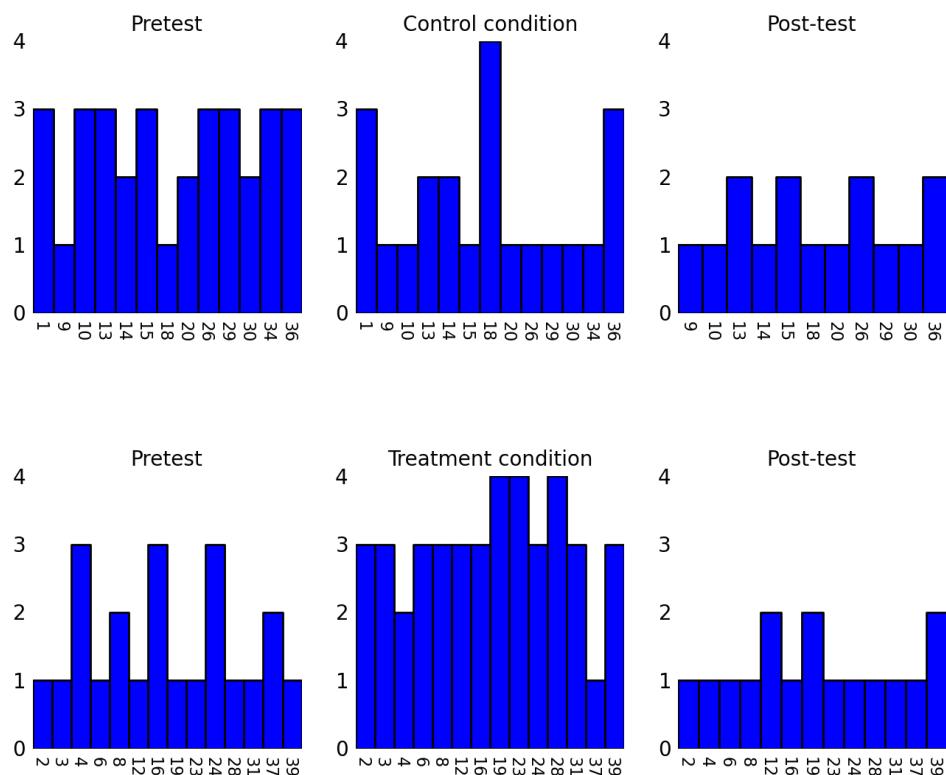


Figure 7.13: ‘Causal complexity’ criterion scores for the control group (top) and the treatment group (bottom). Bars represent individual stories.

So far, the results appear to support the hypothesis. However, table 7.13 on page 261 shows the results of between-groups comparisons of the raw scores for the causal complexity criterion. As with the antagonist criterion the control group's *pretest* scores are significantly higher than the treatment group's ( $\alpha < 0.02$ , two-tailed). As with the antagonist criterion, at control/treatment condition the treatment group's scores catch up to and overtake the control group's scores. The treatment condition scores are significantly higher than the control condition scores ( $\alpha < 0.01$ , one-tailed). Also as with the antagonist criterion, the two groups converge at posttest. In the comparison of the control group's posttest scores to the treatment group's posttest scores, the Mann-Whitney *U* value of 62.000 indicates no significant difference.

Because the control group's pretest scores were significantly higher than the treatment group's pretest scores, *selection bias* arises as a rival hypothesis explaining the between-groups difference in gain scores. It may be that participants with low pretest scores have higher pretest-control/treatment condition gain scores, regardless of whether they belong to the control group or the treatment group. The difference between the gain scores of the two groups may be due to the treatment group having more of the participants with low pretest scores, rather than due to the treatment. Such an effect could be produced by *regression to the mean*.

Examination of the scores for the causal complexity criterion (figure 7.13 on the previous page) reveals that most of the treatment group participants have low scores (1 or 2) at pretest and then improve at treatment condition. This supports both our experimental hypothesis and the regression to the mean hypothesis. The regression toward the mean hypothesis also predicts that treatment group participants with high pretest scores will tend to decline at treatment condition, but only three treatment group participants scored higher than 2 at pretest, too few to test the prediction.

The control group's scores do *not* support the regression toward the mean hypothesis. Many of the control group participants scored 3 at pretest and then declined at control condition as the hypothesis predicts, but of the five control group participants with low scores (1 or 2) at pretest only one improved at control condition. The pattern suggests a global dampening of control group participants' scores over time (such as might be caused by demoralisation) rather than a regression to the mean, but the data are too few to strongly refute the regression toward the mean hypothesis.

### Pretest-posttest

Comparison of the treatment group's pretest-posttest gain scores to the control group's pretest-posttest gain scores (table 7.11 on page 256) finds no significant difference. Nor was there a within-groups pretest-posttest difference for the treatment group (table 7.12 on page 256). The control group's scores declined significantly from pretest to posttest (table 7.12 on page 256,  $\alpha < 0.02$ , two-tailed).

### Conclusion

We argue that the treatment *did* affect the scores for the causal complexity criterion as hypothesised. The treatment group's scores improved more from pretest to control/treatment condition than the control group's scores. However this conclusion must be qualified due to the unexpected difference between the pretest ratings of the groups, which introduces the rival hypothesis that the difference is due to regression to the mean. On inspection the data do not appear to support regression to the mean, but are too few to strongly refute the hypothesis.

Additionally, there is *not* sufficient evidence to conclude that the treatment significantly affected the *post-test* scores. There was no significant difference between the control and treatment groups at posttest, nor was there a significant within-groups pretest-posttest difference in the treatment group's scores.

### 7.5.7 Results for the 'Descriptive Detail' Criterion

The first hypothesis for the descriptive detail criterion was that the treatment would reduce the incidence of 0 scores (scores without a starter event). The hypothesis cannot be tested because no pretest stories from either group scored 0. There was no room for improvement in the incidence of stories containing a starter event over stories lacking a starter event.

The second hypothesis was that the treatment would not affect the amount of detail with which starter events are described, it would not affect where scores fell within the range 1-4.

### Pretest-control/treatment condition

Unexpectedly, a between-groups comparison of the gain scores for the descriptive detail criterion using the Mann-Whitney *U* test (table 7.14 on page 261) finds that the

pretest-treatment condition gain scores are significantly higher than the pretest-control condition gain scores ( $\alpha < 0.05$ , two-tailed).

Table 7.15 on the facing page shows the results of within-groups comparisons of the scores for the ‘descriptive detail’ criterion using the Mann-Whitney  $U$  test. The control group’s scores fell from pretest to control condition, but the difference was not significant (in the comparison of the control condition scores to the pretest scores of the same participants, the control condition has a lower mean rank and sum of ranks but the Mann-Whitney  $U$  value of 59.500 indicates no significant difference). In contrast, treatment condition scores are *significantly higher* than the pretest scores of the same participants ( $\alpha < 0.05$ , two-tailed).

Table 7.16 on page 264 shows the results of between-groups comparisons of the raw scores for the ‘descriptive detail’ criterion. As with the antagonist and causal complexity criterion, the control group’s scores were unexpectedly higher than the treatment group’s scores *at pre-test* ( $\alpha < 0.10$ , two-tailed). As with the antagonist and descriptive detail criterion the treatment group catches up to the control group at control/treatment condition, but in this case the treatment group scores do not overtake the control group scores. In the comparison of the control condition scores to the treatment condition scores, although the treatment condition’s mean rank and sum of ranks are higher the Mann-Whitney  $U$  value of 62.000 indicates no significant difference. Also as with the antagonist and causal complexity criterion, there is no significant difference between the posttest scores of the control group and the treatment group.

Because the control group’s *pretest* scores are significantly higher than the treatment group’s pretest scores, *selection bias* arises as a hypothesis explaining the difference between the gain scores of the two groups. It may be that participants with lower pretest scores have higher pretest-control/treatment condition gain scores, regardless of whether they belong to the control group or the treatment group. The difference between the gain scores of the two groups may be due to the treatment group having more of these participants with lower pretest scores, rather than due to the treatment. Such an effect could be produced by *regression toward the mean*.

Figure 7.14 on page 262 plots the descriptive detail scores of the control group and the treatment group at each stage of the study. At pretest most treatment group stories were scored 1 or 2 (no descriptive details are given, or one or two simple descriptive details are given) with only one 3 score and two 4 scores. At treatment condition most of the stories have 3 or 4 scores (more well-described starter events) with only two 2 scores and two 1 scores. The control group has less 3-4 scores at control condition

Table 7.13: Between-groups comparisons of the scores for the ‘causal complexity’ criterion.

\* Significant at  $\alpha < 0.02$  (two-tailed).

\*\* Significant at  $\alpha < 0.01$  (one-tailed).

		N	Mean Rank	Sum of Ranks	Mann-Whitney U
Pretest	Control	13	17.69	230.00	43.000*
	Treatment	14	10.57	148.00	
Control/treatment	Control	13	9.50	123.50	32.500**
	Treatment	14	18.18	254.50	
posttest	Control	11	13.36	147.00	62.000
	Treatment	13	11.77	153.00	

Table 7.14: Between-groups comparisons of the gain-scores for the ‘descriptive detail’ criterion.

\* Significant at  $\alpha < 0.05$  (two-tailed).

\*\* Significant at  $\alpha < 0.10$  (two-tailed).

		N	Mean Rank	Sum of Ranks	Mann-Whitney U
Pretest–control/treatment	Control	13	10.73	139.50	48.500*
	Treatment	14	17.04	238.50	
Pretest–posttest	Control	11	9.82	108.00	42.000**
	Treatment	13	14.77	192.00	

Table 7.15: Within-groups comparisons of the scores for the ‘descriptive detail’ criterion.

\* Significant at  $\alpha < 0.02$  (two-tailed).

\*\* Significant at  $\alpha < 0.05$  (two-tailed).

		N	Mean Rank	Sum of Ranks	Mann-Whitney U
Control	Pretest	13	15.42	200.50	59.500
	Control	13	11.58	150.50	
	Pretest	11	14.82	163.00	24.000*
	posttest	11	8.18	90.00	
Treatment	Pretest	14	11.54	161.50	56.500**
	Treatment	14	17.46	244.50	
	Pretest	13	14.12	183.50	76.500
	posttest	13	12.88	167.50	

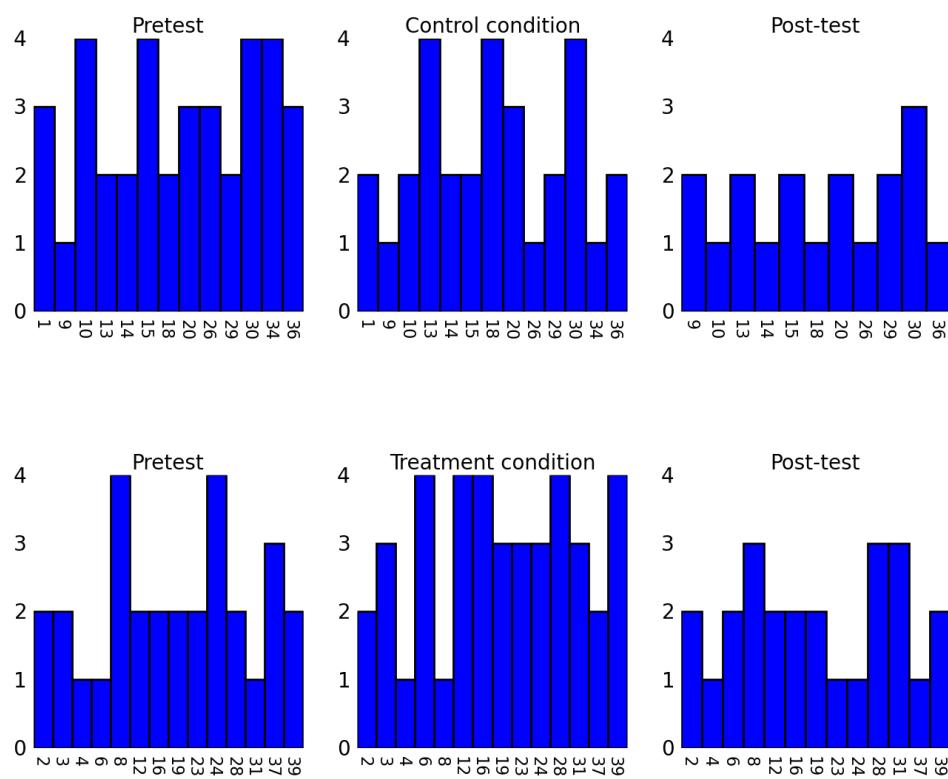


Figure 7.14: ‘Descriptive detail’ criterion scores for the control group (top) and the treatment group (bottom). Bars represent individual stories.

than at pretest. The pattern of the treatment group’s scores might be an effect of the treatment, but could also have been produced by regression toward the mean. The rival hypothesis cannot be refuted.

### Pretest-posttest

The treatment group’s pretest-posttest scores were significantly higher than the control group’s (table 7.14 on the previous page,  $\alpha < 0.10$ , two-tailed), but the difference is due to the control group’s scores declining rather than due to the treatment group’s scores improving over time. A within-groups comparison of the treatment group’s pretest scores to the posttest scores of the same participants using the Mann-Whitney *U* test finds no significant difference (table 7.15 on the preceding page). In contrast, the control group’s scores decline significantly from pretest to posttest ( $\alpha < 0.02$ , two-tailed).

## Conclusion

First, since the study contained no stories that lacked a starter event, there was no room for improvement in the incidence of stories containing a starter event over stories lacking one.

Second, there is insufficient evidence to conclude that the treatment affected the amount of detail with which starter events were described, that it affected where scores for the descriptive detail criterion fell within the range 1-4. Although there is a significant difference between the pretest-treatment condition and pretest-control condition gain scores, and the treatment group's scores improved significantly from pretest to treatment condition while the control group's scores did not, the treatment group's pretest scores were also significantly lower than the control group's, and regression toward the mean cannot be refuted as a rival explanation for the difference between the groups. Additionally, although there is a significant difference between the pretest-posttest scores of the two groups, this is due to the control group's scores declining from pretest to posttest rather than due to the treatment group's scores improving.

### 7.5.8 Results for the ‘Goal’ Criterion

The hypothesis for the goal criterion was that the treatment group's scores would improve more over time than the control group's. The data do not support the hypothesis. Between-groups comparisons of the gain scores for the goal criterion using the Mann-Whitney  $U$  test (table 7.17 on page 267) find no significant differences. A plot of the scores for the goal criterion (figure 7.15 on the following page) shows that no ceiling effect was present, the pretest scores of both groups left room for improvement. However, the plot reveals that there were very few stories in which the protagonist lacked a goal (0 scores for the goal criterion), the treatment group has only two such stories at pretest, so there was no room for improvement in the incidence of stories in which there is a goal over stories lacking a goal (the incidence of greater-than-zero scores over zero scores), only in whether the goal was implied or explicitly stated (1 or 2 scores) and whether two or more goals were explicitly stated (3 scores). Throughout the study, very few stories were scored 3 for the goal criterion.

Table 7.16: Between-groups comparisons of the scores for the ‘descriptive detail’ criterion.

\* Significant at  $\alpha < 0.10$  (two-tailed).

		N	Mean Rank	Sum of Ranks	Mann-Whitney U
Pretest	Control	13	16.81	218.50	54.500*
	Treatment	14	11.39	159.50	
Control/treatment	Control	13	11.77	153.00	62.000
	Treatment	14	16.07	225.00	
posttest	Control	11	11.14	122.50	56.500
	Treatment	13	13.65	177.50	

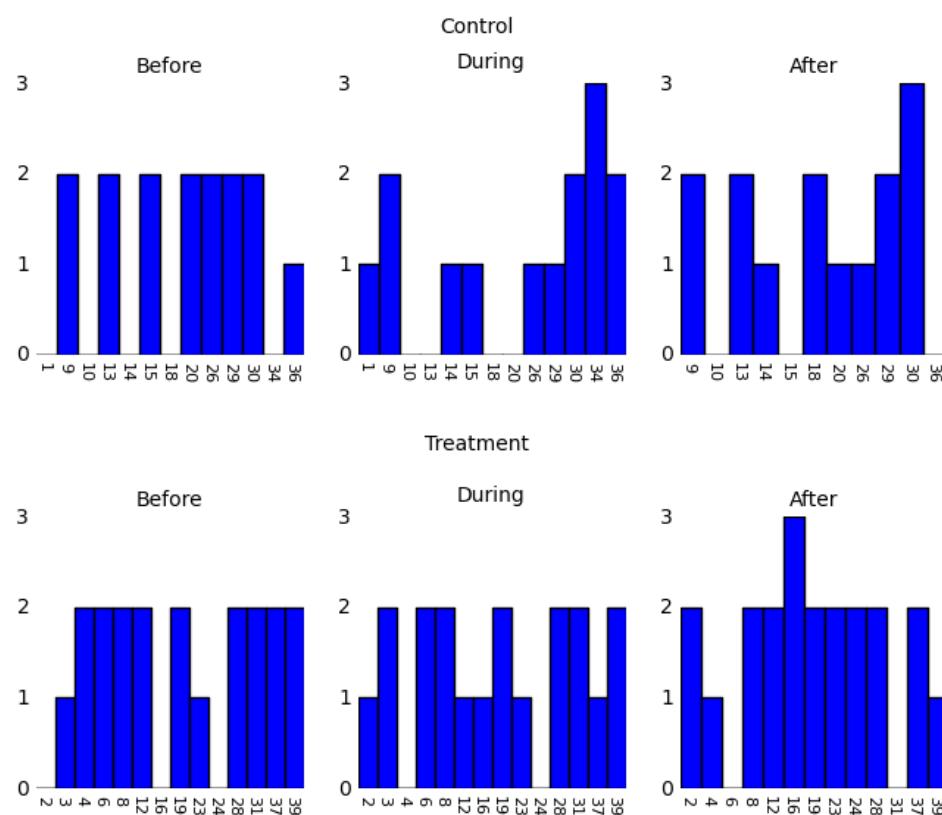


Figure 7.15: ‘Goal’ criterion scores for the control group (top) and the treatment group (bottom). Bars represent individual stories.

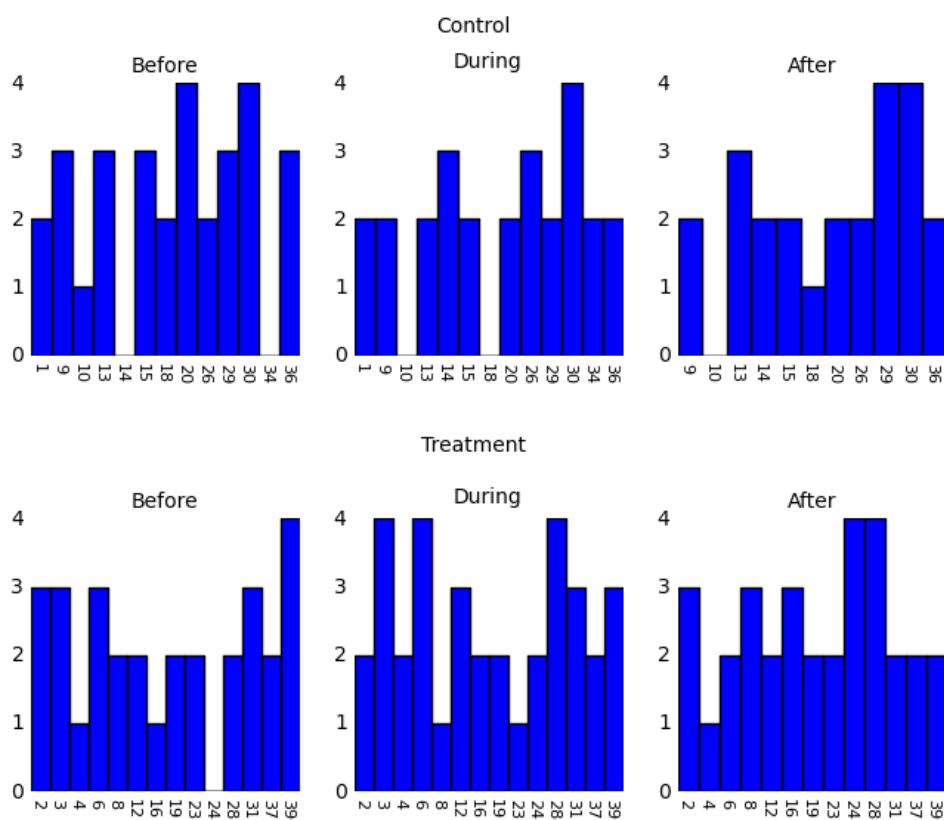


Figure 7.16: ‘Action’ criterion scores for the control group (top) and the treatment group (bottom). Bars represent individual stories.

### 7.5.9 Results for the ‘Action’ Criterion

The hypothesis for the action criterion was that the treatment group’s scores would improve more over time than the control group’s. There is insufficient evidence to support the hypothesis: although the treatment group’s gain scores were higher than the control group’s (both pretest-control/treatment and pretest-posttest) the difference between the groups is not statistically significant (table 7.18 on page 267). A plot of the scores for the action criterion (figure 7.16) shows that no ceiling effect was present, the pretest scores of both groups did leave room for improvement. However, the plot reveals that there were very few 0 scores for the action criterion (stories in which the actions initiated by the protagonist to achieve the goal are not presented), the treatment group has only one such story at pretest, so there was no room for improvement in the incidence of greater-than-zero scores over zero scores, only in where the scores fell within the 1-4 range (in the amount of descriptive detail with which the actions are described).

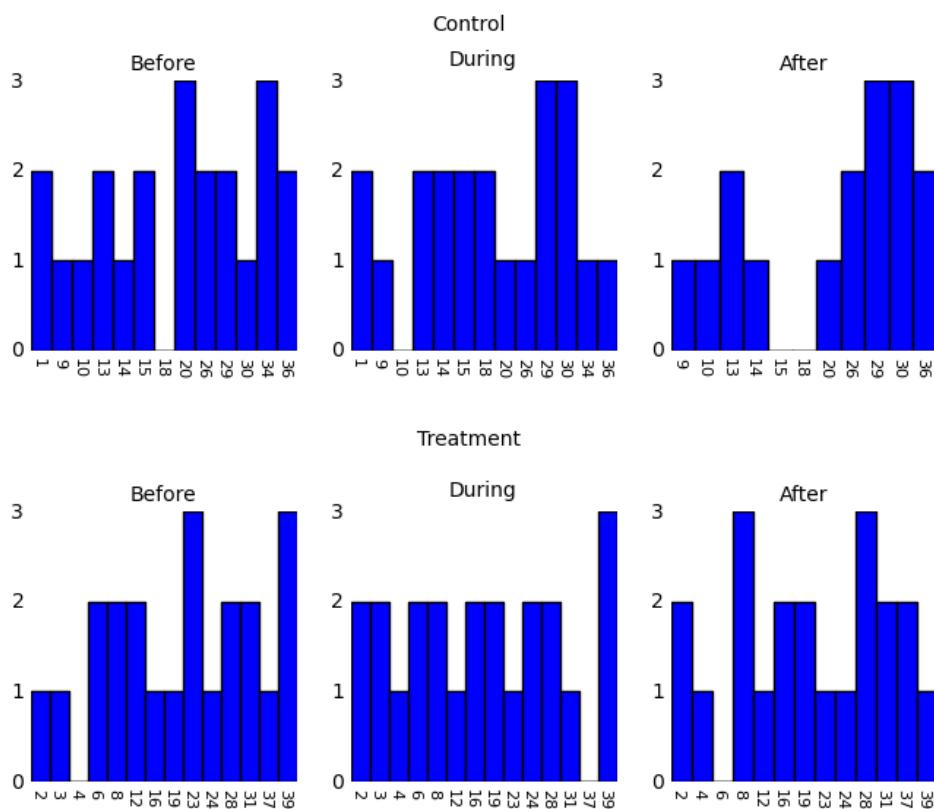


Figure 7.17: ‘Ending’ criterion scores for the control group (top) and the treatment group (bottom). Bars represent individual stories.

### 7.5.10 Results for the ‘Ending’ Criterion

The hypothesis for the ending criterion was that the treatment group’s scores would improve more over time than the control group’s. There is insufficient evidence to support the hypothesis: between-groups comparisons of the gain scores for the ending criterion (table 7.19 on the next page) find no significant differences. A plot of the scores for the ending criterion (figure 7.17) shows that no ceiling effect was present, the pretest scores of both groups did leave room for improvement. However, the plot shows that there were very few 0 scores for the ending criterion (stories lacking a conclusion), the treatment group has only one such story at pretest. So there was no room for improvement in the incidence of stories with a conclusion over stories lacking a conclusion, only in how interesting the conclusions were (where scores fall within the range 1-3).

Table 7.17: Between-groups comparisons of the gain-scores for the ‘goal’ criterion.

		N	Mean Rank	Sum of Ranks	Mann-Whitney <i>U</i>
Pretest–control/treatment	Control	13	13.65	177.50	86.500
	Treatment	14	14.32	200.50	
Pretest–posttest	Control	11	12.00	132.00	66.000
	Treatment	13	12.92	168.00	

Table 7.18: Between-groups comparisons of the gain-scores for the ‘action’ criterion.

		N	Mean Rank	Sum of Ranks	Mann-Whitney <i>U</i>
Pretest–control/treatment	Control	13	11.58	150.50	59.500
	Treatment	14	16.25	227.50	
Pretest–posttest	Control	11	10.45	115.00	49.000
	Treatment	13	14.23	185.00	

Table 7.19: Between-groups comparisons of the gain-scores for the ‘ending’ criterion.

		N	Mean Rank	Sum of Ranks	Mann-Whitney <i>U</i>
Pretest–control/treatment	Control	13	13.35	173.50	82.500
	Treatment	14	14.61	204.50	
Pretest–posttest	Control	11	11.50	126.50	60.500
	Treatment	13	13.35	173.50	

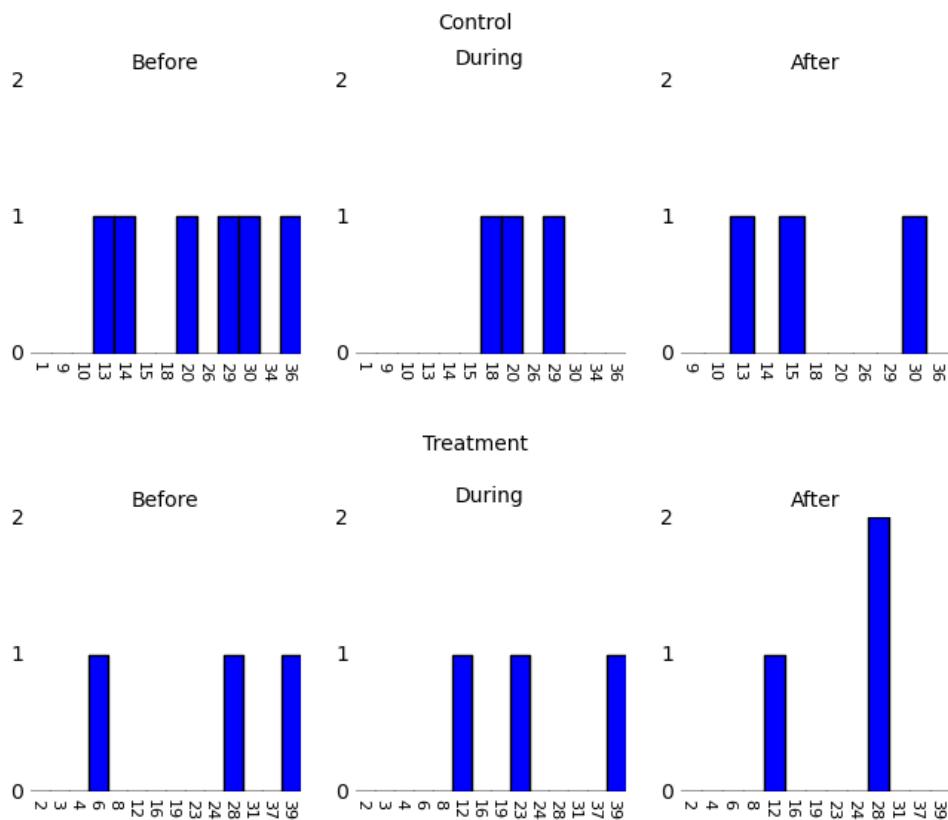


Figure 7.18: ‘Reaction’ criterion scores for the control group (top) and the treatment group (bottom). Bars represent individual stories.

### 7.5.11 Results for the ‘Reaction’ Criterion

The hypothesis for the reaction criterion was that there would be no significant difference between the scores of the control group and the treatment group. A hypothesis of no difference cannot be proven, but the data do not refute the hypothesis. Between-groups comparisons of the gain scores for the reaction criterion find no significant differences (table 7.20 on page 291). A plot of the scores for the reaction criterion (figure 7.18) shows that the pretest scores of both groups left plenty of room for improvement. Most stories from either group at any stage of the study scored 0 (emotional reactions of the characters are not presented), only a few stories scored 1 (some emotional feelings expressed by the characters) and only one story in the entire study scored 2 (emotional feelings of the characters expressed with depth).

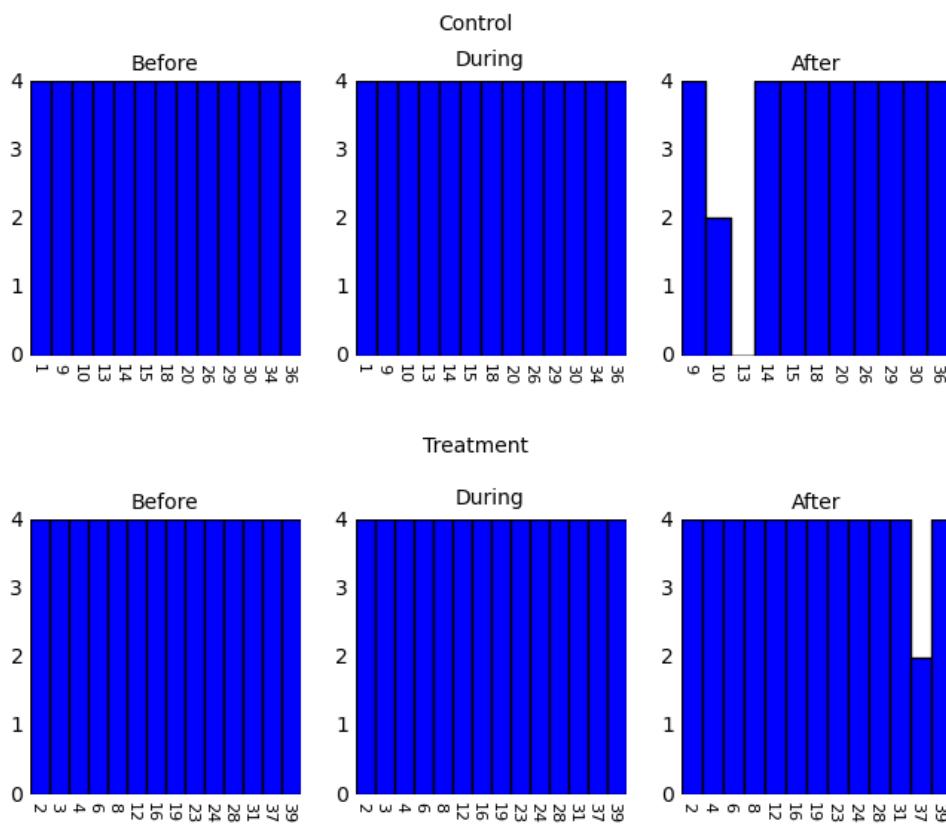


Figure 7.19: ‘Coherence’ criterion scores for the control group (top) and the treatment group (bottom). Bars represent individual stories.

### 7.5.12 Results for the ‘Coherence’ Criterion

The hypothesis for the coherence criterion was that there would be no significant difference between the scores of the two groups because there would be no room for improvement, almost all stories would get the highest score. The data confirm the hypothesis. Between-groups comparisons of the scores for the coherence criterion find no significant differences (table 7.21 on page 291), and a plot of the scores shows that almost all stories from either group at any stage of the study got the highest score (figure 7.19).

## 7.6 Discussion and Further Work

### 7.6.1 Plot Structure and Character Roles

The results show that the plot structure and character roles of stories written using the story maps application did improve in some of the ways expected, but for other aspects

of plot structure there was no room for improvement. The story maps application increased the incidence of stories that contained an antagonist, and increased the causal complexity of story events building up to the precipitating event. However, due to unexpected significant differences between the *pretest* scores of the control and treatment groups the rival hypothesis of regression to the mean has not been strongly refuted in either case. Also, there is insufficient evidence to conclude that either effect remained at posttest.

In other aspects of plot structure that the treatment was expected to improve there was no room for improvement. At pretest there were no stories lacking a starter event, and too few stories in which the protagonist lacked a goal, in which the actions initiated by the protagonist in order to achieve the goal were not presented, or that lacked a resolution. As discussed below (see subsection 7.6.10 on page 281), a more detailed analysis of the plot structure of the stories may find differences where these relatively broad criteria find no room for improvement. The hypothesis that the story maps application would contribute to more interesting endings (endings that are unusual, contain a moral, reveal the fate of the characters, etc.) over simple, traditional endings ('they lived happily ever after' etc.) was not confirmed.

Based on these quantitative results, questions can now be posed for further qualitative analysis to address. Qualitative analysis could aim to strengthen the conclusions that the treatment affected the antagonists and causal complexity of the stories by searching for evidence of the hypothesised mechanisms by which the intervention might have affected the stories. Quantitative analysis has identified (with qualifications) whether an effect is present, qualitative analysis would aim to identify why the effect occurred.

The hypothesis for the *Antagonist* criterion states that the intervention should increase the incidence of stories with an antagonist due to the various Propp cards on which the villain is mentioned. The quantitative data shows (with qualifications) that the intervention did increase the incidence of stories with an antagonist. A study of the stories from the intervention could ascertain whether the antagonists present in the stories correspond to the villain of the Propp cards used to write the stories, and the antagonists in these stories could be compared to antagonists in pretest, posttest and control group stories. Such a study might shed further light on whether the quantitative difference between the control and treatment groups is due to the intervention or due to regression toward the mean.

The hypothesis for the *Starter event, causal complexity* criterion states that the in-

tervention should improve scores for the criterion because the Propp cards representing the functions of the preparation in Propp's morphology, when used correctly in the stories, would contribute to the scores. The quantitative data shows (with qualifications) that the intervention did increase the scores. A study of the stories from the intervention could ascertain whether or not the causal complexity of the stories was due to correct application of these Propp cards as expected, and could compare the causal complexity of the starter events of stories from the intervention with that of pretest, posttest and control group stories. Again, such a study might shed further light on whether the quantitative difference between the control and treatment groups is due to the intervention or due to regression toward the mean.

The hypothesis for the *Starter event, descriptive detail* criterion was that the intervention would not affect the scores. Unexpectedly the quantitative data may show that the intervention did increase the scores, but the observed difference may also be due to regression toward the mean. Again a qualitative comparison of the stories might shed light on the question.

An initial look at the stories from the treatment condition seems to support the hypotheses for the antagonist and causal complexity criteria. As hypothesised, in almost all of the treatment condition stories the antagonist of the story corresponds to the villain on the Propp cards in the story map, and most feature causally linked events that facilitate the starter event and correspond to some of Propp's seven preparatory functions. The participants have selected these Propp functions (the preparatory functions and the functions of the villain's sphere of action) for their story maps and used them correctly and as expected in their stories.

*The Humaneater*, written by a nine year old girl using the story maps application during the treatment condition, is a simple example:

One day Sam went to knock on her friend, who lived in the woods. It was very dark in the woods so Sam took a torch with her. Then when she got to the woods she saw a sign saying "Do not go in the woods because the humaneater is looking for more food." Sam knew what the humaneater was, it was a bad wizard who died if he went into the light, and who ate humans. But Sam just ignored the sign and went into the woods and turned her torch on. Then suddenly she felt a hand on her shoulder then it pulled her into the bag. Then she thought to herself, it's the humaneater. Sam was a bit worried now. She could not stop thinking about what her dad would say.<sup>7</sup>

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<sup>7</sup>Introductory opening paragraphs (corresponding to Propp's initial situation) have been removed from the examples and spelling and grammar have been corrected for clarity, otherwise the example texts are as written by the participants.

This story displays the Propp functions absentation (Sam leaves home on her own), interdiction (Sam comes across a sign warning her not to go into the woods) and violation (Sam ignores the sign and goes into the woods) culminating in villainy (Sam is kidnapped by the humaneater). The functions are used as expected, the preparatory functions lead up to the villainy in a causally connected sequence, and the villainy is used as the starter event of the story, introducing a crisis whose resolution is the motivation for the rest of the story. The functions match the Propp cards in the author's story map, except that violation is missing from the story map. In Propp's morphology the purpose of an interdiction is to be violated, in the tales Propp studied the function of interdiction was always followed by violation. It is interesting that the author had an interdiction without a violation in her story map but nonetheless inserted a violation in her story. The story continues with Sam's dad going out to look for Sam when she doesn't come home, discovering the warning sign and realising what must have happened (mediation), and rescuing Sam (using Sam's torch to defeat the humaneater).

*The Trick for Natasha!*, written by another nine year old girl, has a more complex preparation:

One morning, Natasha's parents went to work. Natasha's parents told her to stay in the house because there was a trickster called Ruby on the streets. But Natasha ignored her parents, and when they left she went outside. She saw a woman with some sweets. "Why hello little girl. I will swap you that bracelet for these sweets" the woman said. So Natasha gave the woman her bracelet, and the woman ran away. Natasha looked into the bag, there was nothing there. She had been tricked.

This text implements the Propp functions absentation (Natasha's parents leave Natasha on her own, the opposite of the form of absentation used in the previous example), interdiction (they warn Natasha not to go outside), violation (Natasha goes outside), trickery (the woman offers Natasha a false exchange), complicity (Natasha agrees to the exchange), villainy (the woman takes the bracelet and leaves) and mediation (Natasha learns of the villainy). This sequence of functions matches the sequence of Propp cards in the story map, except that the story map has mediation in the wrong position (in the story the author has used mediation in its correct position according to Propp's sequence), and the story map also contains the reconnaissance and delivery functions (which the author has missed out in the story, participants were instructed that they could skip cards in their story maps if they decided they no longer wanted to use them). The antagonist in this story corresponds to the villain in the Propp functions, and the absentation, trickery and complicity functions are used in a causally connected

sequence to facilitate the villainy. Unlike the previous example in which the victim and hero were two different characters, in this story Natasha fills both roles. The story continues with Natasha discovering the identity of the trickster (Ruby) and deciding to get her bracelet back, sneaking into Ruby's house and retrieving the bracelet while Ruby is asleep, and then escaping with Ruby in pursuit.

Finally *Spying = Trouble*, written by an eleven year old boy, uses the reconnaissance and delivery functions to facilitate the villainy:

Barry went to meet Chuck. Chuck wanted to know where the golden statue worth loads of money was kept. "In my house in my kitchen in the cupboard under the sink," explained Barry.

What they didn't know was that the villain of the world was listening in. The villain ran to Barry's house. Luckily (for the villain) Barry's mum went out so there was nobody at the house. The villain smashed the kitchen window, and trodded through to the other side of the kitchen where the cupboard hid under the sink. "Ha ha ha" said the villain, very quietly. He found the golden statue. He ran back out of the window he smashed to get in.

Five minutes later Barry returned. He was strolling along when he saw the smashed window. Barry ran into the kitchen and saw the cupboard door opened and saw a letter saying:

Barry,  
Thanks for your rich statue.  
Signed, THE VILLAIN

"I'm going to get my statue back!" screamed Barry.

### 7.6.2 Representation of Characters and Their Attributes

As expected, no evidence was found to suggest that the intervention affected the amount of detail with which characters were described in the stories written. The study found no evidence that scores for the *protagonist* or *antagonist* criteria were affected, other than ensuring that stories written using the story maps application did contain an antagonist (there were no 0 scores from the treatment condition).<sup>8</sup> Although there were some stories at each stage of the study in which the protagonist or antagonist was described in more detail (3 or 4 scores for the protagonist or antagonist criteria), many

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<sup>8</sup>The level of descriptive detail of the protagonist(s) and antagonist(s) only were measured. Although these are the main characters, other characters such as the victim, the sought-for person and the magic helper also exist in Proppian fairy tales. A future empirical study that focused on the character description in particular should consider all characters in the story.

of the treatment group's stories throughout the study contained protagonists or antagonists that were "just a name on a page" with "very little information or detail" (scores of 2 or less). That some participants were able to achieve the higher scores but most did not shows that there is room for improvement and opportunity for a story writing tool to help improve stories in this respect.

A weakness of the story maps application is that by focusing on Propp's functions (Propp cards are the main interactive objects, and each Propp card represents a Propp function) the application emphasises the event structure of the story and neglects the characters. Character roles such as *hero* and *villain* are mentioned on the Propp cards when these characters are required to act in order to realise a Propp function, but only the names of the roles are given, the characters that fill the roles and their attributes are not represented.

An improvement would be to represent characters and their attributes alongside functions as first-class interactive objects. The story maps application could, for example, be enhanced with *character cards* representing the hero, villain, donor etc. and holding descriptive information about the attributes of these characters. Integrating character cards into the interface is a non-trivial design problem, and further interface design studies would be required to achieve the aim. Propp's works provide a rich set of concepts on which this development could be based.

### 7.6.3 Representation of Settings and Their Attributes

As expected, no evidence was found to suggest that the intervention affected the amount of detail with which settings were described in the stories written. No significant differences were found between control and treatment group scores for the *locale* criterion. Most stories throughout the study contained locations described with little or no detail, and in some cases locations were missing entirely (scores of 2 or less for the locale criterion). Very few stories were rated as having locales described in greater detail. That some stories achieved the higher score but most did not shows that there is room for improvement, and opportunity for a story writing tool to help improve stories in this aspect.

The situation is similar to that for the representation of characters. Settings and their attributes are not represented as first-class, interactive objects in the system. Settings are mentioned on some of the Propp cards ("Home," "The hero gets to the destination," "The hero sets out to return home") and the transition from one place to

another on others (“The hero leaves on a journey”). “Home” and “the destination” etc. are to settings as villain, hero, etc. are to characters. The locations themselves and their attributes are not represented.

As with characters, introducing settings into the interface as first-class objects is a non-trivial development, and a question for further interface design studies to explore.

#### 7.6.4 Representation of Details of The Action

The *descriptive detail* criterion measures the amount of detail that is used to describe the starter event of the story, and the *action* criterion measures the amount of detail that is used to describe the actions that the protagonist initiates in order to achieve the main goals in the story. A story map constructed from typically 10-20 Propp cards represents a much more detailed plan of the action of a story than a typical classroom story planning worksheet as used in the control condition. We might therefore expect that stories produced using story maps would contain more detailed action. The study found evidence that may suggest that the treatment improved scores for the descriptive detail criterion, but the rival hypothesis of regression to the mean could not be refuted. The study did not find sufficient evidence to conclude that the treatment improved scores for the action criterion. The scores from both criteria demonstrate that there is room for improvement, and an opportunity for a story-writing tool to help improve stories in this aspect.

The story maps application could further support details of the action by allowing authors to attach notes about such details to the Propp cards in their story map. The Propp cards could contain prompt questions for authors to complete in note form. For example, if the villain attempts to deceive the victim (the Propp card *Trick*), what is the motivation for the deception? Does the villain attempt the deception through persuasion, through use of magical means, or otherwise? If the story contains a *Villainy*, who is the person performing the villainy? What is the object of the villain’s influence? Who is the owner of the object or friend of the person captured? What is the motivation for the villainy? How does the villain escape? And so on. In this way, when constructing her story map the author is planning out the details of her story as well as the overall structure. When writing the story, the story map will act as a reminder of the details as well as the overall structure of the story.

As with the attributes of characters and settings, Propp considered details of the action to be variable rather than constant elements of the tale and so did not focus

on them in his morphological study. But as with the attributes of characters and settings, the variable details of the actions can be grouped around the constant functions. Propp's morphology is a rich source of ideas for the kinds of details that are important, the ways in which tales vary in the realisation of each function. In *The Functions of Dramatis Personae* (Propp, 1968, Chapter III) and *Materials for a Tabulation of the Tale* (Propp, 1968, Appendix I) and elsewhere Propp enumerates the many axes of variation.

### 7.6.5 The Goals of the Protagonist

The hypothesis that the treatment would improve scores for the *goal* criterion was not confirmed, no significant differences were found in the goal criterion scores, either between-groups or within-groups. Throughout the study there were very few stories in which the protagonist had no goal or purpose (0 scores for the goal criterion), so there is not enough data to test whether the intervention reduced the incidence of such stories. There were also very few stories in which the actions that the protagonist initiates in order to achieve the main goals were not presented (0 scores for the *action* criterion). There was no room for improvement in this respect. What the results tell us is that the story maps application did not significantly increase the incidence of protagonist's goals that were explicitly stated by the author. Most stories throughout the study, from both groups, were rated 1 (protagonist's goal is implicit) or 2 (protagonist's goal is explicitly given). The treatment did not appear to have an effect on whether the protagonist's goal was left implicit or made explicit. In retrospect this result is not surprising. As mentioned when discussing the hypothesis for the goal criterion many of the Propp cards represent goal-directed actions undertaken by the hero, so we would expect the protagonist of the story to have a goal. But correct use of these cards does not guarantee that the goal will be explicitly given. Only one Propp card (*Decides*, representing Propp's function *beginning counteraction* in which the hero agrees to or decides upon counteraction) requires the protagonist's goal to be explicitly stated by the author, and it appears that many participants either did not use this Propp card or did not use it as expected. Very few stories were scored 3 (two or more goals explicitly given). Many of the Propp cards represent actions of the protagonist directed at achieving sub-goals or further goals, but again the cards do not require that these goals be explicitly stated by the author.

A quick look at the goals of the protagonists in the stories from the treatment con-

dition finds a mixed picture. In some stories the *Decides* Propp card was not used and no protagonist's goal is present. In others the card does appear in the story map but the protagonist's goal is not mentioned in the story, though it is obvious from the protagonist's goal-directed actions. Other stories contain a statement in place of the *Decides* card but it is non-specific, the protagonist "decides to go off on a journey." In many stories from the treatment condition the *Decides* card is used as expected and the protagonist's goal is stated explicitly, the protagonist "decides to go look for the thief," "decides to set off towards the kidnapper's hut," "set off to retrieve the box," etc. In *Spying = Trouble* (see page 273), after reading the letter left by the antagonist at the scene of the crime the protagonist says "I'm going to get my statue back!" *The Humaneater* also uses the *Decides* card to explicitly state the protagonist's goal:

He saw a sign saying "Don't go into the woods because the humaneater is looking for food." That was when Sam's dad realised that Sam had been took by the humaneater [mediation]. Then Sam's dad decided to go and rescue her [beginning counteraction]. He leaves with all the village people waving him off on his horse [departure].

Nonetheless, the goal criterion scores of the treatment condition stories were not significantly different from those of the other stories.

### 7.6.6 The Resolution and Conclusion of the Story

The hypothesis that the intervention would improve scores for the *ending* criterion was not confirmed. No significant differences were found in the scores for the ending criterion, either between-groups or within-groups. Throughout the study there were very few stories that had no real ending, had a lack of conclusion, or seemed unfinished (there were very few 0 scores for the ending criterion), so there are too few data to test whether the intervention reduced the incidence of such stories. What the results tell us is that the intervention did not have a significant effect on whether the endings of the stories were common (1 score) or more interesting (2 or 3 score). It was expected that a number of Propp cards including "*The villain is defeated*," "*The villainy is put right*," "*The hero sets out to return home*," "*The villain is punished*" and "*The hero gets a reward*" would contribute to more interesting endings, but this was not reflected in the scores for the ending criterion. This may be because participants did not make use of these Propp cards, or because participants did not use the cards as expected.

A quick look at the endings of the stories from the treatment condition finds a mixed picture. At least one ending card such as "*The villain is defeated*," "*The villainy is put*

right," "The hero sets out to return home," "The villain is punished" or "The hero gets a reward" is always present and often more than one. A few stories end suddenly with the resolution of the crisis or the defeat of the villain. In some cases cards such as the return home and the reward are used only to create a very brief and simple ending to the story, after the crisis is resolved the protagonists simply return home and the story ends, or they return home and they have cake, or some other simple form of reward. Many of the treatment condition stories use the reward and punishment cards to create a slightly more interesting ending. The protagonists return home to a surprise party, the villain is sent to prison, etc. For example, in *The Magic Jewel*, written by a nine year old girl, the prince is poisoned and the magic jewel stolen. After retrieving the jewel the protagonist is given a wish as a reward and magnanimously uses it to revive the prince:

"Wait, you need a reward, you can have one wish and it will come true" said the Queen. "I wish for your son to come alive please" asked the man. The boy started to come alive. "Thank you!" said the queen. "Bye!" said the man.

In *The Gold Hunting Thief*, written by an eleven year old boy, the villain is sent to prison and the hero is given money as a reward:

The thief was given a life sentence in jail so he would never return to con people ever again. Tim got given a £15,000 reward for his bravery, and his mum was so proud of him, and they lived happily ever after.

Nonetheless, the ending criterion scores of the treatment condition stories were not significantly different from those of the other stories.

### 7.6.7 The Emotional Feelings and Reactions of the Characters

As expected no evidence was found that the treatment affected the expression of the emotional reactions and feelings of the characters in the stories. No significant differences were found, either between-groups or within-groups, for the *Reaction* criterion. The data reveal that there is much room for improvement in this aspect of the stories. Most stories throughout the study were scored as having no emotional reactions presented (0 score for the reaction criterion). Some stories were rated 1 (some emotional feelings expressed by the characters) and only one story was rated 2 (emotional feelings of the characters expressed with depth). That some stories contained expressions of the emotional reactions and feelings of the characters but most did not shows

that there is room for improvement and an opportunity for a story-writing tool to help improve stories in this aspect.

As discussed above, the story maps application focuses on the action of the story and characters and their attributes, including their emotions, are not represented as first-class objects in the application. The representation of characters would need to be expanded before their emotional reactions and feelings could be represented in the story maps application.

### 7.6.8 The Coherence of the Stories

As expected, no significant differences were found in the scores for the *Coherence* criterion because there was no room for improvement, almost all stories throughout the study were given the maximum score for coherence. The results may show that children of the age group studied are capable of writing a logically coherent and consistent story with or without the story maps application. The logical order and consistency of the actions and events of a story may not be an area on which studies of a story-writing tool such as the story maps application should focus, as children are able to handle this aspect themselves. However, a more detailed analysis of the coherence of the stories using a more sensitive method may find different results.

### 7.6.9 Feedback from the Participants

Twenty participant feedback forms were collected from the treatment group and eighteen from the control group. The responses are given in full in appendix G. This section discusses some of the main themes present in the responses from the treatment group participants. In retrospect, it would have been better if control group participants were given some of the same questions as the treatment group participants instead of being given a different set of questions, so that the two sets of responses could be compared. Nonetheless, the treatment group's responses are interesting. Further studies might investigate some of the hypotheses generated here.

The story maps application may provide children with an intrinsic motivation for story writing. Participants reported that they found the story maps application easy and enjoyable to use: "It's fun and easy to use," "It was cool," "It was very quick and easy," and that they appreciated the opportunity to write stories using their own ideas instead of being told what to write about: "you are allowed to use your imagination and not be told what to do," "I liked that that you got to choose your parts of the story to write

instead of it being done for you," "I liked how you could make your own story up and place it in any order," "I liked the bit where you got to put the pictures anywhere."

Further studies might explore this motivational aspect of a story-construction tool based on Propp's morphology. Use of a morphological approach to learning about narrative structure gives the author a more constructive relationship to the story plan than do the story-planning worksheets typically used in schools. The story planning worksheets collected from both the pilot and main study schools and the worksheet used in the control condition are all of the question-answer format. The questions posed by the worksheet structure the story and partially determine the content. For example, a worksheet titled "A Woodlouse's Adventure" from the pilot study school has four questions for the writer to answer: "Where is he/she heading? What does he/she see along the way? What problem does he/she come across? How does it make him/her feel?" Other such worksheets contain more questions and so exert greater control over the narrative structure and content, taking creative freedom away from the story writer. With story planning worksheets of this form the more detailed the worksheet, the richer the construct of narrative structure that the worksheet embodies, the less freedom is given to the story writer. This may contribute to pupils' feeling that they are being made to write about topics that they do not want to write about, or that were not of their own choosing. In contrast, planning using the story maps application puts the story writer in a more creative role. By constructing her story map from a selection of Propp cards the writer has a greater sense of creative freedom and feels greater ownership over the plan that she has constructed, rather than merely filled in. If the construct of story structure embodied by the story maps application is made richer in future versions, perhaps by incorporating more elements of Propp's morphology and the tales that Propp studied, this only *increases* the writer's creative freedom. By giving the writer a greater number and variety of components to use, and more ways of combining components into a story map, the decision space of possible story maps for the writer to construct and possible ideas that the writer can express is increased while the construct of narrative structure embodied by the application is made more detailed.

The story maps application may help participants to feel confident about the stories they write: "It was the best story I've ever done," "It was structured well," "I felt like I got a higher level in my story." Although children are writing their own original stories, the story maps application provides the stories with a consistency and completeness of form, and participants may have appreciated this.

Participants found the application helpful with generating ideas for, planning and

writing their stories: “It gave me more ideas,” “It helped me to plan my story,” “It structured out my story for me,” “I knew what I was going to write about next.”

Some participants would have liked to have more Propp cards available in the application, or could not find Propp cards to express the ideas that they wanted to use.

The experimental conditions were not ideal for the participants’ story writing: “I could have done better,” “I can never write a good story in such a short time”. Some participants found it difficult to generate ideas for stories three weeks in a row, or found the task of writing their stories on paper difficult. Future studies could benefit from a less rigid and repetitive research design.

### 7.6.10 Further Study of the Acquisition of Fairy Tale Structure

The present study avoided deriving a measure of narrative structure from Propp’s morphology for fear of introducing a bias. The reasoning was that if the construct to be measured, that of narrative structure, was based on the same model of narrative used by participants to plan their stories in the intervention, then the method of measurement might predetermine the outcome. A more general measure of narrative structure was developed instead. However, as a consequence of this desire for objective measurement the quantitative measure embodies a construct of narrative structure that is much more broad-grained and generic than the rich and detailed construct embodied by Propp’s morphology. The risk is that the construct embodied by the measure becomes a lowest common denominator. The measure records whether a story has a protagonist and an antagonist, major and minor settings, a precipitating event and some causal build-up to the precipitating event, whether the protagonist has a goal and initiates actions in order to achieve the goal, whether the story has a resolution, and a few further details. In fact this measure was chosen in part because it is much more fine-grained than any of the other quantitative measures considered. Nonetheless, there may be effects due to the intervention that are not detected by this measure. In particular, the stories may evidence aspects of the fairy tale form as described by Propp’s morphology that would not be detected by the measure. It seems likely that any general measure of narrative structure will be so limited.

A relatively insensitive measure and only a short intervention may not be the most productive combination. Further analysis of the data using a method explicitly based on Propp’s model of narrative may be worthwhile. Such an analysis would discard the notion of a general construct of narrative structure. Instead the argument is that a

successful realisation of the traditional fairy tale form as represented in Propp's morphology is itself an indicator of good narrative structure and a desirable learning aim. It is not obvious how Propp's concepts in all their richness will be understood and applied by children, and whether each concept will be retained and evidenced at posttest when writing without the direct aid of a Propp-based tool.

Going beyond further analysis of the existing data, future studies may aim to carry out a detailed investigation of the acquisition of fairy tale structure as defined by Propp's morphology. The concepts of the morphology should be enumerated and ordered from the most basic and simple to the more advanced and subtle. Research could ask whether or not each concept can be acquired by children and successfully applied in their own stories, and how children apply the concepts, how they affect the quality of the stories written. Our initial, exploratory study began this program by verifying that children can accurately apply Propp's fundamental concept, the function. It is not possible to demonstrate or to learn the later Proppian concepts in only an hour or two, so further studies would require longer interventions with each participant taking part in several sessions over a period of days or weeks.

Of course, before children's acquisition of each of Propp's concepts can be studied the problem of how to represent the concept in the story construction interface must be addressed. User interface features would first need to be generated in formative studies and then their usability verified with child users. Research would be an iterative process guided by Propp's morphology: taking one of Propp's concepts at a time, developing an interface design for the concept in formative studies, verifying the usability of the new interface elements, then studying children's acquisition of the concept through their interaction with the interface, and then moving onto the next concept of interest from Propp's morphology.

### 7.6.11 Methodological Problems and Unanticipated Difficulties

#### 7.6.11.1 Internal Validity

**7.6.11.1.1 History** By use of a control group drawn from the same population as the treatment group and randomised assignment of participants to either the control or the treatment group, the pretest-posttest control group design should control for the threat to internal validity from *history* (Campbell and Stanley, 1963, p.13). That is, it should control for the threat that the specific events (other than the planned control and treatment conditions) occurring between the pretest, control and treatment conditions,

and posttest might affect the data collected. The assumption is that any historical events that might affect the treatment group's stories would also affect the control group's stories. However, there is a potential threat to the current study due to the unique *intra session history* of the control group and the treatment group.

Campbell and Stanley (1963, p.14) warn against treating all experimental group participants in a single session and all control group participants in another single session, and recommend treating each participant separately. Because it was not practical to treat each participant in a separate session this study adopted a compromise position. For each of the pretest, experimental condition, control condition and posttest participants were treated in a number of groups of around five participants each. Nonetheless, the experimental condition suffered from unique events that seem likely to have significantly affected the results.

The four sessions of the experimental condition suffered from a problem with the school's networked printer. In two of the four experimental sessions, after completing their story maps on the computer participants suffered an unplanned 45 minute wait in the school's library before their printed story maps were ready and they could begin writing their stories. During this time it is likely that participants lost their motivation for story writing, forgot some of their ideas for their stories, became tired, bored and distracted etc., and when the story maps finally arrived less time remained for story writing as participants had to return to their classrooms or go for lunch. The control condition sessions did not require the printer, so control condition participants were able to begin writing their stories immediately after planning them. The researcher observed that participants in the affected experimental condition sessions were relatively slow to start writing once their story maps arrived, and that much of the excitement and ideas expressed by participants while constructing their story maps were not realised in the stories written. It seems likely that the stories would have been more successful without the technical problems. The problem with the printer was able to be contained (to about a 15 minute wait) in the remaining two experimental condition sessions, and after the first of the four sessions participants were kept occupied during the wait for their story maps with drawing pictures of their story characters.

Campbell and Stanley (1963, p.14) also recommends assigning session times to the control and experimental conditions at random. In this study the beginning of the week (Monday, Tuesday and Wednesday) was devoted to conducting the four experimental condition sessions. This was done to limit the inconvenience to the school's teachers, who could return to their usual full time access to the entire shared computer

lab for Thursday and Friday. The three sessions of the control condition (which did not require access to the computer lab) were conducted on Thursday and Friday. Both control condition and experimental condition sessions were conducted at different times throughout the day. Because all of the experimental condition's sessions were conducted before all those of the control condition, day of the week is a potential source of bias in the results and may have contributed (for example) to the fall in control group ratings for some criteria from pretest to control condition.

**7.6.11.1.2 Instrumentation** Because only one researcher was available both to conduct the experiment at Collingwood Primary School and to apply the quantitative measure of plot structure to the 120 stories from the study to attain ratings,<sup>9</sup> instrumentation could not be entirely controlled for. It was not possible for the researcher to be ignorant of the research questions and hypotheses while rating the stories, nor to be ignorant of which stories came from experimental condition sessions and which from control condition sessions. When rating pretest and posttest stories, the researcher *was* ignorant of whether the story belonged to an experimental or control condition participant. Additionally, all stories were rated in a random order (and not, for example, the pretest stories first, followed by the experimental condition, and so on) to control for rater fatigue or other changes that would affect ratings over time. Finally, an inter-rater reliability test was conducted comparing the researcher's ratings for five randomly chosen stories to ratings for the same stories from two independent raters (see section 6.3.2 on page 214). The independent raters were ignorant of the research hypotheses, and of whether the stories came from the control or experimental groups.

**7.6.11.1.3 Selection** According to Campbell and Stanley (1963, p.15) “*selection* is ruled out as an explanation of the difference to the extent that randomization has assured group equality.” This study did assign individual participants to either the control or experimental condition at random (and did not, for example, assign each school class that supplied participants to one condition or the other), and we find that participants are distributed roughly evenly between the control and treatment groups by sex, age and class. Nonetheless, the pretest ratings of the control group were significantly higher than those of the experimental group for the *antagonist*, *causal complexity* and *descriptive detail* criteria. We cannot offer any explanation for the difference between

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<sup>9</sup>Applying the measure is a careful analytical task that requires at least ten minutes per story, well over 20 hours to rate all of the stories from the study.

the groups at pretest other than that, as explained by Campbell and Stanley (1963), the assumption that randomisation will ensure group equality will be wrong occasionally and there will be apparently significant differences between the pretest scores. Randomisation is a less than perfect way to ensure the initial equivalence of groups but it is “nonetheless the only way of doing so, and the essential way” (Campbell and Stanley, 1963, p.15).

In further studies, the initial equivalence of the control and experimental groups could be made more likely by using a larger number of participants. *Blocking* of participants into pairs with similar pretest ratings and then randomly assigning one member of each pair to the control condition and one to the experimental condition was not possible, because ratings for the pretest stories were not available before the control and experimental conditions were conducted. Modification of the timetable of the study to make blocking possible might be an improvement, if it were practical under school conditions, but it would be necessary to also ensure that the blocking did not produce a significant difference between the groups on age, sex, which of the school’s classes the participants come from, etc.

### 7.6.11.2 External Validity

**7.6.11.2.1 Sensitizing effect of the pretest** Campbell and Stanley (1963, p.16) describe the threat to external validity from the pretest: that participants are changed by the pretest such that their response to the experimental treatment is affected, meaning that the results cannot be generalised to populations that have not been pretested as the study’s participants were. The effect of the pretest may be to magnify or to dampen the effect of the experimental treatment. In this study all of the sessions (pretest, posttest, control and experimental conditions) were novel experiences for the participants in some respects. Participants were removed from their normal classroom lessons to take part in sessions which took place in the school’s library and were led by the researcher whom the participants had not met before. Aside from these novel aspects, the pretest, posttest and control condition were designed by the researcher with the help of teachers, and meant to resemble typical classroom story-writing exercises.

It would be desirable to reduce the novelty of the sessions by having them conducted by the participants’ usual teachers in normal class time, with the entire class taking part. But this would have been much more inconvenient for the school, as teachers would have had to modify a number of their normal lesson plans replacing them with lessons designed by the researcher in collaboration with the teachers. Much

greater cooperation between the researcher and a number of teachers would be required. In practice, it was more convenient for the teachers to have only a few pupils absent from class to attend a session that was entirely the researcher's responsibility. This also made it easier for the researcher to assure consistency between sessions.

A possible compromise would be to reduce the number of school classes involved, for example having all students from a particular class participate in the study rather than a handful of students each from four different classes. This would mean that only one teacher would be required to collaborate closely with the researcher in order to conduct sessions under normal classroom conditions. In this respect the design used for the pilot study was superior, as the pretest, posttest and control condition were conducted by the class's usual teacher under normal classroom conditions. However, this change would simultaneously reduce the external validity of the experiment by reducing the size of the population from which participants are sampled. Rather than sampling a number of participants at random from all four of the school's classes within the desired age range, the population would be reduced to the pupils of one class who are not sampled at random but all take part in the study.

### **7.6.11.3 Other Methodological Problems and Unanticipated Difficulties**

**7.6.11.3.1 Control Condition** In retrospect, it was felt that the control condition of the study could have been better designed. There were two difficulties with the control condition. First, that it was too similar to the pretest and posttest so that control group participants may have become bored. This may partially explain the dip in the control group's ratings for some of the criteria from pretest to control condition, although it does not seem to explain why the ratings recovered again at posttest. While it is not necessary for the control condition to be as stimulating as the experimental condition (part of what was being measured is the fun, constructionist motivational aspect of Propp cards and the story maps application) it would have been desirable to give the control group participants greater variation and motivation.

Second, the control condition did not include an example story whereas the experimental condition did. This introduces the rival hypothesis that any significant difference between the control and experimental groups is merely due to the example story and not the use of the story maps application.

The experimental condition involved the reading of a sample fairy tale to participants before they planned their stories, as part of the introduction of the Propp cards concept and the story maps application. An example tale was felt necessary for the ex-

perimental condition because the exploratory study found it to be the most effective and stimulating way of quickly introducing the concepts necessary to use the story maps application. In past studies it was observed that children appear to prefer concrete, in-context examples over context-free examples or abstract descriptions to define Propp's functions. Stories written by children who had not been given an example story during a usability test of the story maps application were judged to vary much more widely in their content, quality and correct application of Propp's functions than stories from sessions that began with an example.

The difficulty with the control condition was that a reading of the example story would have seemed conspicuous to the participants. During the experimental condition the example was presented to participants as a demonstration of the use of Propp cards, this purpose was made explicit to the participants, and participants were reminded that they should use the cards to write their own stories and not follow the example story. For the control condition, there would have been no such purpose for the example story. In discussion between the researcher and the teacher, it was felt very likely that if given the example story control participants would copy it.

A solution might have been to embed the experiment as a whole, pretest, control and treatment conditions and posttest, in the context of a series of lessons on fairy tales as a story type. Information about fairy tales could be provided to participants, and example tales presented as examples of the story type before asking participants to write their own original stories of the type. This learning context may also have made the experiment more interesting for the participants, assisting with the first weakness of the control condition (and the pre- and posttests). Unfortunately, to design an experiment like this would simply have required much more preparation time than was available to the researcher.

**7.6.11.3.2 Writing Tasks** Participants at each stage of the study were asked to write original stories using whatever ideas, characters, settings, genre etc. they wished. In retrospect, it may have been desirable for the story writing tasks to be less open-ended. The high degree of variation in the stories produced by such open-ended writing tasks makes measurement difficult, and required levels and criteria of the measure to be defined quite broadly. Additionally, although participants were excited to be able to write about whatever they wanted, a less open-ended writing task might have helped to motivate participants, to generate ideas and to focus on their writing. As discussed above, an improvement may have been to embed the experiment in a series of lessons

on fairy tales with information and examples, and ask the participants to create their own stories of this particular type while giving them freedom to create within the type.

**7.6.11.3.3 Audience** As an external motivation for their participation in the study, participants were reminded that they were assisting in a scientific investigation, helping us to learn about the story maps application, and the research design was explained to participants. However, it would have been better to give participants a more immediate audience for their stories. For example, as was done in the pilot study, participants' stories could have been collected and bound at the end of the study for them to take home to their parents.

**7.6.11.3.4 Truncated Stories** Although every effort was made to reduce the number of absences and incomplete stories throughout the study, arranging for participants to attend a different session if they could not make their scheduled session or could not finish their story on time, it was discovered that participants had an unfortunate tendency to suddenly truncate their stories and declare them "finished." The pupils had evidently learned how to write cliffhangers, so that stories can be finished quickly as the school timetable demands. In some cases these truncated stories could not be rated, and had to be discarded as incomplete stories.

## 7.7 Conclusion

In response to the general research question, we argue that using the story maps application as a story planning exercise *did* improve the structure of the stories written during the intervention, but with two qualifications. First, due to unexpected differences between the control and treatment groups at pretest the rival hypothesis of regression toward the mean cannot be strongly refuted on the basis of the quantitative data. Second, insufficient evidence was found to conclude that any effect was retained at posttest.

**7.7.0.3.5 Plot Structure and Character Roles** Stories written using the story maps application showed better plot structure and use of character roles in some of the ways expected, but other hypotheses about plot structure were not confirmed. We argue on the basis of the quantitative data that using the story maps application increased the incidence of stories containing an antagonist and increased the causal complexity of

story events leading up to the precipitating event, but note that in both cases the rival hypothesis of regression toward the mean has not been strongly refuted. None of the stories from the study lacked a protagonist, so there was no room for improvement in the incidence of stories containing a protagonist. Similarly, there were no stories lacking a starter event, too few stories in which the protagonist lacked a goal, too few stories in which the actions initiated by the protagonist in order to achieve the goal were not presented, and too few stories that lacked an ending or conclusion. In each of these aspects, there was no room for improvement. The hypothesis that the story maps application would contribute to more interesting endings (endings that are unusual, contain a moral, reveal the fate of the characters, etc.) over simple, traditional endings ('they lived happily ever after' etc.) was not confirmed.

**7.7.0.3.6 Further Qualitative Analysis** The quantitative results identify the ways in which the story maps application affected and did not affect the structure of the stories. Based on these results, further qualitative analysis can now aim to verify hypotheses about the mechanisms by which the application affected some aspects of the story structure, and the reasons why the application did not affect other aspects.

**7.7.0.3.7 More Detailed Study of Story Structure** Relative to the richness of Propp's morphology, the quantitative measure applied in this study embodies a simple, broad-grained construct of plot structure. The children's stories may contain evidence of aspects of the fairy tale form as described by Propp's morphology that are not detected by the measure. Further analysis of the data using Propp's morphology as a guide might attempt a more detailed study of children's acquisition and application of Propp's structure in their stories.

Further studies might continue the investigation of children's acquisition of fairy tale structure through Propp's morphology by incorporating concepts from the morphology that were not applied to the present study. Further Proppian concepts must first be incorporated into the story writing tool and can then be studied in children's stories written using the tool. As each new concept is incorporated the fairy tale structure is represented and can be studied in more complete detail.

**7.7.0.3.8 Descriptive Detail** As expected, no evidence was found to suggest that the story maps application affected the amount of descriptive detail with which the characters, settings and events of the stories were described. These results show that

there is room for improvement and opportunity for further development of the story maps application to help improve these aspects of children's stories by incorporating greater representation of characters, locations and their attributes into the model.

**7.7.0.3.9 Emotional Reactions** As expected, no evidence was found that the story maps application affects the presentation of the emotional reactions and feelings of story characters. Throughout the study few stories contained any in-depth expression of the characters' emotions, suggesting that there is an opportunity for the story maps application to help improve this aspect of children's stories.

**7.7.0.3.10 Coherence** As expected based on the pilot study results, the main study found no evidence that the story maps application affected the coherence of the stories. The broad, quantitative measure of coherence that was applied was unable to distinguish between the stories, very few stories throughout the study received less than the maximum score. The results may show that children do not require support for the coherence of their story writing and therefore the tool should not focus on this aspect. However, more detailed analysis of the coherence of the stories may produce different results.

**7.7.0.3.11 Feedback from Participants** Participant feedback suggests some hypotheses that further studies might investigate. Participant responses to feedback forms suggest that the story maps application might provide an intrinsic motivation for story writing. Participants reported that they enjoyed using the application and appreciated the freedom to construct a story plan using their own ideas. Because the story maps application allows the writer to construct a story plan of her own design, rather than obliging her to merely fill in a plan by answering questions on a typical classroom story-planning worksheet, the writer may feel a greater sense of creative freedom, and greater ownership over her story and the process that created it. The responses also suggest that the application helped participants to feel confident about the quality of the stories they had written, and that participants felt that the application was helpful to their story writing. However, some participants complained that there were not enough Propp cards to express their ideas, and some responses suggest that the experimental conditions may not have been optimal for the participants' story writing.

Table 7.20: Between-groups comparisons of the gain-scores for the ‘reaction’ criterion.

		N	Mean Rank	Sum of Ranks	Mann-Whitney <i>U</i>
Pretest–control/treatment	Control	13	12.62	164.00	73.000
	Treatment	14	15.29	214.00	
Pretest–posttest	Control	11	11.00	121.00	55.000
	Treatment	13	13.77	179.00	

Table 7.21: Between-groups comparisons of the gain-scores for the ‘coherence’ criterion.

		N	Mean Rank	Sum of Ranks	Mann-Whitney <i>U</i>
Pretest–control/treatment	Control	13	14.00	182.00	91.000
	Treatment	14	14.00	196.00	
Pretest–posttest	Control	11	11.77	129.50	63.500
	Treatment	13	13.12	170.50	



# **Chapter 8**

## **Conclusions and Further Work**

This final chapter reconsiders the thesis questions that were given in the introductory chapter in the light of the work that has been completed, identifies directions for further work, and then summarises the main contributions of this thesis work.

### **8.1 Thesis Questions**

#### **1. How can Propp's morphology be represented in a story authoring tool for children?**

The story maps application developed in chapter 5 demonstrates how Propp's morphology can be represented in a story authoring tool. The application demonstrates the representation of Propp's functions as Propp cards; the representation of the Proppian narrative structure of a tale as a story map; and user interactions for constructing a story map and writing a story following it. The design of the application is based on the concepts of Propp card, card store and story map that were used in the paper study of children's story authoring with Propp's morphology reported in chapter 4. These interface foundations build on ideas from Rodari (1996) and Charles (2006). Texts for each Propp card (name, brief description and instructions) were developed based on the definitions of Propp's functions and species developed in chapter 3. The format of the card texts was adjusted based on feedback from teachers. Illustrations for each Propp card were created by a professional illustrator based on the texts for the cards. The story maps application was verified in usability evaluations with teachers and children, and was used in the experimental study of children's story authoring reported in chapter 7.

The results from the experimental study reported in chapter 7 identified a number of limitations of the story maps application. The application lacks support for characters and their attributes, for settings and their attributes, for details of the action, and for emotional feelings and reactions.

Another limitation of the story maps application is that only the basic concepts of Propp's morphology are represented in the application. As the description of Propp's morphology in section 2.5 on page 65 shows, the morphology contains many further concepts that are not represented in the application.

## **2. Can children apply Propp's morphology to story writing?**

The study reported in chapter 4 provided evidence that children can use Propp cards and story maps to write stories that display Proppian narrative structure with a high degree of accuracy, both when recasting a traditional tale and when writing to story maps of the children's own construction. This result demonstrates that Propp's morphology is a valid model of narrative for a children's story authoring tool. Children are able to understand Propp's concepts of plot function, role, and that a huge variety of tales can be created from a finite compositional scheme, and are able to apply these concepts to their own story writing. This empirically confirms what Rodari (1996) claims and Charles (2006) assumes.

The results of this first study have certain limitations. The study concerned Propp's functions only, and did not investigate whether children can apply further concepts from Propp's morphology. Such an investigation would require a longer intervention, in which children are introduced to each of Propp's concepts in turn during a series of story writing sessions, traditional tales being used to illustrate each concept before introducing the abstract definition of the concept. The study did not account for the originality or for the quality of the stories written by the participants. Convincing evidence of the originality and quality of the stories could be provided by further qualitative analysis based on the decomposition of the stories into their Proppian components.

## **3. Does using Propp's morphology affect the quality of the stories written? If so, in what ways?**

The experimental study reported in chapter 7 compared stories written using the story authoring application developed in chapter 5 to stories written using a typical class-

room story planning worksheet. The comparison was made using a quantitative measure of narrative structure that was developed in chapter 6.

Based on the results of the study, we argue that using the story maps application as a story planning exercise did improve the structure of the stories written. The story maps application increased the incidence of stories containing an antagonist and increased the causal complexity of story events leading up to the precipitating event. However, two qualifications must be made to these conclusions. First, due to unexpected differences between the control and treatment groups at *pretest*, the rival hypothesis of regression toward the mean cannot be strongly refuted on the basis of the quantitative data. Second, insufficient evidence was found to conclude that any effect was retained at posttest. No evidence was found to suggest that the story maps application affected descriptive detail, emotional reactions, or coherence in the stories.

The quantitative results from the experimental study identify ways in which the story maps application affected and did not affect the stories written. Based on these results, further qualitative analysis of the stories could aim to verify hypotheses about the mechanisms by which the story maps application affected the stories.

In response to feedback forms participants reported that they enjoyed using the application and appreciated the freedom to construct a story plan using their own ideas. Because the story maps application allows the writer to construct a story plan of her own design, rather than obliging her to merely fill in a plan by answering questions on a typical classroom story-planning worksheet, the writer may feel a greater sense of creative freedom, and greater ownership over her story and the process that created it. Participant reports also suggest that the application helped participants to feel confident about the quality of the stories they had written, and that participants felt that the application was helpful to their story writing. However, some participants complained that there were not enough Propp cards to express their ideas, and some responses suggest that the experimental conditions may not have been optimal for the participants' story writing.

## 8.2 Further Work

### 8.2.1 Qualitative Analysis of Children’s Stories Using Propp’s Morphology

Qualitative analysis of stories written by children using a story authoring tool based on Propp’s morphology would provide further insights into how the tool affects children’s story writing, and how children use Propp’s morphology in their stories. The improved formal interpretation of Propp’s morphology developed in chapter 3 and the procedure for analysing a story using the interpretation could form the basis of qualitative analysis. A story would first be broken down into its structural components, and a systematic description of the story would proceed from this decomposition. The method could be used to compare stories written with and without using the authoring tool. This method of qualitative analysis would be similar to Kroll and Anson (1984)’s analysis of stories using Mandler and Johnson (1977)’s story grammar, or Sharples (1985)’s associative networks method (see section 6.2.2 on page 186), but the use of a model of narrative derived from a corpus of tales would enable direct comparisons between the stories written by children and traditional tales. Whereas the qualitative analysis performed by Charles (2006) describes the content of the stories only, the structural analysis of the children’s stories that has been performed for the present study lays the basis for a qualitative analysis of the interaction of structure and content. The decomposition of each participant’s story into its Propp functions and other components of Propp’s morphology can be used as the basis for a systematic qualitative description of the story, and comparison of the participant’s stories with each other and with the sample tale. This qualitative analysis would go beyond the question, answered by the quantitative analysis, of whether or not the participants have applied Propp’s morphology in their stories and would ask function by function, concept by concept, *how* the participants have used each aspect of Propp’s morphology in their stories.

### 8.2.2 Further Formalisation of Propp’s Morphology

The definitions for Propp’s functions and species that were developed in chapter 3 significantly clarify Propp’s morphology. Based on this work, it might now be possible to further formalise Propp’s morphology.

The existing formalisation contains clear and concise definitions of each of Propp’s functions and of the species of each function. These function and species definitions

were intended to be consistent in form, each defining what actions must be carried out by which character roles to realise the function or species, and aiming to make the significance of the function for the course of action clear. Propp's total ordering of the functions is used, though in fact the functions demand only a partial ordering (see section 2.2.1.6 on page 36). The definitions of functions and species could be further formalised by breaking each into its component parts, and the set of valid permutations of the functions could be defined by defining the dependencies between the functions. A first attempt at this further formalisation might break down the definition of each function into five elements: its subject (the character role that carries out the act), its object (the character role that is on the receiving end of the act), the act, preconditions, and effects. The effects of a function would be items that are added into or removed from the ongoing story context when the function is enacted. For example, the function of villainy adds a misfortune or crisis into the context. The function of liquidation removes a misfortune or crisis from the context. The story context is simply a collection of tags that is modified by each function in turn. The preconditions of a function refer to items that must be present (or must not be present) in the story context in order for that function to be usable as the next function in the story. For example, liquidation requires a misfortune or crisis to be present, the defeat of the villain in a struggle requires a struggle to be under way between the hero and the villain. The preconditions and effects of the functions would determine a partial ordering, specifying all the possible permutations of the functions.

As in the current formalisation, each function would contain a number of species and each species would belong to a single function. The species themselves could be defined using the same components as the functions: subject, object, act, preconditions and effects. The components of a species add to the components already specified by its function, adding further more specific details. Each species would contain a number of varieties defined in the same way.

As well as the definitions of the functions and species themselves, the relationships between the different types of element in Propp's morphology might be formalised. For example, a function contains a number of species while a species belongs to a single function. A move contains an ordered sequence of functions, and a tale contains one or more moves, and so on. The *ProtoPropp* project (Peinado et al., 2004; Gervás et al., 2005; Peinado and Gervás, 2005, 2006) began to map out these relationships between Proppian components in an ontology. This ontology could perhaps be combined with definitions of the functions and species themselves.

A detailed formalisation of Propp's morphology would be a significant development of Propp's work and would have many applications, to folktale analysis, story generators, interactive narrative engines, and story authoring interfaces. A more detailed model of narrative could form the basis for further development of the story maps application, adding new features to the story authoring interface.

### 8.2.3 A Digital Library of Proppian Fairy Tales

It would be useful to obtain the texts of all of the fairy tales that were Propp's materials, and mark up the structure of each tale according to an improved formalisation of Propp's morphology. Propp (1968) gives only one complete analysis of a tale, and gives the analyses of the rest of the material in symbol form only, without the texts of the tales. For the tales themselves, Propp refers the reader to Afanas'ev (1855). Unfortunately, alongside each analysis Propp gives only Afanas'ev (1855)'s number for the tale. Afanas'ev (1855) has not been translated into English in full. The various English collections (for example, Afanas'ev and Jakobson 1946) are selections of tales from (Afanas'ev, 1855) rather than complete translations, and they give only the titles of the tales, not Afanas'ev (1855)'s numbers. It is therefore not immediately possible to compare the analyses given in Propp (1968)'s appendices to the texts of the tales themselves in English translation. To do so, it would be necessary to obtain a complete Russian edition of Afanas'ev (1855), have the titles of the stories from this edition translated into English, and then to compare the titles against the titles given in the various English translations to match up the English translations of particular tales with Propp's analyses.<sup>1</sup>

A marked-up collection of the texts of tales would form a digital library that could be indexed tale by tale, or by function, role, or other components. Such a library could be used to look up all instances of a particular species of a particular function, or to compare the different types of donor in different tales. The digital library could be integrated with a Propp-based story authoring tool, such as the story maps application. Detailed analysis of the tales studied by Propp would contribute to understanding Propp's morphology, clarifying Propp's descriptions of the components of his morphology, illustrating how these components are used in tales and to what effect, and identifying aspects of the tales that Propp's morphology does not describe. The collection would be a useful reservoir of examples for the generation of learning materials,

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<sup>1</sup>Personal communication with Professor Anatoly Liberman, 25th April 2010.

for testing of structural theories, and for exploration by learners.

### 8.2.4 Further Development of the Story Maps Application

The story maps application is a verified foundation that can now form the basis for further development. As discussed above, the results from the experimental study reported in chapter 7 identify a number of candidate areas for improvements to the application: representation of characters and their attributes, of details of the action, and of emotional states and reactions.

Only the basic concepts of Propp's morphology are represented in the story maps application. Further work could aim to integrate further concepts from Propp's morphology into the application, enriching the model of narrative structure that the application embodies, enabling author to construct more detailed story plans using the application. Concepts from Propp's morphology that might be represented in the application include assimilations, double morphological meanings, tales with multiple plots, the attributes and motivations of characters, connectives, trebling and transformations. Adding any one of these concepts to the interface is a non-trivial design problem, and would require an iterative process of design, implementation, and evaluation with users.

### 8.2.5 Integration of the Story Maps Application with an Interactive Narrative System

The development of the story maps application was motivated by the lack of an overall model of narrative in current applications of interactive narrative in education (see section 2.4 on page 60). Further work could now integrate the story authoring interface with an interactive narrative authoring tool for children, such as Adventure Author. A high level representation of plot in terms of Propp functions and character roles would ensure that each scene and character has a role to play in the narratives created by children. Examples discussed in section 2.5 on page 65 illustrate how Propp's functions can be translated into goal and action primitives that are the focus of current interactive narrative authoring interfaces.

### **8.2.6 Investigation of Children’s Appropriation of Formal Narrative Concepts through Story Construction using Propp’s Morphology**

The work presented in this thesis has asked how Propp’s morphology can be represented in a story authoring tool for children, whether children can apply Propp’s concepts to their own story writing, and how Propp’s morphology affects the stories written by children. Further work could aim to show that children appropriate formal knowledge of narrative structure through constructing stories using a Propp-based story authoring tool. The question is not whether or not children can apply Propp’s morphology to story writing, nor how they apply it how it affects their stories, but what do they *learn* from Propp’s morphology?

The experimental study reported in chapter 7 attempted to find evidence of appropriation by including a posttest, but the quantitative evidence was insufficient to conclude that any effect due to the experimental treatment was retained at posttest. This result is not surprising, because participants only had one story writing session with the story authoring tool and because the quantitative measure is relatively broad grained and may miss features of the stories that a deep, qualitative analysis might reveal. A longer study, with several sessions with the story maps application between the pretest and posttest, would be more likely to find quantitative evidence for a significant difference at posttest.

A pretest-posttest with control group research design, as used in the experimental study reported in chapter 7 but with a longer intervention, would be appropriate. As pretest and posttest participants would be asked to write fairy tale stories in normal classroom conditions using normal classroom tools. Between the pretest and posttest, the experimental intervention would consist of several story writing sessions using an authoring tool based on Propp’s morphology. To provide content for several story writing sessions the study should go beyond Propp’s basic concepts. The first story writing session would introduce the basic concepts of role and function. Further sessions would each introduce one additional concept from Propp’s morphology. Each session would use a traditional Proppian tale and its story map to illustrate the narrative concept in question, before asking children to try using this concept in their own story writing. In this way, in a series of story making sessions, the fairy tale form would be taught using examples from traditional tales and a story authoring interface. Propp’s morphology plays the role of the model of fairy tale structure, guiding the design of

the sessions, the interface, and the selection and discussion of example tales. Participants are learning a general morphological form by studying and by creating specific instances of the form. The hope is that participants will appropriate and personalise the formal knowledge about narrative that is embedded in the morphological model. Note that the focus on the structure of tales does not exclude the study of their form. Rather, the structural model provides the framework within which non-structural elements can be studied, for example by comparing the attributes of villains, their dwelling places, their motivations and the details of their actions etc. across different tales.

This design presupposes access to a library of Proppian tales and their analyses to serve as materials, and that the formalisation of Propp's morphology has been extended to further concepts and these concepts integrated in the story maps application.

A quantitative analysis using a measuring instrument such as that developed in chapter 6, applied to stories collected at pretest and posttest, would be appropriate. If a significant difference is found at posttest, this would demonstrate that learning took place, and would provide some indication of what was learned. But quantitative results would be shallow. As discussed, qualitative analysis and comparison of some of the stories would show how participants applied the narrative concepts, and provide evidence of the quality and originality of the stories.

Bringing together the suggestions for further work presented in this section, an agenda for the study of children's acquisition of fairy tale structure through Propp's morphology can be foreseen. Propp's morphology would guide the research. The researcher would take one Proppian concept at a time and first carry out formative studies to find out how best to formalise Propp's morphological concept and how best to integrate it into the story authoring interface. Once a new interface feature has been developed and verified in usability studies, then an experimental study of children's application of the concept to story authoring can be carried out. The study would aim to find evidence that children have acquired the new narrative concept and successfully applied it in their stories, and to describe how children have used the concept, comparing features of the children's stories to similar structural features of traditional tales. This cycle could then be repeated for another feature of Propp's morphology. This thesis work has laid the foundation and has identified the program and the methods for such an agenda.

## 8.3 Contributions

The contributions of this thesis work can be summarised as follows:

1. The development of an improved formal interpretation of Propp's morphology and a procedure for using this formal interpretation to derive the sequence of Propp functions that a story contains. The formal interpretation significantly clarifies the definition of Propp's morphology and has applications for story analysis, for the creation of story authoring tools, and for the learning and teaching of formal narrative concepts.
2. Empirical evidence that children can use Propp cards and story maps to write stories that display Proppian narrative structure with a high degree of accuracy, both when recasting a traditional tale and when writing to story maps of the children's own construction.
3. The design, development and evaluation of a computer story authoring application based on the formal interpretation of Propp's morphology.
4. The development and verification of a quantitative measure of narrative structure for analysis of children's stories.
5. Empirical evidence, from a controlled experimental study, that using the story maps application developed for this thesis work as a story planning exercise may improve some aspects of the narrative structures of stories written by children.

## 8.4 Conclusion

This thesis investigated the application of Propp's morphology as a model of narrative for a story authoring tool for children. A computer-based story authoring application was developed, based on an improved formal interpretation of Propp's morphology and using *Propp cards* and *story maps* as representations of Proppian narrative structure. Evidence was provided that the story maps application is a successful representation of Propp's morphology in a story authoring tool for children, that children can apply Propp's morphology to story writing with a high degree of accuracy, and that using the story maps application improves some aspects of the narrative structure of the children's stories. This preliminary study has established that the application of Propp's

morphology to story authoring tools is a promising area for future research in children's creative writing.



## **Appendix A**

### **Planning Frameworks Used to Teach Narrative Structure in Primary Schools**

Figure A.1: "Beginning, Middle and Ending Chart," a *featured resource* from ReadWriteThink's *Teaching About Story Structure Using Fairy Tales* lesson plan, <http://www.readwritethink.org/classroom-resources/lesson-plans/teaching-about-story-structure-874.html>, retrieved February 21st 2011.

## BEGINNING, MIDDLE, AND ENDING CHART

BEGINNING	MIDDLE	ENDING
Once upon a time...	First  Then  Next  After that  Finally	They lived happily ever after.

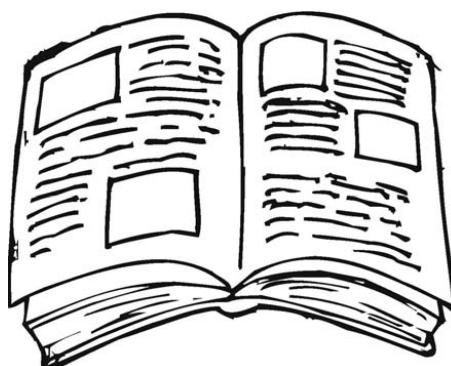


Figure A.2: teachingideas.co.uk planning sheet for a “Storm on the Island” story, <http://www.teachingideas.co.uk/english/contents05writingfiction.htm>, retrieved February 21st 2011.

### Planning Sheet - Storm on the Island

<b>Who?</b>
Who is the person in the story
<b>Where?</b>
Where is the story set? Write down some key words that describe the <b>setting</b>
<b>Beginning</b>
How does the story begin? What is the character doing?
<b>Middle</b>
How does the storm affect the island? What happens?
<b>End</b>
How does the story end? How do you escape the storm? What do you do?

Figure A.3: Story Plan, created by Paul Litten for teachingideas.co.uk, <http://www.teachingideas.co.uk/english/contents05writingfiction.htm>, retrieved February 21st 2011.

# Story Plan

<u>Genre:</u>	
<u>Characters:</u>	<u>Setting:</u>
<u>Plot:</u>	
<u>complication</u>	
<u>Resolution</u>	
<u>Useful words:</u>	

Figure A.4: Story Planner, created by Paul Litten for teachingideas.co.uk, <http://www.teachingideas.co.uk/english/contents05writingfiction.htm>, retrieved February 21st 2011.

Name: \_\_\_\_\_

## Story Planner

<i>Characters</i>	<i>Characteristics (description of appearance, age + behaviour)</i>

Settings

The Plot  
*(What will happen in your story?)*

How will your story begin?

How will your story end?

PLES98

Created by Paul Litten - **Teaching Ideas for Primary Teachers** - <http://www.teachingideas.co.uk>

Figure A.5: Story planner from teachingideas.co.uk, <http://www.teachingideas.co.uk/english/contents05writingfiction.htm>, retrieved February 21st 2011.

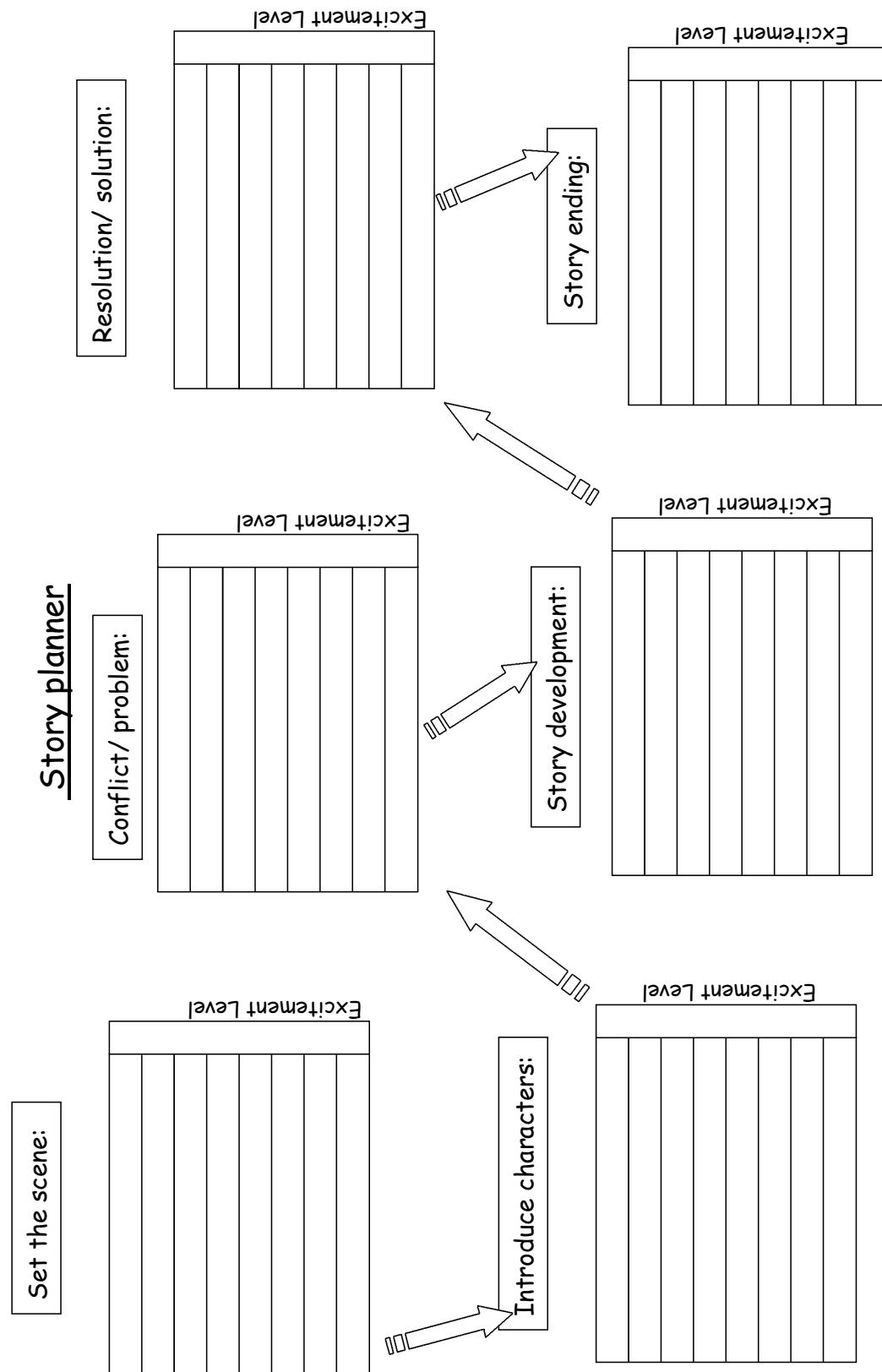


Figure A.6: *My Story Writing Planning Grid* from TES Connect, <http://www.tes.co.uk/teaching-resource/Creative-Writing-Imaginative-Stories-3013115/>, retrieved February 21st 2011.

Name:	My Story Writing Planning Grid			Date
Story Title:				
		What happened at the start?		
		Where did it happen?		
		Who was there?		
		What happened next?		
		Events or Problems?		

Figure A.7: Scary story planning frame from TES Connect, <http://www.tes.co.uk/teaching-resource/Scary-Story-Planning-Frame-6063261/>, retrieved February 21st 2011.

# A Scary Story!



## CHARACTERS

Who are they and what will they be like?

## SETTING

Which words will you use to describe the place and the surroundings?

## OPENING

How will you set the scene and introduce the characters?

## BUILD UP

How will you change the atmosphere?

## MAIN EVENT

What will happen and how will the character feel?

## ENDING

How will your story end and how will everyone feel?

Figure A.8: *A Woodlouse's Adventure* planning framework, collected from Maddiston Primary School, Falkirk.

**A Woodlouse's Adventure**

**WALT:** Write an adventure story from a Woodlouse's point of view.

**WILF:** Story written as if by a tiny creature  
An Exciting Story  
Good descriptions



What does he/she see along the way?



How does it make him/her feel?



Where is he/she heading?



What problem does he/she come across?

Figure A.9: *The Cupboard* planning framework, collected from Maddiston Primary School, Falkirk.

### The Cupboard

WILF Continue the setting M and the events M of the story.

Try to spell some less common words correctly M

Use punctuation (in at least 5 sentences) M

#### My Plan

Which room is the cupboard in?



What was being looked for in the box?

---



---

What was found (What moved)?

---



---

What happens next?

---



---



---



---

Am I ready to write?





## Appendix B

# Improved formal definitions of Propp's functions and species

	<b>Function name</b>	<b>Function definition</b>	<b>Species definition</b>
0	Initial Situation	The initial situation	<ul style="list-style-type: none"> <li>a Statement of the time and/or place in which the story occurs</li> <li>b A character or characters are introduced</li> <li>c Statement of details of the situation of the character(s)</li> </ul>
1	Absence	The absence of a character or characters (the absent guardian(s)) is created	<ul style="list-style-type: none"> <li>a A person or people leave home and the narrative stays at home with those that are left behind</li> <li>b A person or people die and the narrative stays at home with those who are left alive</li> <li>c A person or people leave home and the narrative goes with them</li> </ul>
2	Interdiction	An interdiction or order is given	

<b>Function name</b>	<b>Function definition</b>	<b>Species definition</b>
3 Violation	An interdiction is violated or an order fulfilled	a A character violates an interdiction b A character fulfils an order
4 Reconnaissance	An attempt to obtain information is made	a The villain attempts to obtain information about the intended victim b The victim attempts to obtain information about the villain
5 Delivery	Information is delivered	a The villain receives information about the victim b The victim receives information about the villain
6 Trickery	The villain attempts to deceive or coerce the victim	a The villain tries to persuade the victim b The villain tries to use magic to deceive or coerce the victim c The villain otherwise tries to deceive or coerce the victim
7 Complicity	The victim submits to deception or coercion	a The victim agrees to the villain's persuasions b The victim submits to the villain's use of magic c The victim submits to deception or coercion
8 Villainy	The villain creates a misfortune or crisis	a The villain steals something or abducts someone

<b>Function name</b>	<b>Function definition</b>	<b>Species definition</b>
8a Lack	Something is lacking or desired	<ul style="list-style-type: none"> <li>b The villain hurts someone or damages something</li> <li>c The villain makes someone leave home</li> </ul> <ul style="list-style-type: none"> <li>a Lack of a friend</li> <li>b Lack of a magical agent</li> <li>c Lack of something wonderful (that is not used as a magical agent)</li> <li>d Lack of money or other means of existence</li> <li>e Lack of another sort</li> </ul>
9 Mediation	The misfortune or shortage is made known to the hero	<ul style="list-style-type: none"> <li>a The dispatcher gives out a call for help to correct a misfortune or shortage</li> <li>b The dispatcher gives the hero a direct command or request to correct a misfortune or shortage</li> <li>d The dispatcher tells the hero of a misfortune or shortage (but does not give a call for help, request, or command)</li> <li>h The hero, without the aid of a dispatcher, learns of a misfortune or shortage.</li> <li>e The dispatcher shows the banished hero the way away from home</li> </ul>

	<b>Function name</b>	<b>Function definition</b>	<b>Species definition</b>
			f The dispatcher frees the imprisoned hero
10	Deciding Counteraction	The seeker hero agrees to or decides upon counteraction	a The seeker hero answers the dispatcher's call for help b The seeker hero accepts the dispatcher's direct command or request d The seeker hero decides upon counteraction to correct a misfortune or shortage related by the dispatcher (but not in the form of a call for help, request or command) h The seeker hero decides upon counteraction to correct a misfortune or shortage
11	Departure	The hero leaves home	
12	Test	The donor presents a test to the hero	a The donor gives the hero an explicit test b The donor asks the hero a question or questions c The donor requests a service from the hero d The donor attacks the hero e The donor offers the hero an exchange f The donor gives the hero an implicit test for politeness. (If the hero is polite he will be rewarded, if he is impolite he will not be rewarded.)

<b>Function name</b>	<b>Function definition</b>	<b>Species definition</b>
13 Reaction	The hero reacts to the donor	<ul style="list-style-type: none"> <li>a The hero passes the donor's test</li> <li>-a The hero fails the donor's test</li> <li>b The hero answers the donor's questions correctly</li> <li>-b The hero does not answer the donor's questions correctly</li> <li>c The hero provides a service to the donor</li> <li>-c The hero does not provide a service to the donor</li> <li>d The hero defeats the donor's attack</li> <li>-d The hero does not defeat the donor's attack</li> <li>e The hero accepts the donor's exchange</li> <li>-e The hero does not accept the donor's exchange</li> <li>f The hero is polite to the donor</li> <li>-f The hero is not polite to the donor</li> </ul>
14 Receipt	The hero receives the magical agent	<ul style="list-style-type: none"> <li>a The donor gives the magical agent directly to the hero.</li> <li>a1 The donor gives something of innate value (that is not a magical agent) directly to the hero.</li> </ul>

<b>Function name</b>	<b>Function definition</b>	<b>Species definition</b>
		<p>_a1 A delayed form. The donor promises to give something of innate value to the hero at a future time. The object is not given to the hero immediately, but the hero is given the right to the object at a later time.</p> <p>b The donor makes the magical agent known to the hero.</p> <p>c The donor sells or exchanges the magical agent to the hero.</p> <p>d The hero finds the magical agent by chance.</p> <p>e The magical agent appears to the hero of its own accord.</p> <p>f The hero steals the magical agent from the donor. Cases where the donor sells the magical agent to the hero and the hero then uses the magical agent on the donor and steals back what was exchanged should be coded as f, rather than c.</p>

Function name	Function definition	Species definition
		<p>g The donor helps the hero. The donor does not give something to the hero but rather <i>makes a gift of itself</i> by providing a service to the hero. In this case the donor also takes on the role of the magical agent/helper.</p>
		<p><u>g</u> A delayed form. The donor promises to help the hero in the future, the hero is not given a helper but is given the right to a helper at a later time.</p>
		<p>neg No magical agent is transferred to the hero. This occurs when the hero's reaction to the donor is negative.</p>
		<p>contr Event: The hero is punished by the donor. This occurs when the hero's reaction to the donor is negative.</p>
15 Arrival	The hero arrives at the whereabouts of the object of search.	<p>a The hero uses a mobile means of transport: animal or vehicle, magical powers, etc.</p> <p>b The hero is guided, another character shows or leads the way, the hero follows a trail left by another character, the hero follows a sign, etc</p>

<b>Function name</b>	<b>Function definition</b>	<b>Species definition</b>
		c The hero uses a stationary means of transport: climbing a rope, descending a staircase, crossing a bridge, passing through a doorway, etc.
		d No special means of transfer, the hero simply arrives at the whereabouts of the object of search.
16 Struggle	A struggle begins between the hero and the villain	a The hero and the villain begin a fight b The hero and the villain begin a competition or game
17 Branding	The hero is branded or marked	a The hero receives a recognisable wound or mark to the body b The hero is given a recognisable item
18 Victory	The villain is defeated	a The villain is defeated in a fight b The villain is defeated in a competition or game c The villain is killed without any preceding struggle d The villain is driven out without any preceding struggle
19 Liquidation	The misfortune or lack is liquidated	a A stolen, lacking or kidnapped object or person is retrieved

<b>Function name</b>	<b>Function definition</b>	<b>Species definition</b>
		b An injured person is healed or a damaged object is repaired
		c A banished person returns
20 Return	The hero sets out to return	
21 Pursuit	A pursuit of the hero begins	
22 Escape	The hero is res- cued from or es- capes pursuit	
23 Unrecognised Arrival	The hero, unrecognised, arrives home or in another domain	a The hero arrives home un- recognised and enters into service  b The hero arrives home un- recognised but does not enter into service  c The hero arrives unrecog- nised in another domain
24 Unfounded Claims	A false hero presents unfounded claims	a A test of endurance is pro- posed to the hero  b A test of cleverness or knowl- edge is proposed to the hero  c A test of ability is proposed to the hero
25 Difficult Task	A difficult task is proposed to the hero	

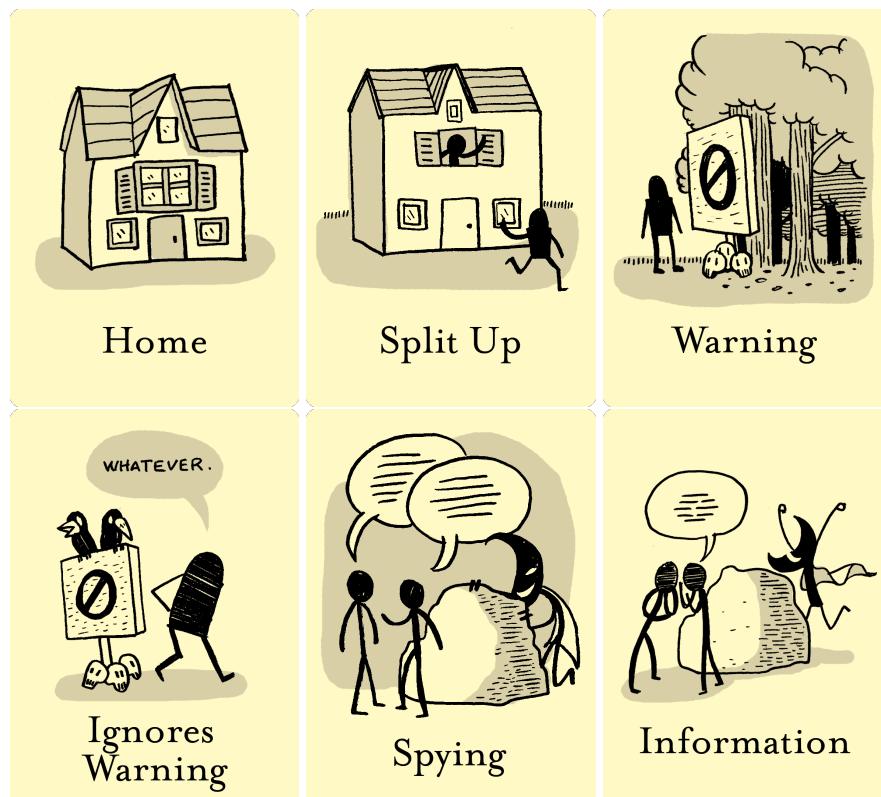
<b>Function name</b>	<b>Function definition</b>	<b>Species definition</b>
26 Solution	The hero accomplishes a difficult task	<p>d A test of strength is proposed to the hero</p> <p>e A test of courage is proposed to the hero</p> <p>f A test of character is proposed to the hero</p> <p>a The hero passes a test of endurance</p> <p>b The hero passes a test of cleverness or knowledge</p> <p>c The hero passes a test of ability</p> <p>d The hero passes a test of strength</p> <p>e The hero passes a test of courage</p> <p>f The hero passes a test of character</p>
27 Recognition	The hero is recognised	<p>a The hero is recognised by a mark or item he possesses</p> <p>b The hero is recognised by his accomplishment of a difficult task</p> <p>c The hero is recognised immediately on his return</p>
28 Exposure	The false hero or villain is exposed	<p>a The false hero is incapable of completing a difficult task</p> <p>b A story is told that exposes the false hero or villain</p> <p>c Other forms of exposure</p>

<b>Function name</b>	<b>Function definition</b>	<b>Species definition</b>
29 Transfiguration	The hero is given a new appearance	<p>a Use of a magical agent or helper directly transforms the hero's appearance</p> <p>b The hero builds a new home for himself</p> <p>c The hero puts on new clothes</p>
30 Punishment	The false hero or villain is punished	<p>a The villain or false hero is punished</p> <p>neg The villain or false hero is pardoned</p>
31 Reward	The hero is rewarded	<p>a The hero is married, is promised a marriage, or resumes a prior marriage</p> <p>b The hero receives a new home</p> <p>c The hero receives a monetary reward or other form of material compensation</p> <p>d The hero's safe arrival home is used in place of an explicit reward.</p> <p>e Other forms of reward.</p>

## Appendix C

### Propp Cards from the Story Maps Application

Illustrations for the Propp cards were created by designer and illustrator Raymond Yuen (<http://rayuen.com>). The image files are shipped with the story maps application in PNG format.









## **Appendix D**

# **Quantitative Measure of Narrative Structure**

### *1. Protagonist*

The protagonist is the main character of the story or, if there seems to be more than one main character, the protagonist is the character who establishes a goal as a result of the starter event and initiates action to achieve the goal.

0 No protagonist is established.

1 ...

2 A protagonist is presented: however, he/she is just a name on a page. Very little information or detail about the protagonist is provided: "a boy called Billy" or "Humphrey the hamster."

3 ...

4 A protagonist is presented and described in detail.

"A little lonely rabbit called Eric Robinson who lives in an empty cottage. No one would ever talk to Eric. Eric was very frightened of foxes because they had killed a lot of his family."

A The story contains multiple protagonists.

### *2. Antagonist*

The antagonist is the main character or characters who oppose the protagonist.

0 No antagonist is established.

1 ...

- 2 An antagonist is presented: however, he/she is just a name on a page. Very little information or detail about the antagonist is provided: "a wolf" or "Max the dog."

3 ...

- 4 An antagonist is presented and described in detail.

"Evil Bear was the King of Bear Kingdom. He was always trying to kill Mini Monkey and Cool Koala because they always foiled his plans to blow up Bear Kingdom because nobody respected him."

"In the distance was a fierce, tall, angry-looking fox. Eric was very frightened of foxes because they had killed a lot of his family. The fox laughed deviously."

- A The story contains multiple antagonists.

### 3. *Locale*

Locale refers to the locations at which events occur throughout the story, both the *major locale* (the overall setting) and the *minor locale(s)* within the overall setting.

- 0 No locations or places are mentioned.
- 1 At least one simple location is given—"a house," "a castle," etc.
- 2 At least one location is described with a little detail—"they lived in a giant mansion in the woods near the river," "their treehouse was built in a big tree" or "a little empty cottage in the forest."
- 3 At least one location is described in greater detail—"In a dark, scary house in a creaky wood" or "a house made of wood with wooden chairs, wooden tables, wooden beds and bedsheets made of leaves."
- A There is both a major location and at least one minor location.
- B There is more than one minor location.

### 4. *Time*

Time refers to the times at which events occur throughout the story, both the *major time* (the overall setting) and the *minor time(s)* within the overall setting.

- 0 No time given.
- 1 Time given, but traditional in reference—"once upon a time"—"a long time ago."
- 2 Time given, but unusual in reference or more complete description—"March 31st at 3:00 in the afternoon"—"a long time ago, before men walked the earth."
- A Both a major time and at least one minor time are present.
- B More than one minor time is present.

##### 5. Starter event: causal complexity

The starter event is the precipitating event which causes the protagonist to establish a goal. The precipitating event can be a natural occurrence (a landslide), an internal response (loneliness), or an external action (the dragon stole the jewel).

Causal complexity refers to the events leading up to the starter event that prepare the way for, make possible or facilitate the starter event.

0 No starter event is presented.

1 A starter event is presented and is a single isolated event:

"When Mistletoe woke up she realised Bluestar was missing."

2 A simple series of events brings about the starter event.

"One day Timmy went out looking for food. Suddenly Timmy got lost."

"One day Cool Koala went for his morning walk. A man grabbed him."

"Jimmy went to his house to get dinner. He was walking through the forest and got ambushed."

3 ...

4 A complex series of events brings about the starter event.

They were walking down the street and Peddy the pigeon says "Do you want to play dares?" "Ok" said Sparks, "I dare you to go into the barber's and dance for ten seconds." So Peddy done it. He came back out and Peddy dares Sparky to set the shop on fire. "Ok" said Sparky, so he done it. There was flames blazing through the windows.

## 6. Starter event: descriptive detail

- 0 No starter event is presented.
- 1 A starter event is presented but no descriptive details are given.

"Roxy the cat went outside and went missing."

- 2 A starter event is presented and one or two simple descriptive details are given.

"Coco fell out of his tree and hit his head. It was bleeding. A wolf grabbed Coco with his big sharp teeth. The wolf took Coco away."

- 3 ...

- 4 The starter event is well described: several descriptive details are given and details of different types are used.

So one day Pat went out to find some food. But from the middle of nowhere Bad the Baboon was hiding behind a tree. He was looking for something to eat too. So he sneaked behind trees trying to get to him. He was two trees away from him. He was as fast as lightning. Now one tree away from him, then he was right behind him. "GOT YOU!" shouted Bad, "now I've got something to eat." So they walked to his tunnel.

A There is more than one starter event.

## 7. Goal

The goal or purpose of the protagonist.

- 0 The goal or purpose of the protagonist is not established.
- 1 The goal or purpose of the protagonist is established, but not clearly articulated—"Bill set off to do something."
- 2 The goal or purpose of the protagonist is clearly articulated—"Bill decided he would rescue his friend."
- 3 Add one additional point if two or more goals are clearly articulated.

### 8. Action

Action refers to the action(s) that the protagonist initiates in order to achieve the main goal(s).

0 The actions are not presented.

1 The actions are presented but no descriptive details are given.

"Billy was walking through the forest and saw Jimmy getting attacked so Billy went to save Jimmy. The attackers started to run away. Jimmy and Billy went home for dinner."

2 The actions are presented and one or two simple descriptive details are given.

"Timmy woke up and Coco was gone. Timmy got out of his bed and went to look for Coco. He saw a wolf about to eat Coco, Timmy quickly took Coco and ran away. Timmy fell over and Coco had to save him, they both ran up a big tree they jumped from tree to tree and got to their treehouse where the wolf could not get them."

3 ...

4 The actions are presented and are well-described: several descriptive details are given and details of different types are used.

Cara started to make her way to the pink gem castle to get magic from the Queen of Animaltopia. Cara reached the gigantic castle, with confidence she knocked on the door of steel. "Who is there?" a deep voice bellowed. "Me, Cara the Confident Crocodile, I'm here to buy magic to help my friend." "Well..." said the voice, "...the queen asks you to come in" and the door opened...

A Ingenuity or originality are used to solve situations or predicaments—"Bill made a laser-reflector to capture his enemy."

B There is more than one well defined episode. For example, the protagonist tries one action and is unsuccessful (storms the castle but has to retreat due to boiling oil) and then tries another (tries to sneak through in a tunnel). Or the protagonist goes to one place during his travels and then another.

*9. Ending*

- 0 No real ending, lack of conclusion, or story seems unfinished. In other words, the long range-consequences of the protagonist's actions are not resolved.
- 1 Long-range consequences of the protagonist's actions are resolved, but the ending or conclusion is fairly common—"They lived happily ever after—Billy slew the dragon and rescued the princess."
- 2 ...
- 3 Long-range consequences of the protagonist's actions are resolved and the conclusion or ending is more interesting: it is unusual, contains a moral, reveals the fates of the characters (e.g. the villain is punished or the hero is rewarded), brings closure to the story or wraps up loose ends, hints at a sequel, etc.

The Emperor ran away in case he died. Joe picked out his heat ray and shot the Emperor in the foot as a joke. Now the Emperor was hopping and he was going very slow so Joe ran and caught him. Johnny said "Put him in his own cage, he he", "Ok buddy." "Let me go now!" shouted the Emperor."

*10. Reaction (expressed anywhere in the story.)*

- 0 The emotional reactions of the characters are not presented.
- 1 Some emotional feelings expressed by the characters.—"The boy was happy with what he had done."
- 2 Emotional feelings of the characters expressed with depth.—"I hated everyone in that black moment. I felt hot anger. Why did they have to humiliate me?"

*11. Coherence*

- 0 Actions or events happen in a mostly or completely illogical order, there are many significant inconsistencies.
- 1 ...
- 2 Actions or events happen in a mostly logical order, there are few significant inconsistencies.

3 ...

4 Actions or events happen in a completely logical order, there are no significant inconsistencies.

# Appendix E

## Rating Guide for the Quantitative Measure of Narrative Structure

This guide describes in detail each criterion of the measure and how it should be applied. Read this guide once through to get an understanding of the measure. You should be able to rate most stories without further reference to this guide, but if a scoring decision is difficult to make then this guide (particularly the example scorings) may be a useful reference.

### Rating Guide

Before rating a story read the story from start to finish to get a feel for it. It can help to write down a bullet-point summary of the characters and plot at this point, noting which aspects seem relevant to particular criteria of the rating scale. Once you have a feel for the story consider each criterion on the rating scale in turn, scan the relevant part of the story for that criterion, and assign a score.

#### 1. Protagonist

The protagonist criterion records the absence or presence and level of descriptive detail of the story's protagonist.

**Identifying the protagonist:** the first step when applying this criterion is to identify which character is the protagonist. The definition of protagonist is a loose one: the protagonist is **the main character of the story**. Often this loose definition will be enough, it will be clear which character is the main one. In some stories however

there appear to be several main characters and it's not clear which should be designated the protagonist. In these cases the tighter definition of the protagonist as **the character who establishes a goal as a result of the starter event<sup>1</sup> and initiates action to achieve the goal** should be applied.

Note that if a story does not have *any* character who meets the tighter definition, i.e. the story has no starter event, goal or action, this does not mean that the story has no protagonist as the looser definition applies.

**Example:** in *The Missing Animal* Pat goes out to find some food and ends up being kidnapped by Bad the Baboon. When Tanya realises Pat has gone missing she takes David and Crocky and goes looking for him. They find Pat and rescue him. Pat initially appears to be the main character in this story as the story begins by following Pat, but when Tanya and friends come into the story later on it becomes confusing. The tighter definition of protagonist clarifies the situation. The starter event of the story is that Pat is kidnapped. Tanya, as the character who establishes a goal as a result of the starter event (her goal is to rescue Pat) and initiates action to achieve that goal (sets off on a search for Pat) is the protagonist, assisted by David and Crocky. Pat is the victim of the story, and not a protagonist. Bad the Baboon is the antagonist.

**Multiple protagonists:** multiple protagonists in a single story can occur in a number of different ways. For example there may be two or more characters who always act together throughout the story, essentially they are multiple characters acting as one, filling the same role. Alternatively, if the story contains more than one sequence of starter event->goal->action->resolution (the story contains multiple plots) it may be that one character acts as the protagonist in the first plot, then another in the second plot. A single character may play the role of protagonist in the first plot then another role, such as villain, in the second plot within the same story. Technically multiple plots may even occur simultaneously in a single story, with the same characters playing different roles in different plots at the same time, but this degree of complexity is not found in stories written by children.

In all such cases A should be checked to indicate there are multiple protagonists, and the score for the highest-scoring protagonist should be recorded (e.g. if one protagonist is described in detail and another is just a name on a page, assign the higher score of 4 rather than 2).

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<sup>1</sup>The starter event is **the precipitating event which causes the protagonist to establish a goal**, see criteria 5 and 6 below.

## 2. Antagonist

The antagonist criterion is similar in form to the protagonist criterion but records the absence or presence and level of descriptive detail of the story's antagonist. The antagonist is defined simply as **the main character or characters who oppose the protagonist**. Multiple antagonists may occur in the same ways as multiple protagonists may occur, and should be treated in the same way.

## 3. Locale

The locale criterion records the locations present in the story and how well they are described

**Distinguishing between major and minor locales:** although the scale does not require the rater to count the number of locations present, it does ask you to record whether or not there is a major and a minor locale, and whether or not there are multiple minor locales. The major locale is the overall setting of the story, usually given near the beginning, and minor locales are the locations visited throughout the story.

To distinguish between a major locale and a minor locale remember that a major locale is one that *contains* the minor locales. If the story takes place in a forest, and the characters visit a hut, a clearing and a big tree within the forest, then the forest is a major locale and the others are minor locales. In this case both A and B would be checked. If the story takes place in “a land far away” and some of the events occur in “a forest” then in this case the forest is a minor locale, and “a land far away” is the major locale.

## 4. Time

The time criterion is similar in form to the locale criterion but records the times described in the story. Major and minor times are distinguished in the same way as major and minor locales. For example, “once upon a time” may be a major time and (later in the story) minor times such as “one day”, “in the morning” and “later in the afternoon” may occur.

Movement forward in time is of course implied when any sequence of events is described, but the time criterion only applies to times that are explicitly given in the text.

## 5. Starter event: causal complexity

**Identifying the starter event:** this is the first of two criteria that concern the starter event. The first step to applying this criterion (and criterion 6) is to identify the starter event. The starter event is the key feature that defines the structure of the story and so the crucial feature to identify in order to rate the story. It is the event that establishes the motive force that drives the action of the story. The starter event is defined as **the precipitating event that causes the protagonist to establish a goal**. The starter event can take many varied forms, but a typical starter event is that a person is kidnapped or something is stolen by an antagonist, and the rest of the story follows the protagonist as they attempt to rescue the person or recover the item.

**Identifying causal connections:** the causal complexity criterion differs from most other criteria in that it does not concern the amount of descriptive detail present. Causal complexity concerns the number of causal connections from prior events and circumstances to the starter event that prepare the way for, make possible or facilitate the starter event. The key to applying the criterion is to identify these causal connections, separating them from the actions and descriptive details that make up the starter event itself.

**Counting causal connections:** note that the levels of the criterion are not defined strictly in terms of the number of causal connections (one connection, two connections...) but in looser terms such as “a simple series of events” and “a complex series of events.” Strictly counting the number of causal connections is problematic because the number of causal connections counted will depend on how far the rater chooses to decompose the action into individual events and connections for counting. The measure instead relies on the examples given of simple and complex series of causal connections, and asks the rater to compare the story they are rating to these examples and make a judgment.

**Causal connections can occur in series or in parallel.** If event A causes event B which in turn causes event C then we have connections in series. If event A and event B both contribute to causing event C then we have connections in parallel. In both examples the number of connections is 2.

## 6. Starter event: descriptive detail

This criterion records the level of detail with which the starter event is described. After identifying the starter event it is useful to delineate the portion of the text that describes

the starter event and identify the descriptive details within it. Descriptive details are phrases that modify or complement the description of the starter event, such as reported speech, details of the action, adjectives and adverbs, etc. As with causal complexity the scale does not rely on counting precisely the number of descriptive details or the number of types of descriptive detail, but relies instead on examples of simple and detailed description and asks the rater to compare the story they are rating to these examples and make a judgement.

## 7. Goal

This criterion records the expression of the goal that the protagonist establishes as a result of the starter event:

- If no goal is established and the protagonist's actions following the starter event seem aimless then score 0.
- If no goal is explicitly articulated but the protagonist's actions following the starter event seem directed at a goal arising from the starter event (i.e. the goal is left implicit) score 1. Implicit goals should always be scored 1, the rater should *not* make a judgement that an implied goal is clear and score it 2.
- If the goal is explicitly given then score 2.
- If two or more goals are explicitly given then score 3. Note that we only count multiple clearly articulated goals, goals that are only implied are not counted towards this multiplicity.

Note that multiple goals could occur in different ways. The protagonist could have one goal and then, later, another independent goal. Or the protagonist could have a goal and a subgoal within it.

Examples of explicitly articulated goals:

*Two monkeys and a big bad wolf*

“Timmy woke up and Coco was gone Timmy got out of his bed and went to look for Coco...”

*The evil bear becomes king*

“[Cool Koala] was shouting for help Mini Monkey heard him and swang as fast as he could but the time. He was away. Mini Monkey went back to his tree and made a plan to get him out.”

*Penguin and panda cause problems*

“Billy was walking through the forest and saw Jimmy getting attacked so  
Billy went to save Jimmy”

*The Missing Animal*

“I think Pat is in trouble said Tanya we better go and find him.”

**8. Action**

The action criterion records the actions that the protagonist initiates in order to achieve the goals.

**Identifying the action:** action must be directed at the goal! An easy trap to fall into is to use this criterion to record the level of detail of whatever events occur between the starter event and the ending. But an aim of the criterion is to record whether or not the protagonist’s actions seem directed towards achieving the protagonist’s goal. If the actions do not seem to be related to the goal or if there is no goal then 0 should be scored for this criterion.

Once you have identified the action scoring this criterion is similar to scoring the starter event, descriptive detail criterion: delineate the portion of the text that describes the action, identify the descriptive details present, and judge them against the examples given on the measure to assign a score. Additionally decide whether the points for ingenuity and originality and for multiple episodes should be assigned.

**9. Ending**

The ending criterion records whether or not the precipitating force of the story is finally resolved.

- Stories without a resolution score 0,
- Stories with a resolution and a simple and common ending such as ‘they lived happily ever after’, ‘they got home safely’ etc. score 1.
- Endings that are more original but still short and simple score 2: the monkeys get home safely and the next morning Coco wakes up with a sore head; after using their new super powers to escape the monkeys go home and become super heroes, etc.

- More complex endings score 3. In *The Emperor Penguin* Jonny rescues Joe from the cage that the Emperor Penguin has trapped Joe in then they shoot the emperor in the foot with a heat ray and trap him in his own cage; In *The Evil Bear Becomes King* after the victim is rescued the protagonist and victim work together to destroy Evil Bear's castle by shooting the bear out of his own cannon; *The Bird and Groom* ends with an extended wedding scene, etc.

Whether to score 1, 2 or 3 is a judgement that the rater must make by comparing the ending before them with the examples given on the measure.

## 10. Reaction

The reaction criterion records the emotional reactions expressed by the characters throughout the story. The criterion is restricted to explicit statements or descriptions of emotional state or responses, implied emotions should not be counted.

## 11. Coherence

The coherence criterion is a broad measure of the overall coherence of the story, recording any significant logical inconsistencies in the plot.



## Appendix F

# Experimental Study: Certificate of Participation

A certificate of participation was given to each participant in the study.



### Certificate of Participation

Awarded to:

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For excellent participation  
in the StoryMaps study.

Signed: \_\_\_\_\_



*Illustrations by Ray Yuen <http://rayyuen.com/>*



# **Appendix G**

## **Feedback from Participants**

This appendix presents all of the participant responses to the control group and treatment group feedback forms from the June 2009 experimental study (figures 7.2 on page 232 and 7.3 on page 232). Twenty participant feedback forms were collected from the treatment group and eighteen from the control group. The following sections present the responses to each feedback question in turn.

### **G.1 Treatment Group Feedback Questions**

#### **What did you like about the story maps program?**

The most common response (eight responses) was that the story maps application helped participants to plan and write their stories:

- “The idea to help planning and writing stories.”
- “It helps you with stories.”
- “It helped to plan your story easier.”
- “Helps you with your stories.”
- “It helps you to think about the main parts of the story, because there are pictures that you use to show the main steps.”
- “It helped me to plan my story” (two participants gave this response).
- “It had easier ways about how writing a story.”

A number of participants (five responses) said that they enjoyed constructing their own story plan by choosing Propp cards, rather than being given a plan to follow or fill in:

- “I liked where you got to choose your parts of the story to write instead of it being done for you.”
- “I liked how you could make your own story up and place it in any order.”
- “I liked the bit where you got to put the pictures anywhere.”
- “I liked it when we made up the stories.”
- “Being able to write anything we want” (this response may refer to the writing task, participants were told that they could write about whatever they liked, with their own characters, settings, etc.)

Seven participants said that they found the story maps application easy and enjoyable to use, using words like “fun,” “cool”, “easy” and “quick” to describe the application:

- “I like it because it’s fun and easy to use.”
- “It was cool.”
- “It was very quick and easy.”
- “I liked the story maps when the pictures came up and I had a shock.”
- “I liked it it was fun.”
- “I liked it when we made stories on the computer and then on paper to compare them.”
- “It was a quick and easy way to plan my story.”

### **What did you dislike about it?**

The most common response was “nothing,” “I liked everything” or equivalent (13 responses). Two participants said that they could not find Propp cards in the story maps application to express the ideas that they wanted to use: “I disliked it because it did

not really have some of the pictures I wanted” and “Some ideas were not there such as romance or magic which is very common in stories, particularly fairy tales.”

The other responses were:

- “Quite difficult to understand”
- “I didn’t like it when you had to think loads of things”
- “I didn’t like it when I was getting frustrated because it was taking me a long time”
- “How many stories we had to write”
- “There wasn’t enough room for you to write your plan”

### **Are you happy with the story you wrote? Why/why not?**

Two participants said they were not happy with the stories that they wrote, and their responses suggest that they felt that under the experimental conditions they had not written the best stories that they could:

- “Not really. I could do better.”
- “No, because I can never write a good story in such a short time. My stories usually take a long time to write.”

Five participants said that they were happy with their stories, and said that their story maps helped them to write, structure or plan their stories. The responses suggest that the story maps application helped participants to feel confident about the quality of their stories:

- “I am happy because the story maps helped me make a story.”
- “Yes because I thought the story maps helped me.”
- “Yeah because the story cards gave me a better idea of how to write it. It was the best story I’ve ever done.”
- “Yes because it was structured well.”
- “Yes, I’m happy with the story because it was easier to write when I had planned it.”

Two participants cited the freedom to use their own ideas rather than being told what to write about:

- “Yes because I could use my own imagination.”
- “Yes because you are allowed to use your imagination and not be told what to be doing.”

Eleven participants said that they were happy with their stories and cited some quality of the story, saying that they thought it was a good story or they thought it was an imaginative story, etc., or simply responded “Yes”:

- “Yes, because I kept it simple and easy to follow.”
- “Yes I am I think I am pleased with it.”
- “Yes because I like making made up stories and it is the second best thing I like.”
- “Yes because I think it is a good story.”
- “Yes because they’re imaginative.”
- “I am happy because I tried my best and it was good.”
- “I am because it was a very good story.”
- “Yes because I thought it was imaginative.”
- “Yes because I added a lot of description”
- “Yes because I felt like I got a higher level in my story”
- “Yes”

### **What was easy about using story maps? How did it help you?**

Most responses suggest that planning a story with the story maps application made writing the story easier, that the story maps application made the task of planning the story easier, or that the story maps application helped to generate ideas for the story:

- “It helped me write a story.”
- “It structured out my story for me.”

- “It was quite hard helped me to finish the story.”
- “Going through the stages of the story. Great idea.”
- “It helped me because it said it already for you instead of having to write it.”
- “It was easy because it was all set out clearly. It helped me because I knew what I was going to write about next.”
- “The story cards gave me a rough idea of what it was about.”
- “Putting them in the places. It helped me write the story.”
- “It did all my planning so I had more writing time.”
- “The way you could choose the parts in your story easier.”
- “It was easy when you chose the cards to use and it gave me more ideas.”
- “It was easy when I was planning the story.”
- “Picking what pictures you need and it helps you on the website.”
- “It was easy because you just picked the pictures. It helped me because you picked out different pictures.”
- “Yes, it gave me a variety of different things to choose from.”
- “It gave me more ideas.”
- “The pictures showed you parts of stories and you could use them.”

Two participants said that the combination of pictures and matching captions was helpful in explaining the Propp functions:

- “The pictures and captions to match because they were good pictures.”
- “It helped me by explaining the pictures properly.”

Finally, one participant responded “Everything.”

## **What was hard about it?**

Eleven participants said “Nothing was hard about it” or equivalent.

Three participants said that thinking of ideas for their stories was hard:

- “Thinking of stories to write about and it was hard because you had to write three.”
- “Thinking of what to write”
- “It was hard thinking about what to write about”

Three participants said that writing their stories (after planning them with the story maps application) was hard:

- “It was hard when I was writing a story”
- “Writing the story”
- “Having to write it on paper”

Two participants said that choosing which Propp cards to use and which not to use in their story maps was hard:

- “It was hard to pick only a few”
- “It was hard figuring out which card to use”

Finally, one participant simply responded “Hard to use.”

## **What would you change about Story Maps?**

Sixteen participants responded “I wouldn’t change anything” or equivalent. One of these participants added “too much stuff could spoil it,” several others added “It’s a great idea,” “It’s really good,” etc. The remaining responses were:

- One participant would add more Propp cards to expand the available range of ideas: “The amount of picture cards, so children can expand their ideas.”
- One participant would like more help with writing the story as well as planning it: “I would just change when you click on a picture it gives you a part of story to fill in.”
- “I would change the computer program”
- “The colour”

## G.2 Control Group Feedback Questions

### What is easy about writing stories?

Six participants said that using their imagination to generate ideas for their stories was easy: “Using your imagination,” “Imagining what to write about,” “Thinking about what I’m going to write about,” “Imagining a story board,” “It is easy to think of a beginning,” “Thinking of the stories.”

Four participants said that being allowed to use their own ideas and write any story they wanted made the task easier: “It is easy because they are your own ideas,” “Having my own imagination to write stories instead of based on the day’s topic,” “You get to pick what you want to write about,” “The story being imaginary and free to write what you want.”

Conversely, three responses suggest that writing a story becomes easy once you have a good idea: “When I have thought of a good idea,” “When I have good ideas,” “If you have a good imagination it is easy.”

Other responses were: “When you write the stories in different bits,” “Using words to fit into sentences,” “You can write everything you want and make a good story,” “That you think hard and listen to advice” and “Nothing.”

### What is difficult about writing stories?

Nine participants said that they have difficulty thinking of ideas for their stories:

- “When you can’t think of what to write about”
- “Thinking of a story to write about”
- “Thinking what I could do the story about”
- “Thinking about good ideas”
- “It is difficult to think of things to fit in my stories”
- “Thinking what’s going to happen”
- “Sometimes you can’t think of anything”
- “Making it up because they are load of different ideas to decide”
- “It’s hard to think of everything to write”

Four responses suggest that the participants have difficulty planning their stories:

- “Structuring it”
- “Actually planning a story”
- “It’s difficult when you don’t have a plan to copy off”
- “Planning and naming characters”

Other responses were: “You have to use all the success criteria and it’s sometimes hard to get it all in,” “Setting and description through action,” “Something based on one vocabulary,” and two participants responded “Nothing.”

### **What helps you to write a story?**

Six participants said that their imagination is what helps them to write a story: “My imagination helps me to write a story,” “My very creative mind,” “What helps me write a story is I clear my mind and try to think of a story,” etc. Six participants said that imagination aids such as looking at book covers, pictures etc. or the story ideas worksheets used during the study help them to write a story. Five participants said that a plan/planning, a story board, or breaking the story into different bits helps them to write a story. One participant responded “What I’ve learned from my teachers.”

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