

Stories, scripts, networks^{*}

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Abstract

In *Identity and Control*, Harrison White (1992) stresses the importance of stories as a medium for and outcome of efforts at control. Stories as social ties retell the events that have occurred between people or identities and they offer scripts for social action. The notion of stories as scripts is in line with an early result in the study of literature, where Vladímir Propp (*Morphology of the Folktale*, 1928) showed that a large corpus of Russian folktales are characterized by a script with a limited number of functions or roles that appear in a fixed order. It will be demonstrated that these roles can be identified by a signed dyadic tie with a particular chronological order and that the scripts culminate in a balanced situation. Furthermore, it will be shown that the temporally ordered ties occur in a social network and that the associated fairytale meanings seem to apply here as well. Finally, a nesting rule is proposed that captures the scripting of roles within fairytales. This rule, however, does not seem to exert a profound influence on the dynamics of the social network of literary authors and critics studied.

Keywords: social roles, story grammar, longitudinal networks, network analysis, balance theory, literary criticism

Introduction

Current sociology witnesses a growing interest in the dynamics of social structure and in the cultural aspect of social organization (the “cultural turn”). When the two merge, investigators quite naturally direct their attention to stories as scripts for social action, because stories combine structure, culture, and the dynamics of a plot (e.g., see (Bearman and Stovel 2000; Franzosi 2004; White 1992 and 1993). As Harrison White eloquently states: “Social organization can be seen as the interlocking of *stereotyped stories* that actors proffer and through which they perceive and perform and maneuver. Cultural and social organization thus wind around each other.” (White 1993: 194)

According to White, “Literary criticism has much to say about stories and their *grammars* and voices.” (White 1992: 21). In this paper, I explore one of the things that literary theory may say to sociology. The seminal work of Vladímir Propp –

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Morphology of the Folktale (1928) – which inspired most of the later work on story grammars and narratology, offers a concise set of propositions on the basic form and plot of a large corpus of Russian fairytales. Because Propp's ultimate aim is the construction of a scientific typology of folktales, this work focuses exclusively on the structure of stories. However, I will show that his theory can also be applied to social structure provided that the propositions are conceptualized as dynamic networks (graphs). Thus, the grammar of fairytales may be applied to social relations and, as I hypothesize, this grammar may be used by people for interpreting and shaping their social networks.

Propp's morphology of the folktale

Propp's work on the Russian fairytale was conceived within the context of an academic movement known as Russian Formalism. This movement consisted of linguists, scholars of literature, and ethnographers that searched for general or universal features and laws for the structure of literary work. Due to their highly conventional structure, fairytales and folktales offered interesting material to the Russian Formalists. Vladímir Propp, although not the first to study these stories, created the most elaborate account on the structure of fairytales: *Morphology of the Folktale*. Published in 1928, however, his book did not reach an international audience quickly. The first English translation appeared in 1958 and an Italian translation was published in 1966. From that time on, Propp's ideas were picked up by many scholars and are still being used in several disciplines: anthropology (Colby 1973; Colby et al. 1991), linguistics (Herman 1997), computer applications (Fairclough and Cunningham ; Havholm and Stewart 1996; Klein 1975), and sociology (Franzosi 1998).

Just like most story grammars and narratologies, Propp's main concern is the understanding of stories: creating text typologies and finding rules or criteria for constructing correct (well-formed) stories. As Alan Dundes points out in his introduction to the second edition of the English translation of Propp's book, Propp's approach to the formal structure of stories is different from the angle that later narratologists (e.g., Greimas, Barthes) and cultural antropologists (Lévi-Strauss) take. While the latter stress the fundamental cultural or social distinctions that are exemplified in the structure of the stories, Propp focuses on the linear sequence of events within stories. Propp's morphology contains a syntactic, dynamic aspect that is highly relevant to the notion of scripts for action and that is neglected in much later work in narratology. For this reason, I take Propp's work as my starting point for translating story grammars to sociology.

The beauty of Propp's morphology is that it offers a very concise model of characters and functions that is immediately recognizable; reading Propp, one feels as if one's intuition about fairytales is spelled out for the first time and one immediately sees that they fit the fairytales one has in mind. According to Propp, the Russian fairytale contains at most seven types of characters: villains, donors or providers, helpers, princesses (sought-for persons) and kings, dispatchers, heroes, and false-heroes (Propp 1968: 79-80). Each of the characters is connected to a set of functions (acts, events) and Propp claims that all Russian fairytales contain no more than 31 different functions (Propp 1968: 25-65). Propp's central claim is that these functions always occur in the

same order within the tales, but they do not occur in each fairytale. This claim incorporates the main sequential (or syntactic) aspect of his morphology and it is very important to the argument presented in this paper.

An example of a fairytale may help to understand Propp's analysis. The example is the fairytale of the Swan-Geese as it is presented by Propp (Propp 1968: 96-98). The notes at the right refer to the functions that appear in the story according to Propp. Greek letters refer to functions in the preparatory part of the story and roman letters indicate functions in the tale's main body or complication. Additional numbers in superscript or subscript denote variants of a function. Other numbers indicate events or attributes connected to the characters.

There lived an old man and an old woman; they had a daughter and a little son.¹ Daughter, daughter," said the mother, "we are going out to work and we will bring you a little bun, sew you a little dress and buy you a little kerchief. Be wise, take care of your little brother and don't leave the courtyard."² The elders went away,³ and the daughter forgot what they had ordered⁴ her to do. She placed her little brother on the grass under a window and ran out into the street and became absorbed in playing and having fun.⁵

The swan-geese flew down, seized the little boy and carried him away on their wings.⁶

The little girl came back, looked, but her brother wasn't there.⁷ She gasped and rushed hither and thither, but he wasn't anywhere. She called out; she burst into tears, wailing that harm would come to her from her father and her mother, but her little brother did not answer.⁸ She ran out into the open field;⁹ the swan-geese sped away into the distance and disappeared beyond the dark wood. The swan-geese had long before acquired an ill fame, caused much mischief, and had stolen many a little child. The girl guessed that they had carried off her little brother, and she set out to catch up with them.¹⁰ She ran and ran until she came upon a stove.¹¹

"Stove, stove, tell me, where have the swan-geese flown?"

"If you eat my little rye-cake, I'll tell."¹² "Oh, we don't even eat cakes made of wheat in my father's house."¹³ (A meeting with an apple tree and a river follows, Similar proposals and similar insolent replies.)

She would have run through the fields and wandered in the forest a long time if she had not by good fortune met a hedgehog.¹⁴ She wished to nudge him,¹⁵ but was afraid of pricking herself.¹⁶ "Little hedgehog, little hedgehog," she asked, "did you see where the swan-geese have flown?"¹⁷ "Away, over there," he pointed.¹⁸

She ran and came upon a hut on chicken legs. It was standing and turning around.¹⁹

1. *Initial situation (α).*

2. *Interdiction, intensified with promises (γ).*

3. *Departure of the elders (β¹).*

4. *Violation of the interdiction is motivated (M).*

5. *Violation of the interdiction (δ¹).*

6. *Villainy (A¹).*

7. *Rudiment of the announcement of misfortune (B⁴).*

8. *Detailing: rudiment of trebling.*

9. *Departure from home on a quest (C†).*

10. *Since no dispatcher is present to inform of the misfortune, this role is transferred to the villain himself, after a certain delay [...].*

11. *Appearance of the tester [...] (71, 73).*

12. *Dialogue with the tester [...] (76, 78b).*

13. *An insolent answer, negative reaction of the hero. This provokes a trebled repetition.[...] (E neg.)*

14. *Appearance of the thankful helper (F₆⁹).*

15. *Helpless status of the helper without a request for mercy (d⁷).*

16. *Mercy (E⁷).*

17. *Dialogue (§).*

18. *The thankful hedgehog becomes a helper who shows the way (F⁹=G⁴).*

19. *Dwelling of the villain (92b).*

In the hut sat Bába Jagá, hag-faced and with a leg of clay.²⁰ The little brother also sat there on a little bench,²¹ playing with golden apples.²²

His sister saw him, stole up, seized him away,^{23,24} and the geese flew after her in pursuit;²⁵ the evil-doers were overtaking them; where was there to hide?

(Once again a triple testing by the same characters, but with a positive answer which evokes the aid of the tester himself in the form of rescue from pursuit. The river, the apple tree, and the stove hide the little girl.²⁶ The tale ends with the little girl's arrival home.)

20. Physical appearance of the villain (94).
21. Appearance of the sought-for person (98).
22. Gold is one of the typical details of a sought-for personage. Attribute (99).
23. Receipt, through the application of cunning or strength (K^1).
24. Return is implied but not mentioned (\downarrow).
25. Pursuit, chase in the form of flight (Pr^1).
26. Deliverance from pursuit (Rs^4).

(Reproduced from Propp 1968)

Propp has chosen this example because it is the shortest fairytale in his corpus and it is simple in the sense that it contains only one *move* (plot). As we will see later, fairytales may consist of several moves, which are either ordered sequentially, e.g., the hero comes home but experiences a new villainy that starts another plot, or they are nested, e.g., while liquidating one villainy, the hero experiences another that must be solved first. Another important aspect of the morphology is the *trebling* (repeating) of functions or sets of functions. The repeated interaction with potential donors to find out the whereabouts of the swan-geese or secure a hiding place offers an example.

Fairytale roles

As stated above, the aim of this paper is to translate or formalize Propp's story grammar in such a way that it can be applied to social structure outside stories. It should be noted from the outset that this approach is necessarily and purposely reductive; Propp's level of detail in describing situations, events, characters and their attributes must be discarded in order to transfer the tale's structural aspects to social life. We don't encounter huts on chicken legs in our present lives.

My formalization of Propp's morphology is based on a representation of the actions among characters in a story by signed directed relations. Propp's major functions are linked to acts from one character toward another, which may be characterized as positive (helping, giving something valuable) or negative (hurting, deceiving, retaining vital information). Represented by a signed directed graph, well-known structural properties, such as the ones predicted by balance theory, can be applied to the structure of the tales. This is not a novel approach because, for instance, Jane Auster and Frank Harary have applied balance theory to tales, drama, and opera in this manner before (Auster 1980; Harary 1963; Harary 1966).

If we transfer Propp's example of the swan-geese into a signed digraph, we obtain a very regular graph with all relations involving the hero of the tale: the little girl (Figure 1). Reading the sociogram clockwise, the girl disobeys her well-meaning parents (a negative act toward the parents that nourished her), a villain (the swan-geese) hurts her by abducting her little brother, she acts insolently or respectfully toward potential donors (stove, apple tree, and river), which refuse provide help to her, she finds and defeats the

villain (the witch, who is the same character as the swan-geese), and, helped by the donors, she finally arrives home with her brother making up for her disobedience. Note that a reaction is displayed on top of the initial action between two characters and that, according to conventions, positive acts are depicted by a solid arc and negative acts are drawn as dashed arcs in Figure 1.

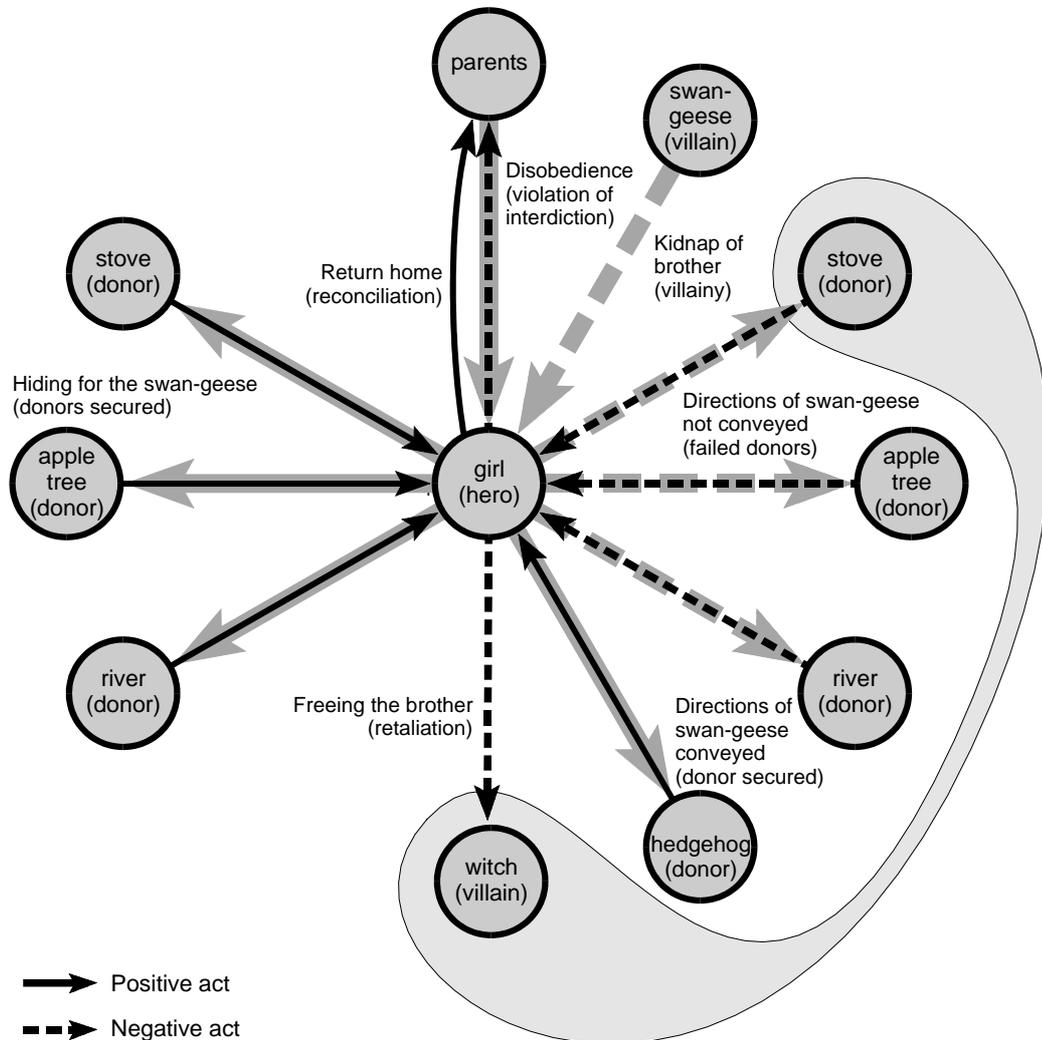


Figure 1 - The tale of the Swan-Geese as a signed directed network.

From Figure 1, it is immediately apparent that the story is highly balanced: almost all dyadic ties are balanced – action and reaction both being either positive or negative – and the only unbalanced dyad at the start of the fairytale, viz., the hero’s disobedience toward the well-meaning parents, is balanced at the end of the story when the girl makes up for her disobedience. In the end, the story is balanced if we replace the initial negative act of the hero toward her parents by the final positive act. This result is in line with the findings of Auster and Harary (Auster 1980; Harary 1963, 1966) and it suggests that if fairytales help people to structure their social lives, they learn them to count on and strive for balance: don’t harm your benefactors, combat your enemies, expect reciprocity from potential donors. In that case, stories such as these fairytales socialize into a culture of balance.

The structure of the fairytale as a signed directed network shows another, new result. Each role in the fairytale, assuming that the swan-geese represent the witch, is connected to a particular temporally ordered sequence of interaction with the hero. Taking into account the direction, sign, and order of the acts (arcs) within a tie, we can define the role of a character within the fairytale by a specific tie to the hero.

The parents, who care for the hero but who are disobeyed or hurt, are identified by a tie consisting of a positive act toward the hero, which is followed by a negative act from the hero. The parents represent the role of a harmed benefactor. In the end of this tale, the tie is extended with a positive act from the hero to the parents, representing the reconciliation of the hero with her parents. The third act, however, is not necessary for defining the parent role.

The villain is a character who acts first, harming the hero. As a reaction, the hero retaliates the villainy by defeating or deceiving the villain, inflicting harm, or stealing something valuable. The pursuit of the hero by the defeated villain or its substitutes extends the temporally ordered tie with a third action (negative toward the hero) or it can be seen as a new act of villainy. Propp notes that a lack rather than villainy is the cause for the hero's quest in some fairytales, arguing that they basically have the same meaning. For the sake of simplicity, I will restrict my argumentation to true villainy (see the discussion at the end of this paper).

A donor or tester and helper typically is a character to whom the hero must make the first move. The donor offers a neutral proposal, which the hero has to accept or decline. Then, the hero receives as good as she gets from the donor, establishing balance or reciprocity at short term or with a delay in the case of a helper appearing later in the story.

I will skip the remaining characters, which are not included in the tale of the swan-geese, such as the dispatcher, a character that requests, commands, or allows the hero to set out on a quest, the princess and king, and the false hero. The dispatcher's act toward the hero cannot be assigned a positive or negative value in general because the dispatch function is sometimes fulfilled by the parents and other close relatives, or by the villain. The false hero and princess/king roles seem to be connected to particular signed structures involving the hero and two other characters rather than the hero and one other character. Since these structures are more complicated and not represented in the example, I postpone the discussion to later work.

Now that the fairytale roles can be identified by merely looking at the positive or negative value (sign) and the temporal order of the acts within a tie, we can strip the attributes of the characters that are specific to the fairytale from the morphology and we are able to determine fairytale roles in any signed social network. It is my conjecture that stories like fairytales teach people, esp. children, that particular social roles are connected to particular types of ties, that is, sequences of actions. The stereotyped attributes of the characters communicate the positive or negative value of particular sequences of action. In the case of the Russian fairytale, one learns to appreciate the villainy of someone hurting you, the ineffectiveness of approaching a potential donor negatively, etcetera. In 'real live' interaction, these lessons are being utilized, attributing positive or negative roles to the people with whom one is interacting from the temporally ordered pattern of

ties. Finally, people are likely to adjust their (re)actions to the roles that they attribute to others, developing ties in accordance with these roles.

Some support for the conjecture that people pay attention to the temporal pattern of positive and negative acts and interpret them in ways comparable to their meaning in fairytales, is found in relational therapy. In marital crises, for instance, the punctuation of events is thought to play an important role (e.g., see Watzlawick et al. 1967). Much of the argument is about who started the problems, which is about assigning the villain role in the semantic universe of fairytales.

Fairytale roles in a social network

Let us see whether the fairytale roles occur within a real social network and whether the cultural (fairytale) meanings implied by the roles explain the events there. My case is a network of circa five hundred evaluations among forty Dutch literary critics and authors in the 1970s. The majority of the critics and authors started their literary careers in this decade. The evaluations among authors and critics were published in reviews and interviews and they were classified as positive, neutral, or negative. For a description of the data and previous analyses, see (De Nooy 1991, 1999, 2002).

Before we can identify the temporally ordered ties among authors and critics that represent fairytale roles – I will abbreviate this to *fairytale role ties* – we must first realize that the roles were defined from the perspective of the hero in the previous section. In the swan-gees tale, for instance, the stove is a negative donor to the girl because the girl (hero) is the person who makes the first (negative) move. However, from the perspective of the stove, the girl is a villain because she inflicts harm “out of the blue.” In a social network, every actor will consider himself or herself as the focal person or hero of the story. As a consequence, fairytale roles must be identified from the perspective of each actor within the network; the first person’s villain is the second person’s failed donor.

A social network offers another minor complication. In contrast to a fairytale, ties among two persons may contain many more acts than two or three over time. One critic, for instance, reviews an author’s work no less than ten times in the 1970s. If, at a certain point of time, the author passes judgment on the critic, with which of the critic’s evaluations should we link it when determining the type of fairytale role? To make fewest assumptions, I decided to pair an evaluation with the last preceding evaluation in the opposite direction. In other words, if two successive evaluations between two persons point in opposite directions, they count as a pair and they are classified according to the corresponding fairytale role. The third act within the parent role, that is, reconciliation by the hero, needs some further decisions but since this act does not occur in the case, I do not want to go into details here.

Table 1 - Fairytale role ties in the Dutch literary criticism case (until 1980).

Tie type	Number	Number of recipients (1 st actor)	Number of senders (2 nd actor)
++	19	14 (securing a donor)	14 (willing donor)
--	22	13 (villain)	11 (unwilling donor)
+-	11	6 (parent)	8 (ungrateful child)
-+	8	7 (-)	6 (-)
(+-)+	0	0 (reconciliation as a child)	0 (reconciled parent)

Looking back at the 1970s, including evaluations among the selected authors and critics that appeared before 1970, the number of bi-directional arcs is quite low. No more than 60 fairytale role ties have been found (see Table 1) because most ties consist of unilateral evaluations by reviewers on authors. The reciprocal positive and negative ties are a little bit more common (circa 20 instances of each type), which may be a result of a tendency toward balance. Note that one type of ordered tie, reacting positively to a negative action, is not covered in the fairytale.

Since all ties are rather scarce, authors or critics do not accumulate many instances of a particular fairytale role tie; usually they have less than three. However, there is one exception. One critic, Kees Fens, collected no less than six parent with ungrateful children ties, whereas no other author or critic received more than two. Interestingly, Fens made his name in the 1960s, so he belonged to an older literary generation than most of the authors and critics in the sample. In addition, Fens decided to quit reviewing contemporary prose in the late 1970s. In this instance, a person's attribute – seniority – combines with a particular fairytale role tie that is linked to the parent role, culminating in an event that is semantically related to both, namely, retirement. Here, the type of tie seems to be associated with the cultural meaning it has in the fairytale model.

Notwithstanding this example, being involved in a particular type of tie is never strongly associated with social attributes of the author or critic involved. The weak associations found (uncertainty coefficients predicting the occurrence of a particular tie ranging between 0.15 and 0.25), involve unbalanced ties only. Authors and critics from lower class origins and/or with parents having non-cultural jobs are slightly more likely to receive negative judgment from people whom they evaluated positively (uncertainty coefficients 0.17 and 0.16) and they are more likely to evaluate favorably authors or critics that passed negative judgment on them (0.22 and 0.18). This is probably due to status deference mechanisms as I have argued elsewhere (De Nooy 2004) and it does not make sense to expect a typical parent role in their case.

There is also a weak association between literary seniority and having a particular fairytale role tie. The oldest generation, who made their appearance before 1970, is slightly more likely to pass positive judgment on an author or critic by whom s/he was evaluated negatively than younger generations (0.17). Although hurt by their “children,” they continue to cherish and support them. Finally, critics are relatively often recipients but not senders of +- ties (0.21), indicating that they more often start ties with negative evaluations than authors. As critics, they often pass judgment first because they must review new books and, being critically, their judgments are not solely positive. Thus, they are predisposed to act as villains, which may be the reason for authors to reproach them of being frustrated authors at times.

Considering the general tendency of critics to pass negative judgment first, the many positive first evaluations passed by Fens mark him as an atypical critic. In combination with his seniority, this may have stimulated authors and other critics to associate him with the typical role of the elder that must be “disobeyed” in order to advance one's own career. And Fens gave way to the new generation.

Nested action

In spite of its title, Propp's *Morphology of the Folktale* is not strictly a morphology. It contains syntactical elements as well, notably the statement that the functions appear in a strict order. Unfortunately, we cannot translate this fixed order into a fixed sequence of fairytale role ties or Markov chains specifying transition probabilities between fairytale role ties. Even blockmodeling (Borgatti and Everett 1992) does not seem to offer a simple solution to the problem of how to analyze the temporal order of the tales' structure. There are two reasons.

First, Propp states that not all functions and characters necessarily appear and if they appear, they may even appear repeatedly (trebling). As a consequence, it is quite difficult to predict the next function that will occur in the tale and the total number of functions in a tale. Second, tales may contain several *moves* (plots), which are either sequentially ordered or nested (subplots). With two or more sequentially ordered moves in a story, any function may precede any other function in the story even when they are in fixed order within each move. The demarcation of moves, however, is not straightforward if one abstracts from the characters' attributes and connecting events, especially when moves are nested. In applications to social networks, detecting sequences is further complicated by the fact that most social settings do not have a clear beginning and ending.

Instead of analyzing sequences, I propose to investigate the nesting of fairytale role ties. It is possible to formulate a simple nesting rule, which covers most of Propp's stipulations about the order of functions and the combination of plots as I have translated them into temporally ordered signed ties. The nesting rule is:

A fairytale role tie must end within any fairytale role tie in which it starts
and it must start within any fairytale role tie within which it ends.

In this rule, a fairytale role tie is considered to start within another fairytale role tie if its first action occurs in between the first and second action of the other fairytale role tie. Similarly, it ends within another fairytale role tie if its second action occurs in between the first and second action of the other fairytale role tie.

To show that this nesting rule covers Propp's ideas about order in my formalization of story structure, I must first translate Propp's order into four criteria for stories as temporally ordered signed networks.

1. If donor, villain, or parent role (from disobedience to making up for the disobedience) ties appear in one move, they are always correctly nested (in the sense of the nesting rule) in the following order: donor role tie within villain role tie within parent role tie. This nesting reflects the order of the functions associated with the donor, villain, and parent role as specified in Propp's Chapter III. The fairytale role ties as I have defined them in a previous section incorporate the pairing and ordering of the associated functions within a move according to Propp. Note that I disregard functions that are not associated with the defined fairytale role ties.
2. Within a move, fairytale role ties that occur more than once (trebling) are sequentially ordered.

Propp (Propp 1968: 74-75) discusses the trebling of functions, function pairs, or groups of functions. Although he does not state this explicitly, I infer from his examples that trebling means repeating one group of functions after the other without overlap as in the trebling of the donor role in the swan-geese example.

3. Any fairytale role tie may define a move, that is, its first act may signal the beginning of a new move and its second/last act may signal the end of a move.

Propp (Propp 1968: 53, 58, 92) states that each instance of villainy and each new lack creates a new move. In his example of liquidating a lack as a distinct move, Propp uses the functions formalized as a (successful) donor role tie for delineating a move (Propp 1968: 94-95, example 4). This suggests that securing the help of a donor may count as a move. For the sake of simplicity, I extend this to unsuccessful donor role ties. Finally, since the first part of the parent role, disobedience, is part of the initial phase of a move and the second part, making up to the parents, is in the final phase, it seems quite logical to conclude that these two parts together may define a move. As a result, all four defined fairytale role ties may delineate a move

4. Moves may be ordered linearly or nested integrally, that is, the nested move is completed before the story returns to the previous (nesting) move.

Propp (Propp 1968: 92-96) presents six ways in which moves can be combined in a story. My statement clearly covers types 1 (linear coordination) and 2 (simple nesting). Type 3 is also covered if we regard it as multiple nesting, assuming that move III is nested within move II, which is nested within move I, but move III is not a continuation of move I as Propp's diagram may suggest. Type 4, referring to two villainies occurring simultaneously followed by the liquidation of the two moves one after the other, is an instance of simple nesting if we assume that the order of the two initial villainies is irrelevant. Types 5 and 6, moves with a common ending, may or may not obey the criterion of integral nesting, depending on the order of functions in the common ending. Here, my criterion may be more strict than Propp's, which could be tested on his corpus of tales. Propp's Example 6 (Propp 1968: 131), however, suggests that the move that is nested more deeply is completed first.

With these criteria, it is easy to show that the nesting rule covers all combinations of fairytale role ties that are allowed by the criteria. In a single move, all fairytale role ties are nested or ordered linearly (in the case of trebling) by criteria 1 and 2, so both situations taken apart satisfy the nesting rule. Trebling a nested structure means repeating the nested structure, so the nesting within each instance remains intact and nesting of different instances cannot overlap, excluding the possibility that they overlap and are not nested correctly. The final possibility, trebling within a nested structure, occurs when a role tie is repeated between opening and ending acts of the nesting fairytale role tie, so a trebled fairytale role tie always starts after these opening acts and ends before the closing acts of the nesting role tie. Therefore, it cannot end within another role tie than the one in which it started and vice versa, so it cannot be nesting incorrectly.

If fairytale role ties are nested correctly within a single move, they are nested correctly also in any linear combination of moves because appending one move to another does not induce new instances of nesting. Similarly, the integral nesting of an entire move within a new move yields only correct instances of nesting because each role tie within the nested move is completed before the story returns to the nesting move

(criterion 4), so all role ties of the nested move start and end within any role tie that was opened but not yet closed in the nesting move at the time the nested move commenced. We may conclude that any story satisfying the criteria specified above will comply with the nesting rule.

It is even easier to see that the nesting rule covers no other story structure than the combinations of fairytale role ties allowed by the four criteria. In other words, any instance of correct nesting can be identified as a correct fairytale according to the specified assumptions. First, in a correctly nested structure of fairytale role ties, any pair of linearly ordered fairytale role ties may be either interpreted as two separate moves, since any fairytale role tie may define a move (criterion 3) or as a case of trebling (criterion 2). Second, in a correctly nested structure of fairytale role ties, any pair of nested ties may be interpreted either as the internal structure of one move if the nesting conforms to assumption 1 or it may be seen as the integral nesting of a move within another move, since any fairytale role tie may define a move (see assumption 3). This concludes the proof that the nesting rule only yields structures that comply with the criteria.

The nesting rule seems to bear some resemblance to the type of rules developed in transformational grammars for natural languages. Although some have argued against transferring grammars for the structure of sentences to grammars for the structure of stories (e.g., Wilensky 1982), a focus on nesting and repetition seems to be very fruitful. A previous analysis of Eskimo folktales inspired by Propp's morphology arrives at a transformational story grammar that is both elegant and powerful (Colby 1973). Although Colby's aim is quite different from mine – he focuses on the rules for well-formed folktales – some of his results are quite similar, e.g., each move in the Eskimo folktales contains a Motivation – Engagement – Resolution (M – E – R) sequence, in which E – R sequences can be nested or repeated. Villainy or lack in Propp's sense is often part of the motivation, donors appear in the engagement section, and victory over the villain is a typical form of resolution (Colby 1973: 646-650). This suggests that the Eskimo folktales, if formalized as temporary ordered signed networks, will comply with the nesting rule formulated above.

Nesting in a social network

Do people pattern their interaction according to the nesting rule that they may have learned from fairytales, e.g., securing the help of a donor before retaliating a villainy? I will attempt to answer this question using the same network of literary critics and authors analyzed in a previous section, using the fairytale role that were identified there. The parent – child couple may contain three acts, that is, two successive pairs of acts, but I have looked only at the second pair (disobedience – reconciliation) because Propp does not discuss the first pair. Having identified the fairytale role ties, each pair of ties involving at least one common author or critic, may be classified either as sequential, correctly nested, or incorrectly nested according to the nesting rule.

Table 2 shows the results of correct and incorrect nesting. There are hardly more instances of correct (21) than incorrect nesting (18), so there is not a clear tendency toward correct nesting in the network. In particular, the nesting of the securing a donor

within a villainy tie, which is characteristic of fairytales, does not occur at all. Most correct instances of nesting (15 out of 21) involve failed donor and villain roles, which are predominantly nested within the same type (11 out of 15). Reciprocal negative evaluations seem to be nested regularly, indicating that authors and critics tend to handle negative evaluations in reverse order: react to the last one before handling previous ones. Conversely, positive reciprocal ties (donor secured role) are relatively often ordered sequentially, that is, they precede other ties (Table 3). Perhaps not the fairytale but a different kind of story is governing the evaluations of literary critics and authors.

Table 2 - Frequencies of correctly and incorrectly nested fairytale role ties.

	donor failed		donor secured		villain		parent*	
	correct	incorrect	correct	incorrect	correct	incorrect	correct	incorrect
donor failed	5	2	2	4	1	1	0	0
donor secured	2	3	1	0	0	1	0	0
villain	3	3	1	3	6	1	0	0
parent*	0	0	0	0	0	0	0	0

Row tie is correctly or incorrectly nested within column tie.

* Disobedience – reconciliation.

Table 3 - Frequencies of sequential ordering of fairytale role ties.

	donor failed	donor secured	villain	parent*
donor failed	1	1	2	0
donor secured	3	3	3	0
villain	1	1	0	0
parent*	0	0	0	0

Row tie is directly followed by column tie.

* Disobedience – reconciliation.

Discussion

This paper investigated the relations between the structure of stories, that is, fairytales, and social structure, assuming that stories offer dynamic models of affect relations that people use as scripts in their lives. To investigate this function of fairytales, elements of the general structure of Russian fairytales proposed by Vladímir Propp were formalized as patterns of temporally ordered signed ties. It turns out that Propp’s basic structure can be formalized elegantly, yielding results that are intuitive. However, the patterns do not dominate the social network analyzed, which consists of published evaluations among literary authors and critics.

As noted before, the fairytales show a high degree of balance and they evolve toward balance. This underlines the conjecture that stories function as models of balance. It is plausible that fairytales instill a longing for balanced relations into children’s minds, which may explain the general tendency toward balance in interpersonal relations noted by Heider (Heider 1958) in the Western world.

An important result is the discovery that archetypical roles in fairytales can be identified by particular sequences of interaction (ties). Perhaps, fairytales and other stories attach cultural meaning to these dynamic ties. In other words, stories may provide the link between structural roles as relational constructs and social roles as mental

constructs. Some evidence was found in the literary network, where one critic developed ties that characterize the parent role and finally adopted the behavior associated with the older generation, viz., retirement. The case suggests, however, that personal attributes must match the cultural meaning of the structural role for this to happen. If this case stresses one thing, I think it is that we should pay attention to ties as temporally ordered sequences of actions within a dyad rather than relying on cross-sectional snapshots. To quote Harrison White: “There also must be ambivalence and complexity built into a tie, since it is a dynamic structure of interaction in control attempts. It is this structure which is being summed up as ‘a tie,’ and interpreted in stories, both by its members and by onlookers.” (White 1992: 69)

The other new result is that the temporal order of fairytales may be translated to dynamic signed networks by means of a simple nesting rule. This type of rule, just like rules of transformational generative grammars for sentences, may well govern our interpretation of the events that we experience, either consciously or subconsciously, and our construction of stories about these chains of events. In this way, the nesting rule may be a powerful scripting device. The typical fairytale nesting, securing a donor before you retaliate a villainy, however, was not found in the network of authors and critics.

Perhaps the range of fairytale role ties should be expanded or additional relational features should be included before we can apply them to actual social networks. Heider’s unit relations (Heider 1958), which among other things express relations of possession, are a likely candidate for inclusion since lack and its resolution is an important element in the fairytales. Much more work should be done here.

Another solution may be that we should not try to apply the syntax (nesting rule) directly to the actual ties among people but to the stories that they tell about their ties. It is not unlikely that people reorder their interaction into meaningful patterns in their stories, that is, in the standardized patterns that fairytales and other types of stories offer. This could be the true meaning of Harrison White’s conjecture that social structure should be seen as “the interlocking of *stereotyped stories* that actors proffer and through which they perceive and perform and maneuver” (White 1993: 194).

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