

## **Role of Goals in Narrative Experience**

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## **Role of Goal in Receivers' Projectile of Narrative**

Narratives are fundamental to human experience and culture, it is an inevitable way to access history and form cultures of societies (Bruner, 1991; Connell et al., 2004). One reason for its importance in these aspects is that they are a form of entertainment, children listen to stories told by older people for fun and people watch films or TV shows and play video games to kill time. Another possibility is that they provide opportunities to learn how to solve complex problems that are faced in a given culture, people learn from idiom stories about solutions or behavioral guidance of different problems and situations in their cultural environment.

How might this be the case? Narratives convey characters engaged in goal-directed behaviors to solve problems that emerge under certain environments. This provides perceivers opportunities to obtain knowledge about how to solve those problems via social learning (Bandura et al., 1961; Wijnker et al., 2021). Here we define a goal as a desired state that one wants to reach or maintain. As will be discussed, people routinely infer the goals of characters and construct their understanding and reactions based on this process.

The purpose of this paper is to explore the basis by which narrative may provide a base for learning how to solve real-world problems. The features of narratives and characters that afford learning about how to solve problems will be first discussed. Second, the psychological mechanism that affects learning about how characters solve problems will be considered. Finally, a series of observations about the literature will be offered.

### **Features of narratives**

#### ***Narrative plots are structured around goal plans***

Theories of story grammar (Thorndyke, 1977; Stein & Glenn, 1979; Trabasso et al., 1989) all assume that stories are structured around goals. In Rumelhart's schema for stories,

desire, and emotion are two of the finest elements in a story (1975). A story must include at least one desire or emotion, where the former can be interpreted as a type of goal, and the latter can be considered as a consequence of a goal based on appraisal theory (Hamby et al., 2022). In Thorndyke's grammar rules for simple stories, eight out of 10 rules require a goal or subgoal or the element consisting of them (1977). The two lefts are the rule of setting and the rule of the state, which consist of characters, the holder of the goal. Most of the story grammar systems use trees describing narratives and the goals always shown in the leaves. On another hand, the causal network model by Trabasso et al uses directed arcs between clauses describing the causal relationship, and the set up of goal is considered one of the fundamental types of information units that compose causal chains (1989).

### ***Direction in narrative***

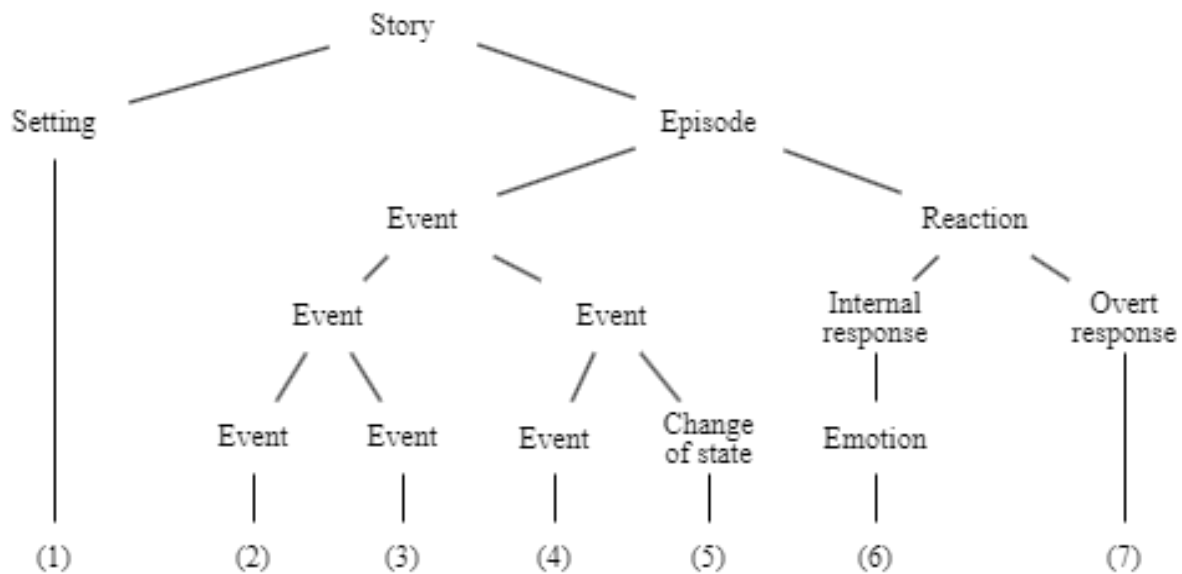
Another common feature shared by the theories of story grammar is that they all demonstrate a directional relation between elements in either tree structure or directed graph. Here don't discuss the meaning of this order relationship, it can be either temporal order or causal order. Consider an example used by Rumelhart (1975):

- 1) Margie was holding tightly to the string of her beautiful new balloon.
- 2) Suddenly, a gust of wind caught it.
- 3) The wind carried it into a tree.
- 4) The balloon hit a branch
- 5) and burst.
- 6) [sadness]
- 7) Margie cried and cried.

With the schema for stories by Rumelhart, the story can be transferred into a tree structure as shown in *Figure 1*.

**Figure 1.**

*The tree structure of the story grammar for Margie story*



In such a structure, each fork indicates a sequence, therefore the tree structure can be transferred into a multiple-layered sequence

(setting, (((event, event), (event, change of state)),(emotion, overt response)))

which is equivalent to

$$1 \rightarrow (((2 \rightarrow 3) \rightarrow (4 \rightarrow 5)) \rightarrow (6 \rightarrow 7))$$

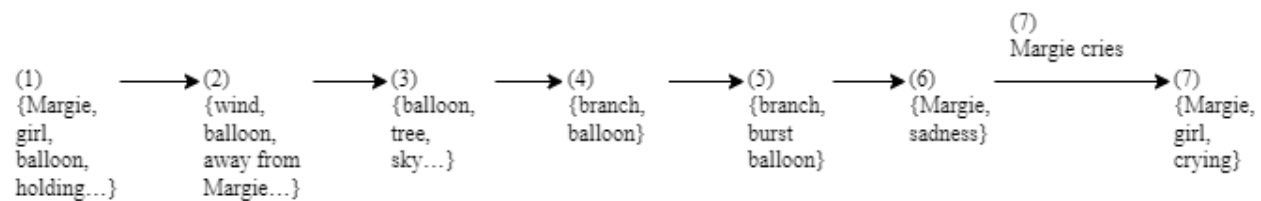
It is worth noticing that, although the text of the story itself is a sequence of clauses, it is different from the sequence of elements in story grammar because different semantic orders can convey the same story sequence. For instance: “Margie cried and cried. Her balloon hit a branch and burst” conveys the same event sequence as “The balloon hit a branch and burst. Margie cried and cried.” This sequence is a directed chain. Similarly, the directed relationship is explicitly shown in Trabasso’s causal network model by directed labeled arcs (1989). By applying a

general definition of “state” and “action”, where a state stands for a set of internal and external features and action stands for any change of mental or physical activity performed by a character, the story grammar can be shown as a directed graph. In the Margie story, it would look like

*Figure 2.*

**Figure 2.**

*The directed state graph for Margie story*



Therefore, narratives can be described as state graphs composed of states and actions (simple stories only have one directed path, while parallel narratives can have multiple paths, therefore we use the term graph).

***Hierarchy of Character Goals***

In all story grammar theories, both episodes and character goal plans are hierarchical. This is demonstrated by the multiple layers of the tree structures and the recursive structure of causal chains (Thorndyke, 1977; Stein & Glenn, 1979; Trabasso et al., 1989; Trabasso & Wiley, 2005; Shanks & Abelson, 1977). Consider the story Melvin, The Skinny Mouse, which was used by Stein and Glenn (1979).

- 1) Once upon a time, there was a skinny little mouse named Melvin
- 2) who lived in a big red barn.
- 3) One day, Melvin found a box of rice crispies underneath a stack of hay
- 4) Then he saw a small hole in the side of the box.
- 5) Melvin knew how good the cereal tasted

- 6) and wanted to eat just a little bit of the cereal.
- 7) He decided to get some sugar first
- 8) so that he could sweeten his cereal
- 9) Then Melvin slipped through the hole in the box
- 10) and quickly filled his cereal bowl.
- 11) Soon Melvin had eaten every bit of the rice crispies
- 12) and had become very fat.
- 13) Melvin knew he had eaten too much
- 14) and felt very sad.

In the story, Melvin has a superordinate goal, which is eating sweet cereal. To complete this superordinate goal, a sequence of subordinate goals was set up and formed a goal chain, where the previous goal affords later:

Get some sugar → Get into box → fill his cereal bowl → eat sweet cereal

Notice, this goal chain of goals is not a narrative structure but is a representation inferred by perceivers based on the story's grammar. It affords the perceivers' mental representation of the narrative and provides the possibility of learning how to set up goal plans to solve problems. This will be discussed later.

### ***Categories of Character Goals.***

Characters have goals, but they vary in multiple dimensions. First, goals can differ by their distance from the final goal in the goal chain. A goal that is closer to the final goal is more likely to be considered as the superordinate goal, while a goal that is further away from the ultimate goal is more likely to be considered a subordinate goal. Second, goals differ in their level of explicitness. The perceivers of narratives can capture the goal with a higher level of

explicitness easily but can be harder to capture the less explicit goal. In a study of the relationship between goals and identification and liking toward characters, Tchernev separated goals into the hero's external goal, the hero's conscious internal need, and the hero's unconscious need based on screenwriting habits (2022). These three types of needs correspond to three levels of explicitness of goal. Third, goals differ based on the properties of the characters who hold them. Magliano and colleagues have identified prominence and centrality as two properties of characters that may impact narrative perceivers' goal monitoring (2005). A protagonist is more prominent than an antagonist, and the authors defined centrality as the total length of the causal chain that the character directly involves. The influence of these dimensions on perceivers' mental representation will be discussed in the next section.

### **Feature of Projection**

The narrative itself is different from people's representation of it. The representation of narratives is a metaphorical projection of the narrative. As mentioned previously, we claim the goal chains and state chains inferred from the narrative structure provide the foundation of the projection of narratives, and thus goal plays a more important role in the projection than in the narrative itself. Readers monitor the goals of characters and there are several sources of evidence for this.

### ***Hierarchy of Character Goals***

In the last section, the hierarchy of goals in narrative structure was discussed and was also shown in the goal chain, which is considered a component of projection. Evidence supports this hierarchical structure on goals in projection. People performed event segmentation with different graininess based on different instructions and both goal and causation contribute to the finer and coarser event segmentation (Zacks & Tversky, 2001; Magliano & Zacks, 2011;

Magliano et al., 2014). Although Trabasso and colleagues did not directly show the structure of the projective of the narratives in the perceivers' minds, their studies reflected the importance of characters' goals in the projective for between-clauses connections by asking participants to rate the strength of the causal relationship between two clauses (Trabasso et al., 1989). The result shows receivers report significantly higher strength for clauses involving goal-directed activity regardless of the criteria of the causation and would distinguish motivation/goal from other psychological causation.

### ***Focus of Superordinate Goals***

People seem to hold the superordinate goals of characters when comprehending narratives. The study by Long and colleagues tested the Minimal Inference Processing and Global Coherence Hypothesis of goal monitoring (1992). The former suggests that only bridging inference or inference based on ready information in working memory are encoded online, thus both types of goal inference will not be encoded during comprehension automatically. The latter hypothesis is an explanation-based comprehension process where people initially use available information in working memory or short-term memory for inference, then long-term memory or general world knowledge, therefore the subordinate goal inference is less likely to be observed online since it is less important for supporting global coherence and explanation. The results suggest the activation of knowledge related to superordinate goals is significantly stronger than those related to subordinate goals, which supports the Global Coherence framework. This indicates that superordinate goals play important role in the projections.

### ***The Connection between Goals and Action***

Action is deeply related to goals, people infer goals to understand the actions of characters and use their observation of actions to infer others' goals (Long et al., 1992;



Blakemore & Decety, 2001; Zacks & Magliano, 2011). Thus the perception of action is deeply related to the explicitness of goals. In visual narratives, actions are demonstrated via changes in body position. Kopatich and colleagues' study found both goals and change of body position have an impact on viewing time and are both significant predictors of event segmentation (2019). Therefore it is reasonable to believe actions and goals bind together in the projection of narrative.

Studies of mirror neurons support this relationship between goals and actions inference. Mirror neurons were initially found among social animals, it fires both when the animal performs or observes other agents perform certain physical actions. A similar mirror neuron system was found in human brains, located in the Wernicke area (Glenberg, 2010). One important feature of the mirror neuron system is that it does not independently reflect physical actions, but is also related to the intention of action and therefore many researchers consider goal understanding and action understanding as indivisible processes (Thill et al., 2011).

It is worth noticing, people are not projecting any action and goals in the narrative onto their projection. Instead, people apply and are limited by personal experience during this process (Mulcahy & Gouldthorp, 2015). A study done by Sommerville and her colleagues demonstrates that the experience of physically interacting with a specific object increases habituated infants' sensibility of goal-directed action related to the object performed by others (Sommerville et al., 2005). This suggests that people are using their experience, which contains goals, actions, and states, to infer others' actions and goals. That is, the projection of narratives is not generated from narrative structure alone, but a product of combining narrative structure and personal experience.

### ***Containing Multiple Characters' Goals***

In narratives, the presence of characters' goals in the narrative is not in a constant form, it can come with different types of characters. Magliano and his colleagues studied how the prominence and centrality of a character affect people's monitoring of their goals (2005). The researchers operationalized prominence as protagonist vs. antagonist and operationalized the centrality of characters using clips from two movies with different amounts of antagonists. The participants performed an event segmentation task in Experiment 1 and wrote their understanding in Experiment 2. The results show that goal monitoring is mainly influenced by the centrality of character instead of prominence. This study indicates at least during the goal monitoring process, the identification of characters either has not yet formed or formed but has no immediate contribution to projecting goals displayed into projectiles, while the involvement of plots facilitates the projecting of the goals of characters. Also, the projection of narrative in perceivers' minds can contain the goals of multiple characters when comprehending narratives.

### ***Dynamic Changing of Goals***

The goals of characters are dynamically changing in narratives and perceivers routinely update their projections to fit the changed goals. This process is part of event model updating. Event-indexing models provide insight into how the projection of narratives works, where people construct situation models by tracking agents/characters, characters' goals, causality, space, and time (Zwaan et al., 1995). When changes in the dimensions appear, people may update their situation model and perform event segmentation using their event schemes (Magliano et al., 2014; Zacks & Swallow, 2007). This indicates people keep matching the inferred characters' goals in their projection to the incoming plots of narratives and update the goals in projection when there is a mismatch.

### *Effects on Character Identification*

It is not precise to consider needs or motivation as the same concept as goals since a goal is a single desired state while a need or a motivation can be considered as a collection of final goals. However, it is reasonable to consider that their needs and motivation are related to superordinate goals. Tchernev's study identified multiple classes of needs that vary in explicitness and functionality and investigated their impact on the narrative perceiver's identification and liking toward the character was evaluated (2022). In the study, researchers categorized characterized characters' motivation into hero's external goal, conscious internal need, and unconscious need based on suggestions from screenwriting handbooks (explicitness high to low). Another concept of character flaw (displaying some negative features of the character) was added for key moment labeling. With ERG (Existing, Relatedness, and Growth needs) theories, the goals of characters were classified into existence needs, relatedness needs, and growth needs. The researchers have experts labeled the key moments when the needs of different categories are established in three films and had the subjects rating their liking or identification with the protagonist. The result shows that external and internal goals increase both liking and identification and character flaw decreases identification and liking overall. On another hand, the establishment of existence needs affects neither identification nor liking, but the establishment of relatedness needs increases liking and the establishment of growth needs increases identification. Moreover, a correlation between identification and liking was observed.

This study infers us that compared to less explicit superordinate goals (e.g., unconscious need or goals generated from it), more explicit goals are more likely to have an impact on receivers' identification and liking toward the characters. Also, the establishment of superordinate goals that are related to social context (those based on relatedness or social needs) and self-

development may have a stronger impact on liking and identification. This brought up two properties of the projection of narrative, where the explicitness of goals is necessary for receivers to be affected by, and the receivers might take a self-centered perspective to project themselves onto characters (receivers' relatedness and growth needs) when comprehending narratives.

### **Observations and Further Thoughts**

With the studies reviewed above, we have identified some observations of the projection of narrative:

- 1) There is a hierarchical structure of goals.
- 2) The understanding of the characters' goals leads to a perception of a stronger causal relationship between states.
- 3) Observation of characters' goals is different from observation of characters' psychological state.
- 4) Receivers focus more on superordinate goals during narrative comprehension.
- 5) Goals and actions are deeply connected in the projection.
- 6) Projection is constructed based on personal experience and narrative structure.
- 7) Projection can contain goals of multiple characters
- 8) Involving in state chains help characters' goals better projected.
- 9) Goals in the projection routinely update based on the intention shift of narrative
- 10) More explicit goals can be better projected.
- 11) Goals align with perceivers' real-life goals providing higher identification and liking.

On top of these observations, we add two hypotheses to construct the big image of the goal projection of narratives.

- a) There exists a directional connection between states in the projection.

b) there are multiple representations distinguished by perspective.

a) is partially supported by the ordered property of narrative structure, and the structure of the goal chain (as a goal is a type of state). b) is partially supported by Mulcahy and Couldthorp's study. They investigated how point-of-view effect peoples' reading engagement and enhanced readers' ability to monitor changes in characters' emotions, which implies there might be different kinds of projections based on perspectives.

With the 13 claims listed above, consideration of the structure of the projection of narratives with these properties is worthy, especially how the goal of characters and perceivers' experience plays a role in such projection. We suggest that one structure that is compatible with all these points of projection is multiple dynamic goal-centered directional graphs of physical and mental states which take both perceiver's perspective and the characters' perspectives. More specifically, all graphs are generated based on the perceiver's experience. The graph with the perceiver's perspective has a third-person view of the events and integrates the first-person view from the graphs with the characters' viewpoints. The directional edges in the graph correspond to a). The paths of the graph correspond to the goal chain, combine with event schema that applies to subpaths with different lengths, and the containing relationship between different subpaths corresponds to property 1). Goals are a type of state, one graph can contain multiple goals of a single character, but each path is heading toward a goal. This gravity of goals corresponds to properties 2), 3), and 4) (since the superordinate goals have greater gravity than subordinate goals). The edge of action between states reflects 5). The multiplicity of graphs corresponds to 7) and b). 8) can be considered as a consequence of the difference in the stability of characters' graphs (which is a result of dynamicity), where the graphs for characters' with lower centrality are less accessed and thus cost more cognitive resources when constructed or retrieved when

integrating into the receiver's view graph. The dynamic of the graphs corresponds to 9). The 10) and 6) reflect a process of using the perceiver's experience to generate the graphs, where more explicit goals with higher match with receivers' experience are more likely to be captured and mapped to their experience for generating paths from states to goals. 11) reflects the needs of the receiver and how it interacts with observed characters' goals when they update the graph with the receiver's viewpoint. Moreover, the directional connection from state to state itself involves action. There are two ways to put action into such connection: action is the edge that connects states or actions are a series of sub-state (a subset of elements involved in a state).

Perceivers' own goal graph contains knowledge of solutions to different problems (path from one state to another state). The states here are not concrete, but an abstract set of features. Includes states not connected to goals. When a goal or motivation is activated, one or multiple states are pointed as goals. People use the goal graph to evaluate incoming states. Their own goal graph serves as the self-centered perspective graph of goals. When a character and its goals are established in a narrative, people extract subgraphs of their own goal graph and adjust them based on the narrative to construct the character perspective graphs. Perceivers also adjust the goal graph of characters when narratives offer information about goal plan change. During narrative comprehension, people use the goal graph of their own and characters to match incoming states to generate reactions. These goal graphs compose the intention dimension of the current situation model. When moving on to new states, the old states which have matched with the goal graph become part of the integrated situation model with the reaction attached to them.

To better demonstrate this model, consider a story from the Boy, Dog, Frog series used by Hutson and colleagues (2018).

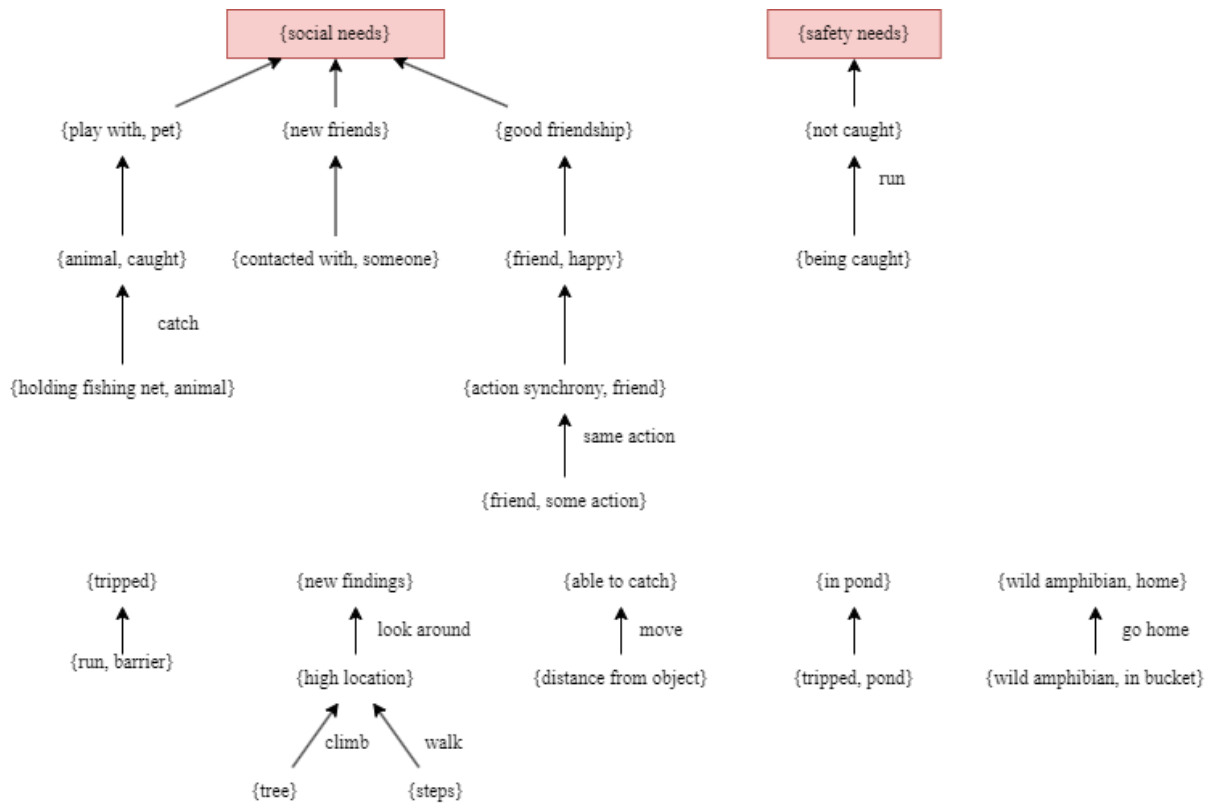
1) Once there was a boy who had a pet dog.

- 2) He and the dog went walking one day and
- 3) the boy was carrying a fishing net and bucket.
- 4) He set down his bucket and net,
- 5) and looked down over a tree at a small pond.
- 6) He saw a frog sitting on a lily pad.
- 7) He got his bucket and net.
- 8) The boy and dog ran down the hill towards the frog.
- 9) He had his net raised.
- 10) A large tree branch was in front of the boy.
- 11) He and the dog both tripped over the tree branch.
- 12) He dropped the bucket and net.
- 13) The boy and the dog fell headfirst into the pond right in front of the frog.
- 14) The frog was upset..

Consider a reader with a goal graph that contains the subgraph as shown in *Figure 3* based on his/her experience (notice, every state is a set of representations, the text is for convenience; the actions can be a chain of states, here displayed as text for convenience).

**Figure 3.**

*A goal graph of a reader containing his/her knowledge based on experiences*

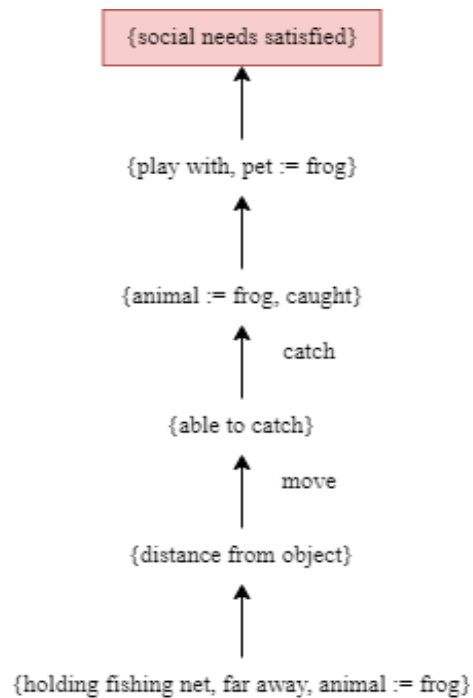


In line 8), the goal graph constructed by the reader based on his/her goal graph and the narrative is shown in *Figure 4*.



**Figure 4.**

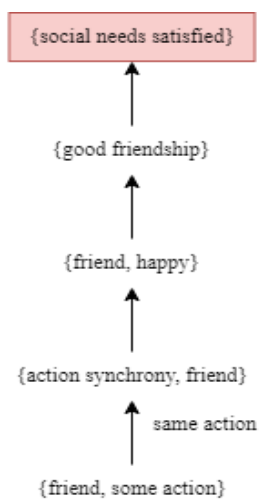
*A goal graph setup for the boy based on the reader's goal graph*



If the reader personified the dog at this moment, the goal graph constructed for the dog might be as *Figure 5*.

**Figure 5.**

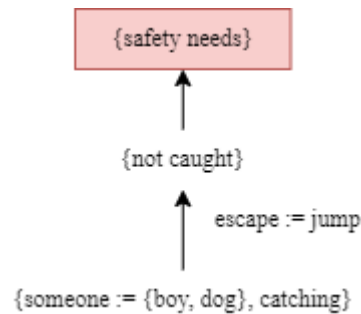
*A goal graph setup for the personified dog based on the reader's goal graph*



If the readers assume the frog knows that the dog and frog are catching it, a goal graph of the frog might be constructed as *Figure 6*.

**Figure 6.**

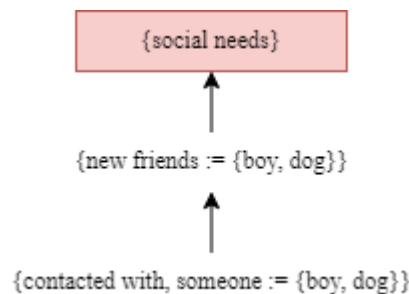
*A goal graph setup for the personified frog based on the reader's goal graph*



However, when reading through line 14, perhaps the reader would notice the emotion displayed by the frog doesn't match the constructed goal graph of the frog as it should feel positive when safety needs are satisfied. Such they might update the frog's goal graph to *Figure 7*.

**Figure 6.**

*An updated goal graph for the personified frog*



How do the goal graphs enable social learning? Although it is not shown in the example, we suggest that when perceivers observe a chain of state and action of a character that the perceiver has no experience with is temporally or causally connected to a state in their constructed goal plan, the perceivers would record and innately the chain from an unfamiliar state

to a familiar goal state, and this expansion of the perceiver's goal plan provides the base of social learning through narrative comprehension.

These are naïve demonstrations of the mechanisms and functions of goal projection in a multiple dynamic goal-centered directional graphs structure, the process and detail structure worth more development and discussions. For instance, under what condition will a goal graph of character be constructed, and whether there is a limit to the number of goal graphs? Also, people's attention may play a role in goal graph construction and maintenance. This structure of goal projection provides a base for discussing phenomena that happen during narrative comprehension. For instance, how might the overlap of the self-perspective goal graph and character perspective goal graph affect reactions such as participatory responses? Also, how would the mismatch of goals and states or the detection of increased distance between states and goals raise emotion?

## **Conclusions**

In conclusion, we have identified 13 properties of the perceiver's projection of narrative by reviewing several studies about narrative structure and goals. With these 13 properties, a possible structure of narrative projection and the role of goal in it was pictured. More studies will be needed to better understand the projection structure and how it involves in the process of narrative comprehension. First, more evidence of the directional connection between states should be checked. Second, the interaction between the receivers' goals and the characters' goals should be investigated. Third, the relationship between action, state, and goal is worth more focus. Understanding how physical actions are represented will help us better understand the directional connection. A better understanding of how states are represented in projections will help answer that question. Additionally, we used action for physical activity in this paper,

however, it makes sense to consider action in a broader view, that is, both mental action and physical action.

Developing a specific and even computational model of the projectile of narratives in receivers' minds may take a long time, but it is worthwhile because it can have a great impact on understanding narrative comprehension and even contribute to a more general psychology model of human beings. With a deeper understanding of narrative comprehension, it will be possible to develop a system for improving societies by manipulating cultures via cultural products like narratives.

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