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The shapes of stories: A "resonator" model of plot structure

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Abstract: Plots have been described as having shapes based on the changes in tension that occur across a story. We present here a model of plot shape that is predicated on the alternating rises and falls in the protagonist's emotional state. The basic tenet of the model is that, once the emotional valence of the beginning and ending of a story has been specified, then the internal phases of the story are constrained to connect these endpoints by oscillating between emotional rises and falls in a wavelike manner. This makes plot structure akin to a musical resonator – such as a flute – which can only conduct sound waves of certain discrete shapes depending on the structure of the tube's endpoints. Using this metaphor, we describe four fundamental plot-shapes based on a 2 x 2 crossing of the emotional valence of a story's beginning (happy beginning vs. sad beginning) and ending (happy ending vs. sad ending).

Keywords: plot, story, narrative, character, protagonist, dramatic arc

1 Introduction

One of the oldest graphic metaphors for the structure of a story's plot is that of an arc, referred to variously as the narrative arc and dramatic arc (Kukkonen 2014; Lunenfeld 2005; Richardson 2011). "Shape", "arc", and "trajectory" are just a few of many metaphorical terms that have been used to describe the structure of a plot (Caracciolo 2014: 55). The narrative arc, as a graphic structure, has two dimensions to it. While it is clear that the x axis represents the progression of *time* in a story – from beginning to end – what does the y axis of the arc represent? To most theorists, it represents something about "tension" (Cohn 2013), such that

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stories are crafted to present a progressive build-up of tension from a neutral starting point, leading to a peak or climax, followed by a release of the tension. But what does this tension refer to? Whose tension is it – the reader's or the character's?

We recently developed an Embodied Plot model of narrative (Tu and Brown 2020) that posits that the narrative arc of a story is isomorphic with the experientiality of the story's protagonist in their storyworld. According to this view, the y axis of the narrative arc specifies the intensity of *the protagonist's emotional experience*. By assigning tension to the embodied experience of the protagonist within the story, rather than conceiving of it as an unsourced parameter, we set the stage for examining the progression of a plot in terms of protagonist experientiality. The present study looks beyond arcs alone to provide a general classification of the shapes of plots. To account for these shapes, we introduce the metaphor of a musical resonator (like a flute), and argue that the dynamic properties of a plot are analogous to the oscillating sound waves inside of an acoustic resonator, except that the oscillations in this case are comprised of *rises and falls in the protagonist's emotional state*, something that we will refer to as emotional "shifts".

Before presenting this so-called Resonator model of plot structure, we will briefly review several historical models of plot, as shown in Figure 1. This review is in no way meant to be exhaustive, but simply introduces four types of plot shapes: a line (Aristotle), an arc (Freytag), a circle (Campbell), and a wave (Vonnegut). Most theoretical approaches to plot structure have been influenced by the thinking of ancient Greek philosophers such as Plato and Aristotle. In *Poetics*, Aristotle (335 BCE/1996) presented a plot-based model of narrative in which dramas progress linearly from a beginning to a middle to an end. According to Aristotle's perspective, plot is the primary element of narrative, and character is subordinate to plot: "character is included along with and on account of the actions. So the events, i.e., the plot, are what tragedy is there for, and that is the most important thing of all" (Aristotle 335BCE/1996: 11). This perspective has been highly influential well into the present day (see Chatman 1978).

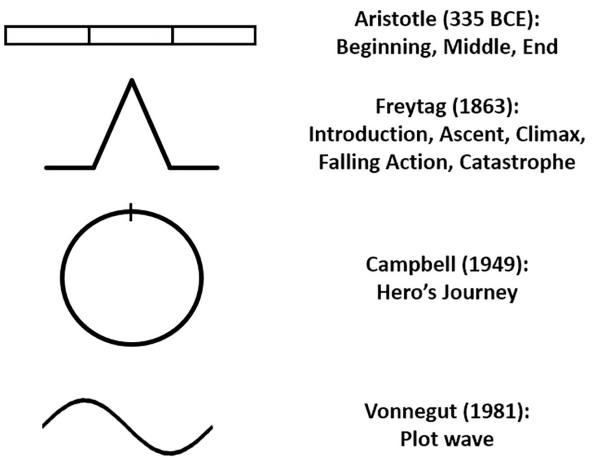

Figure 1: A simplified taxonomy of theories that use shapes to model plot structure. These shapes include a line (Aristotle), an arc (Freytag), a circle (Campbell), and a wave (Vonnegut).

While the linear progression of events and acts that Aristotle proposed is accurate, it is one-dimensional. A dramatic arc requires a second dimension. Nineteenth-century theorizing about drama led to a transition from Aristotle's three-act plot to a five-act structure known as the pentalogy, although this structure had its origin in Horace's *Ars Poetica* from the first century BCE (Cutting 2016; Matthews 1894/1916). Perhaps the best known pentalogy is Gustav Freytag's (1863/1900) "pyramid", in which the five acts of a tragedy – i.e., introduction, ascent, tragic force/climax, falling action, and catastrophe – are arranged in the peaked structure shown in Figure 1 (Freytag 1863/1900: 115). What is significant about Freytag's pyramid is not only its restructuring of a plot from three to five acts, but its introduction of a second dimension to plot structure that complements the temporal dimension introduced by Aristotle. This second dimension creates a dramatic arc, as shown by the rising and falling action from Act 2 (ascent) to Act 4 (falling action), which is often described as being a measure of the change in tension of the unfolding events of a story (Brooks 1977; Lehne and Koelsch 2015).

An alternative to a linear representation of plot is a circle, as exemplified by Joseph Campbell's (1949/2004) "hero's journey", itself based on a myth theory of the subconscious and on Jungian psychoanalysis. The hero's journey outlines a cyclical trajectory in which the hero departs from their known world to explore an unknown world before returning home after having experienced significant challenges and growth. This sequence shows important similarities with Propp's (1928/1958) model of folk tales (see also Murphy 2015). While the hero's journey can certainly be represented in a linear fashion, the cyclical representation high-

lights the importance of the protagonist's return at the end of the story, which is a signature feature of the quest plot.

Kurt Vonnegut offered yet another representation of the progression of a plot, namely a wave. In his autobiographical collection *Palm Sunday* (1981: 285), Vonnegut described the work of his (failed) master's thesis on the shapes of stories: "The fundamental idea is that stories have shapes which can be drawn on graph paper". In Vonnegut's graphs, the x axis is time, spanning from the beginning to the ending of a story. The y axis represents the "fortune" of the protagonist, where positive-y values indicate good fortune and negative-y values indicate bad fortune. From the standpoint of the Resonator model that we will present here, a number of Vonnegut's analyses look like simple *waveforms*, for example the graph of a story about "a person who is leading a bearable life, who experiences misfortune, who overcomes misfortune, and who is happier afterward for having demonstrated resourcefulness and strength" (1981: 285). This is shown in Vonnegut's graph as a falling-then-rising wave starting from a positive y value ("a bearable life"), dipping down into negative y ("experiences misfortune"), and then ending at a higher position in y than where the person started out ("overcomes misfortune" and "is happier afterward"). Since Vonnegut, several other scholars have analyzed the dramatic arc of narratives in a similar fashion, such as Northrop Frye (1982), who proposed that comedies have a U-shaped plot, while tragedy is the inversion of the U. Likewise, Gergen and Gergen (1997) noted that romantic narratives are comprised of a sequence of progressive and regressive phases. When these phases are graphed, they resemble Vonnegut's waves. The graphical approach taken in the present study is similar in many respects to the wave-based models advocated by these authors.

The closest precedent to the current model is the computational study of Reagan et al. (2016) that was inspired by Vonnegut's approach to graphing the shapes of plots. In that study, the authors used automated methods to examine the texts of 1737 books (both novels and plays) from the Project Gutenberg database. They analyzed these texts for their emotional arcs, as based on a sentiment analysis that classified the words across the time-series of a story as being either positive, neutral, or negative in emotional valence. The results were presented as a series of "modes" having positive phases (emotional rises) and/or negative phases (emotional falls) to them, much like a sound wave. Twelve modes accounted for the majority of variance in the sentiment analysis. These modes progressed from emotional arcs having few oscillations to those having greater numbers of oscillations. For example, mode 1 was just a single rise, whereas mode 6 was an alternating sequence of three rises and falls. Reagan et al. identified the first six modes as representing the "core emotional arcs" across the corpus, which they labelled as rise ("Rags to riches"), fall ("tragedy"), fall/rise ("Man in a hole"),

rise/fall ("Icarus"), rise/fall/rise ("Cinderella"), and fall/rise/fall ("Oedipus"). Reagan et al. recognized that the emotional arc of a sentiment analysis is not the same thing as the story's plot: "the emotional arc of a story does not give us direct information about the plot or intended meaning of the story, but rather exists as part of the whole narrative" (2016: 1).

Other sentiment analyses have attempted to address this disparity between the emotional arc of a sentiment analysis and that of the narrative plot. Kim, Pado, and Klinger (2017) analyzed the sentiment trajectories of different literary genres, but only examined sentiment differences between genres, rather than between characters within a story. Elsner (2015) attempted to measure character-specific emotional trajectories within a story by linking emotional words with the mentioning of specific characters. His goal was to "represent plot structure at a high level" by capturing "basic concepts such as 'protagonist' or 'happy ending'" (2015: 2). Elsner compared single-trajectory representations – which analyzed the emotional trajectory of words throughout the entire novel – with character-trajectory representations for every character. While this character-specific approach is an improvement of over sentiment analyses that take a more global approach, it is ultimately still a lexical analysis, rather than a psychological one, since the method is still dependent on the automated process of analyzing a text in a word-for-word manner.

Some word-based approaches have attempted to identify higher-order psychological processes in characters, such as decision making and goal formation. Boyd, Blackburn, and Pennebaker (2020) incorporated a psychological approach in their analysis of 40,000 traditional narratives by using a Linguistic Inquiry Word Count (LIWC) to identify the narrative process that they called "cognitive tension". The authors described cognitive tension as occurring when characters confront and try to resolve conflicts and obstacles that interfere with their goals. Cognitive-processing words such as "think," "realize," "because," and "believe" are useful indicators of cognitive tension since these words are markers of people's sense-making and problem-solving processes (Boals et al. 2011; Heppner and Krauskopf 1987; Pennebaker and Francis 1996; Zheng, Lu and Gan 2018). However, this method lacks the character specificity of Elsner's (2015) approach. Elkins and Chun (2019) developed a hybrid method by combining sentiment analysis with an analyst's close reading of a text. Such a reading can help the analyst adjust the sentiment analysis to better match the character's actual emotional trajectory in the narrative, since the analyst can develop a better understanding of the character's psychological processes. While the introduction of a human interpreter is an improvement over purely automated analyses of text, our objective is to move beyond the bottom-up methodology of sentiment analysis altogether.

While the aforementioned studies of sentiment analysis have made significant theoretical and methodological advances in the study of narrative, not least in their ability to analyze large corpora of stories using automated methods, we feel that they suffer from the same type of drawback that has plagued historical models of the narrative arc. In the same way that the "tension" of the narrative arc lacks any source of attribution, so too linguistic analyses of sentiment in texts lack a source of attribution. Sentiment analyses describe changes in sentiment-related words over the course of a text, but they are not able to identify the source of these sentiments (Burrows 1987; Mohammad 2015). The current approach differs from sentiment analyses in that, instead of looking at words alone, it uses a rater-driven approach that specifically analyzes the emotional trajectory of the protagonist throughout the course of a story. Instead of looking at sentiment in a manner that is devoid of an attribution of emotions, the approach specifically *parses out the emotional experience of the protagonist* from other emotional components of a story. It employs a top-down psychological analysis, rather than a bottom-up lexical analysis. The method is thus linked to one specific character, the protagonist, rather than to global emotion in a non-specific manner. While clues to the protagonist's emotions are unquestionably found in the language of the text, our analysis is not linked to specific words or word categories, but rather to a rater's psychological interpretation of the episodes of the story from the protagonist's vantage point.

The current approach follows on the heels of our previous development of an Embodied Plot model of narrative (Tu and Brown 2020) in which the dramatic arc of a plot is attributable to psychological processes occurring in the protagonist's mind. According to this view, plot structure is isomorphic with the psychological and problem-solving experience of the protagonist inside their storyworld. The model offers a rich psychology for the protagonist that includes processes related to emotional appraisal, motivation, intentionality, agency, decision making, goal formulation, and action planning, as organized into a psychological problem-solving sequence. The dramatic arc of a plot is conceived of in terms of the emotional shifts experienced by the protagonist, as associated with their psychological responses to both internal motivational factors and external storyworld factors. The model posits that the protagonist drives the dynamics of a plot by experiencing emotional rises and falls that move the story forward. The current analysis uses the psychological details of the Embodied Plot model to develop a structural model of the shapes of plots, as well as a Vonnegut-inspired graphical means of visualizing these shapes.

2 The Resonator model of plot structure: Plots as waveforms

In the current section, we present the Resonator model of plot structure. We view plots as a series of waveforms – similar to the shapes of sound waves – that oscillate up and down over time. In the case of sound waves, the rising and falling phases of the wave represent increases and decreases, respectively, of the pressure of colliding air molecules. In the case of plots, these phases represent changes in the time-varying emotions of the story's protagonist, where a rising phase represents a change to increasing positive emotion, and a falling phase represents a change to increasing negative emotion for the character.

Emotional shifts. We will use the term "shift" to specify the phases of a story's waveform, where a shift is defined as a significant change in the protagonist's emotional state in a story. An emphasis on shifts reflects the fact that the plots of stories focus on processes of change, rather than on periods of stasis. Hence, shifts serve as basic building blocks of plot structure and are major contributors to the shapes of plots. According to the Embodied Plot model (Tu and Brown 2020), an emotional shift can occur during a protagonist's emotion appraisal, a decision-making point, or in their planning for a goal-directed action. It is important to note that situation models in cognitive psychology (Zwaan and Radvansky 1998) talk about shifts as changes in time, progressing from one situation to another. Our focus here is not on time shifts in the episodic structure of the narrative, but rather on *emotion* shifts in the experientiality of the protagonist during the narrative's progression.

Shifts are characterized by both their emotional *valence* and *intensity*. Valence is indicated by the direction of the shift, where rising shifts reflect a change toward positive emotion, and falling shifts a change toward negative emotion. Intensity is indicated by the size of the shift. Shifts can occur as small or large increments in emotional intensity, reflecting small or large changes in the emotional state of the protagonist. In addition, a shift can be either a reversal in emotional valence (e.g., a change from positive to negative emotion) or a continuity of a given valence but to a higher point of emotional intensity (e.g., a change from being glad to being joyous). Therefore, while most stories progress as alternations between rises and falls, it is possible to have a repetition of shifts in a given direction such that the protagonist experiences successive rises or falls. From the standpoint of the Resonator model, the key determining factors in the analysis of plot shapes are the *initial shift* and *final shift*. The initial shift can be either a rise (e.g., the protagonist striving for a desired object) or a fall (e.g., the protagonist encountering an oppressive situation). Similarly, the final shift can be either a rise (i.e., a happy ending) or a fall (i.e., a sad or tragic ending).

Resonator structure. The most common dynamic for the progression of a plot is an alternation between rises and falls. This makes plots into something *wavelike*, permitting the modeling of plot structure as a series of waveforms of various shapes. The basic tenet of using a musical resonator as a metaphor for plot structure is that, once the endpoints of the structure are determined, then the resonator is constrained to conduct waves of certain specific shapes and not others. Figure 2 presents an example from musical acoustics. A tube that is open at both ends (panel A), such as a flute, can conduct waves of one type of structure, whereas a tube that is open at one end but closed at the other (panel B), such as a clarinet, conducts different shapes of waves than a tube open at both ends. Hence, once the endpoint-structure of the resonator is determined (e.g., open at both ends vs. closed at one end), the resonator is constrained to conduct waves of one type of shape and not others. The waveforms that are supported in a flute cannot exist in a clarinet, and vice versa. Using this analogy, we make the parallel argument for plot structure: *once the structure of the endpoints of the plot are specified (i.e., the initial and final shifts), the plot is constrained to have one type of shape and not another*, since the basic dynamic of a plot is a wavelike alternation between rises and falls. This is the fundamental tenet of the Resonator model of plot structure.

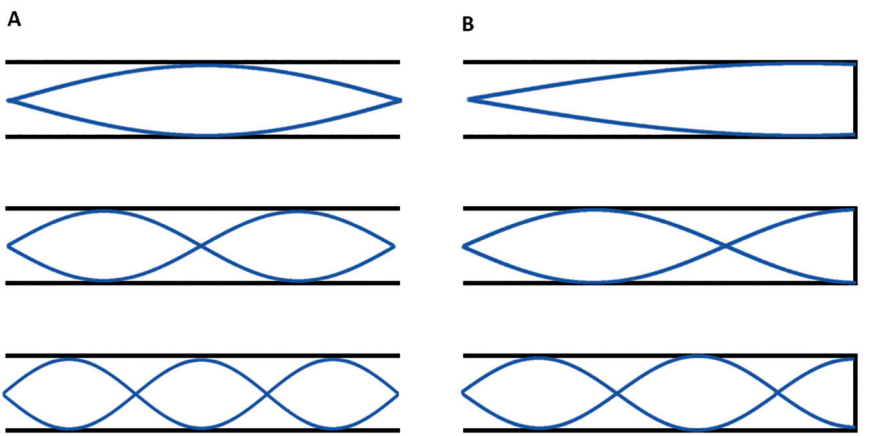

Figure 2: An acoustic resonator with different endpoint configurations. A. A resonator open at both ends, like a flute. B. A resonator with one open end and one closed end, like a clarinet. The two types of resonators conduct sound waves of different shapes, as shown in the successive rows of the figure. Hence, the endpoints of the resonator determine the structure of what is contained within it.

Basic plot shapes. A 2 x 2 crossing between the initial shift and the final shift of a story results in the establishment of four basic plot shapes, as shown in Figure 3.

The left two are the happy-ending plots (N and V), while the right two are the sad-ending plots (Λ and И). All four shapes are among the six basic story shapes put forth by Reagan et al. (2016). We name each one based on its resemblance to the structure of a letter, resulting in a four-letter code for the four plot shapes, as follows.

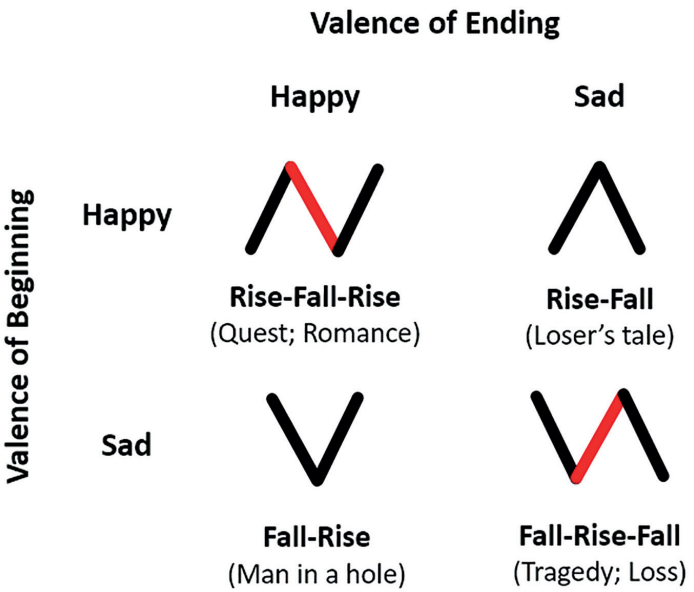

Figure 3: A 2 x 2 crossing between the valence of the beginning (the initial shift) and the ending (the final shift) of a story establishes four basic plot shapes, as represented by the letters N, V, Λ, and И, respectively. The endpoint-shifts shown in in black, while the internal shifts are shown in red. Standard plot-types for each shape are listed in parentheses.

1) *The N or rise-fall-rise*. In this structure, the protagonist strives for something of value and ultimately acquires it, as in a quest story or a romance. Given the fact that both the initial and final shifts are positive in an N plot, one can reasonably ask why this plot cannot be simply represented by a single continuous rise, for example a / structure, as in the story "Mary walked out of her apartment one morning, bought a lottery ticket, and won the jackpot". In general, stories are predicated on *complications* for the protagonist (Abbott 2008; Propp 1928/1958; Ryan 2007). A story without a complication is not considered much of a story, since stories are supposed to offer people strategies for how to achieve desired things in life or likewise how to overcome obstacles and deal with threats (Bietti et al. 2019; Boyd 2009; Coe et al. 2006; Gottschall 2012; Smith et al. 2017). Model-

ing this plot-type as a single rise, rather than as a rise-fall-rise, would reduce the narrativity of the story. Hence, we model it as an N, rather than as a /.

2) *The V or fall-rise*. This structure is what Vonnegut referred to as the "man in a hole" plot (or more properly the "man falls into a hole" plot). It is initiated by an emotional fall for the protagonist, and ends with an emotional rise such that the protagonist overcomes their complication and is restored to their initial state.

3) *The Λ or rise-fall*. This structure represents a failed attempt (Λ is the Greek letter lambda). The protagonist strives for something desirable, but their action ends in failure, potentially even in the death of the character. In lighter literary genres, this would correspond with the "loser's tale", for example the Ralph Kramden character from *The Honeymooners* TV show who repeatedly attempts to better his position in life, but who repeatedly fails.

4) *The И or fall-rise-fall*. In this structure (*И* is the Russian letter for the "ee" sound), the protagonist finds themselves in a negative situation, makes an attempt to raise themselves out of it, but ultimately fails. This is the typical plot structure of a tragedy or other genres of loss. As with the rise-fall-rise N structure, we argue against modeling this plot as a single continuous fall (\), as in the story "Joe walked out of his apartment one morning, fell into a ditch, and died". In most cases, it would be Joe's positive attempt to get himself out of the ditch, coupled with his failure to do so, that would define this plot-type as a story.

The key difference between the oscillations of the Resonator model and the reversals that occur in Vonnegut's taxonomy of plot shapes is that Vonnegut views reversals of fortunes in terms of external storyworld factors that impact the protagonist's welfare, whereas the Resonator model views reversals in terms of *the protagonist's emotional appraisal* of their situation. Appraisal theories of emotion in cognitive psychology (Lazarus 1968; Ortony et al. 1988; Roseman 1991) argue that events in life do not have an intrinsic or fixed meaning for people, but instead that people appraise life events in terms of the consequentiality of these events for their welfare and survival. For example, someone's death can be a tragic loss for one person and a welcome relief for another. The Resonator model bases its shifts on the perceived consequentiality of a story's events from the vantage point of the protagonist, as grounded in their emotional appraisals of these situations. Hence, the model is character-based, compared to Vonnegut's event-based model.

Harmonic structure. Figure 3 demonstrated that, just as with a musical resonator, a specification of the two endpoints of the plot – the initial and final shifts – constrains the nature of the overall plot shape, resulting in the four discrete plot shapes just described. The insight of the resonator metaphor is that, once the emotional valences of the beginning and end of a story are specified, then the internal phases of the story are constrained to *connect those endpoints* by oscillating between rises and falls in a wave-like manner. This is demonstrated in Figure 4 for

the N plot. Panel A shows the basic rise-fall-rise structure that defines this plot shape, where the endpoints are shown with black segments and the internal shifts with red segments. Panels B and C show the first two possible expansions, respectively, that conform with this plot structure. Panel B shows that, compared to the basic N, an additional episode of rise-fall – essentially a failed attempt by the protagonist – is added to create an episodic expansion of this plot. Note that this is the *only* possible oscillatory pattern that will preserve the endpoints of rise-fall-rise N structure. Using the acoustic analogy, we can think of this plot-shape as being the "second harmonic" of the wave, where the basic N is the first harmonic of the wave. It is represented with the letter code NV. Panel C takes this one step further to the third harmonic. Compared to the second harmonic, the third harmonic incorporates yet one more rise-fall segment into the plot (NVV). Again, this is the only type of structure that can be added to this plot type, since the endpoints constrain the internal oscillations of the plot, as predicted by the resonator metaphor.

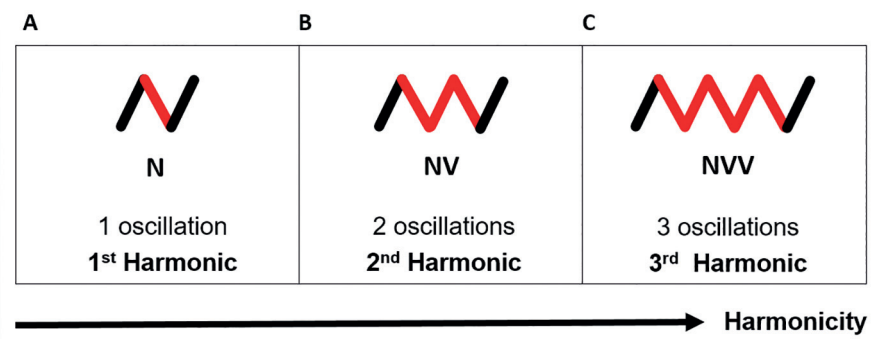

Figure 4: The harmonic structure of plot. The figure shows the N plot and its first two harmonic expansions. Endpoint-shifts are in black, and internal shifts are in red. A. The first harmonic of the N plot. B. The second harmonic of the N plot (NV). C. The third harmonic of the N plot (NVV).

An intuitive way of understanding this harmonic expansion of the plot is to consider that the N plot is a story about a protagonist who seeks something of value (rise), encounters obstacles to obtaining it (fall), and successfully overcomes these obstacles (rise). The principal manner by which this plot-type is expanded is by adding additional protagonist attempts to the plot in the form of coupled rise-fall shifts. This pairing of shifts is the basis for what we shall call a *hypershift*. In N-type plots, the pairing of a rise (/) and a fall (\) to represent a failed attempt (Λ) by the protagonist comprises an important building block for this type of story. Hence, hypershifts are important structural components of plots. The notion of a hypershift suggests that shifts may not be independent of one another, but that they may instead show a dependency relationship. For example, horror

films are predicated on a rise-fall (Λ) hypershift in which the most terrifying events in the story are preceded by periods of calm or even levity.

The wavelike nature of plots suggests that stories are constructed from emotionally-contrastive episodes that alternate between scenes of positive and negative valence. This predictable alternation allows audience members to anticipate many aspects of the plot, including the ending in the case of stories that are exemplars of well-established genres. From a harmonic standpoint, there is no limit to the number of attempts that the protagonist can make in a N-type plot. However, the Resonator model dictates that the endpoints of the plot act to constrain the oscillations that this plot-type can support, just as with acoustic resonators like flutes that can support specific waveforms and not others (Figure 2). The same harmonic principle that is described here for the N plot applies to all of the four basic shapes (an example with the V plot is shown in Figure 10). Each of them can be expanded to create more-complex plot structures using hypershifts, where the endpoints constrain the kinds of oscillations that can be added to create higher harmonics of that plot-type.

2.1 The resonator graph

While the four plot shapes just described are abstractions, a true plot shape is derived from the actual emotional rises and falls of the protagonist over the course of a story. This can be visualized for any given plot using what we shall call a *resonator graph*, as shown in Figure 5. The x axis of the resonator graph encodes time. The y axis of the graph represents the emotional experience of the principal protagonist of the story. Zero is the state of neutral emotion. Positive emotions scale upward from 0 to 3, while negative emotions scale downward from 0 to -3, where higher numerical values refer to a higher emotional intensity for that valence. The 7-tiered emotion scale is broad enough to capture a sufficient range of emotional intensities (i.e., low, medium, high), yet concise enough to allow consistent evaluations between raters. This 7-tiered emotion scale is similar to the 7-point Likert scale used in surveys to obtain reliable and accurate responses (Finstad 2010). This use of a tiered system to represent height, rather than the system of fixed height that is found in an acoustic resonator (or in the plot analyses of Reagan et al. 2016), is a violation of the resonator metaphor, since actual resonators have fixed heights. This discrepancy demonstrates that the resonator metaphor is imperfect. Despite this, the y axis of the resonator graph is capable of capturing a significant amount of narrative detail since it allows a rater to code shifts of varying emotional intensities of a given valence for the protagonist's emotional experience throughout the course of a story, as shown in Figure 5.

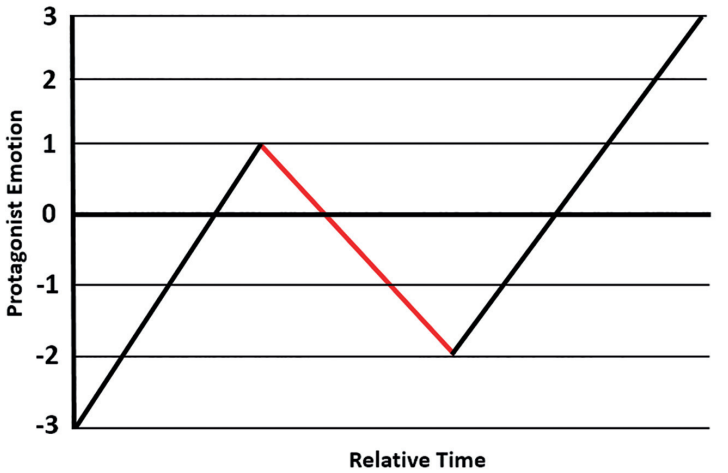

Figure 5: A resonator graph, displaying an example of a possible N plot. The x axis is relative time in a story, from the beginning to the ending. The y axis is protagonist emotion, spanning from 0 (neutral) to 3 (positive valence) and to -3 (negative valence). As in the previous figures, endpoints are in black and the internal shift is in red.

2.2 Complex plot shapes

In the previous section, we used letters to represent the four basic shapes of plots (N, V, Λ, *И*) as well as their expansions to form larger harmonic structures (e.g., NV, NVV). However, these shapes are merely abstractions, and actual plots generally have irregular shapes that violate the symmetry of the written letters. In most actual plots, the shifts are not of equal magnitude. Hence, their plot shapes generally look like unusual versions of their letter reductions, as was shown in Figure 5 for the N plot. The letter codes merely establish *prototypes* for plots. Most actual plots have far more complex shapes than are conveyable with simple letters. Figures 6 and 7 below demonstrate the application of some of these caveats to the prototypical plots.

Starting position vs. initial shift. We argued in the previous section that the shapes of stories are defined by their initial and final shifts. It is important to point out that the initial shift is not identical with the *starting position* of the protagonist in a story. For a story that begins with an initial rise, that rise could start not just from the 0 baseline of neutral emotion, but also from points above or below it. For example, if the story is about a constitutionally sad protagonist who decides to seek out something desirable, the first shift would be a rise, but that rise might start from -1 on the y axis. Likewise, if the story is about a constitutionally happy

protagonist who suddenly experiences a major setback, the first shift would be a fall, but that fall might start from +1 on the y axis. While many protagonists do start out at a neutral baseline in stories, there is no requirement that this be the case. Hence, there is no constraint that the starting position and initial shift be matching in valence.

Along these lines, Figure 6 demonstrates a comparison between a standard N plot (panel A) and what we will call a negative-N plot (panel B) that begins with a rising shift but from a negative baseline. Negative-N plots tend to have similar emotional tones to sad-beginning stories (i.e., V plots) since they are often about a protagonist coping with a chronically oppressive situation. However, they tend to be more optimistic than sad-beginning plots due to the more proactive stance of the protagonist. For example, *The Book Thief* (Zusak 2005) is a novel about a young girl's love of books in relation to her life experience during the Holocaust. It is a coping story in which the protagonist, Liesel, is trying to find moments of happiness during the war. The death of her brother establishes a negative emotional baseline for the story. However, the first true shift in the story is a rise when Liesel begins to bond with her foster father. *The Book Thief* thus does not fit well to the standard definition of a happy-beginning story because Liesel is not striving for a material goal. She is instead striving for emotional comfort and security during an oppressive situation, which makes the plot more similar in many ways to a sad-beginning story.

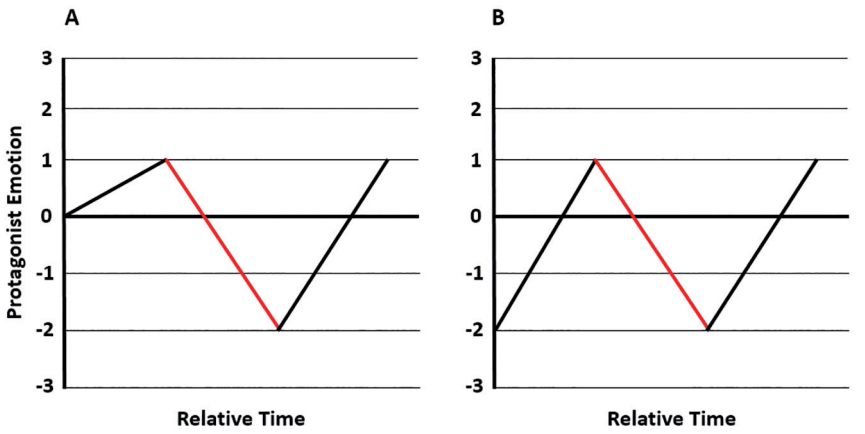

Figure 6: A comparison between (A) a standard N plot with a protagonist having an initial rise from a neutral baseline and (B) a negative-N plot with a protagonist having an initial rise, but starting from a negative baseline. Both graphs are identical except for the starting position of the plot and thus the intensity change of the first shift.

A similar caveat can be presented regarding the status of the protagonist's final emotional state relative to their baseline state. Figure 7 demonstrates that the protagonist's final state may be either higher than, equivalent to, or lower than the level of their baseline state at the beginning of the story. When a protagonist ends at a more positive state or at the same state as they started, then the story can still be considered as having a happy ending. However, the categorization of the N plot becomes more complicated when the protagonist ends at an emotional state that is more negative than where they started. In Figure 7C, the protagonist makes a goal-directed attempt to overcome an immediate complication, but this attempt does not fully resolve the situation and remove its negativity for the protagonist. Plots of this type are often stories having bittersweet endings, as seen in the novel *L.A. Confidential* (Ellroy 1990), where the crime is solved at the end, but where the protagonist's situation has neither improved nor returned to the way it originally was at the beginning of the story. The story ends with a sense of loss.

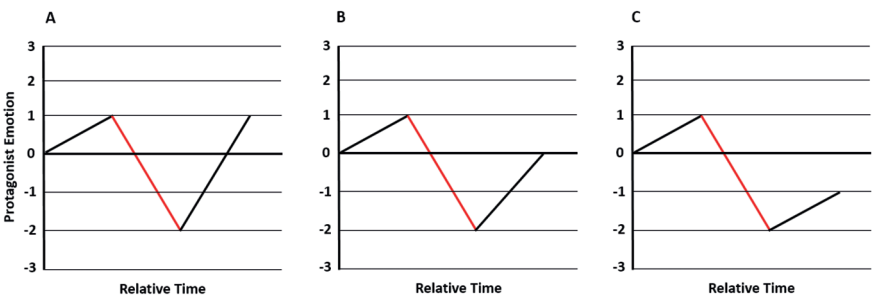

Figure 7: At the end of a story, the protagonist may be at an emotional level that is either (A) higher than, (B) equivalent to, or (C) lower than their level at the beginning of the story, as shown here using the N plot. All three panels are identical except for the final position and thus the intensity change of the final shift.

2.3 Examples of actual story plots

The following two figures will demonstrate what we argue are the two most common plot shapes, the N and the V. We will then present an example of harmonic structure using three versions of the *Cinderella* V plot.

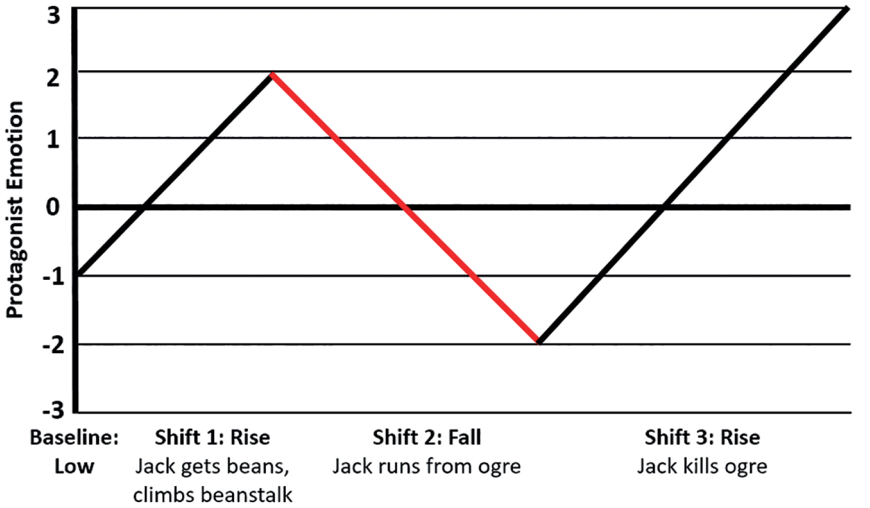

Figure 8: Jack and the Beanstalk is modeled as an N (rise-fall-rise) plot.

Jack and the Beanstalk. Figure 8 presents a condensed version of the emotional trajectory of *Jack and the Beanstalk* (Jacobs 1890) as a rise-fall-rise or N plot. Jack has a low emotional baseline (-1) since he and his mother are poor. Jack experiences his first significant emotional shift when the cow suddenly stops providing milk. While this trigger can be interpreted as being a fall in fortune for Jack, the Resonator model is based on the protagonist's emotional appraisal of such triggering events, and Jack reacts optimistically to this situation by reassuring his mother that he can find work. This therefore marks the beginning of a rise for Jack (Shift 1). When his mother suggests that he sell the cow, he goes to the market, but he instead trades the cow for some magic beans that he hopes will grow into a beanstalk. Although he is reprimanded by his skeptical mother when he returns home, he soon dozes off into sleep and awakens to see that the beans that his mother had thrown out the window has grown into the beanstalk that he was promised. Jack is excited to climb it, marking a rise to +2. When Jack reaches the top, he asks the woman there for some breakfast. When they hear the ogre coming, the woman tells Jack to hide. While hiding, Jack steals several bags of gold and returns home. Jack continues this routine two more times, stealing more things, until he is caught by the ogre. Jack runs from the ogre in fear for his life, marking an emotional fall to -2 (Shift 2). Jack calls on his mother to give him an ax, and he uses it to cut down the beanstalk and kill the ogre. Jack is then able to live happily ever after with the riches that he stole from the ogre, marking a rise to +3 (Shift 3).

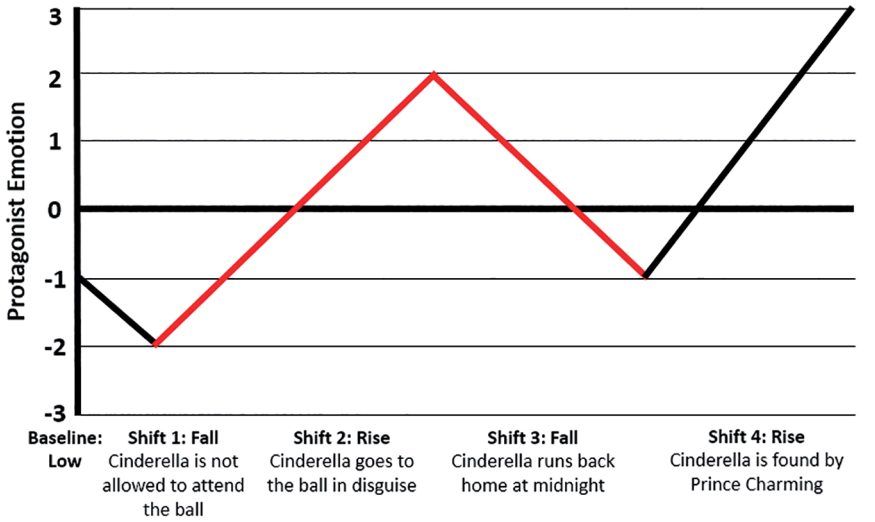

Figure 9: Cinderella is modeled as a V (fall-rise) plot, more specifically its second harmonic as a VV structure.

Cinderella. Figure 9 shows the plot of Perrault's (1687) version of *Cinderella* as being the second harmonic of the fall-rise plot, namely the VV structure. Cinderella has a negative emotional baseline of -1, since she is abused by her stepmother and stepsisters for most of her life. Cinderella's first significant emotional shift occurs at the beginning of the story when her stepmother forbids her from attending the ball. Cinderella feels dejected and starts to cry, marking a fall to -2 (Shift 1). While crying in the garden, Cinderella's fairy godmother arrives and provides her with a gown and carriage in order to allow her to attend the ball. Cinderella is happy that her wish is fulfilled. She enjoys the attention from the prince and her sisters at the ball, which causes her emotional state to rise from -2 to +2 (Shift 2). When the clock strikes midnight, Cinderella is worried that her gown and carriage will revert back to their original forms, and so she runs home, marking a fall back to -1 (Shift 3). When the prince's gentleman arrives at Cinderella's home, Cinderella laughs when the gentleman suggests that she try on the slipper. When the slipper fits, Cinderella is brought to the prince and marries him, while also providing her sisters with a place to live in the palace. The ending thus marks a final rise to +3 (Shift 4).

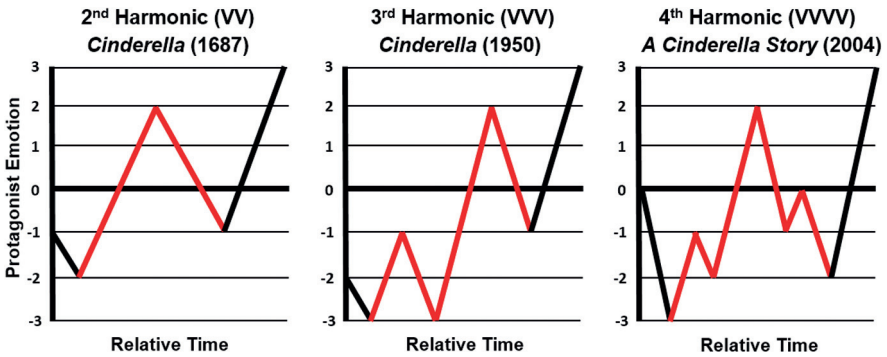

Figure 10: The harmonic structure of *Cinderella*'s V plot in three different versions of the story: (A) the second harmonic (VV), (B) the third harmonic (VVV), and (C) the fourth harmonic (VVVV). The figure demonstrates that the same basic V plot is present for all three versions of the story, and that what varies is the harmonic structure (see Figure 4). Panel A reproduces the resonator graph from Figure 9.

Differences in harmonic structure are commonly observed when comparing different adaptations of the same story. Due to the archetypal plots and characters of fairy tales that are in the public domain, many authors and filmmakers have made adaptations of fairy tales. One fairy tale that has a rich history of being adapted is *Cinderella*. Authors and filmmakers have chosen to create variations in the plot by introducing or removing scenes. Expansions of the plot beyond that of the folk tale typically represent harmonic expansions of the basic V-structure of the Cinderella story (Figure 10). *The third harmonic*. In 1950, the Walt Disney Company produced an animated film based on Perrault's version of *Cinderella* (Figure 10B). Since films are longer media formats than fairy tales, the Disney adaptation had to add episodes (and thus shifts) in order to extend the story. A notable modification is the emotional shift that occurs when Cinderella finds her mother's old gown and decides to redesign it for the ball with the help of her animal friends. Cinderella's inspiration to repurpose her mother's old gown marks the beginning of a goal-directed emotional rise from -3 to -1. But when Cinderella's stepsisters discover her wearing the gown, they rip it up and depart for the ball. Cinderella cries in the garden, which marks a traumatic negative appraisal and thus a fall down to -3. Thus, the 1950 film adaptation inserted an additional rise-fall (Λ) hyspershift pairing, turning the plot of the film into the third harmonic of the V plot, hence a VVV structure. *The fourth harmonic*. There have also been several modern adaptations of *Cinderella*, such as the 2004 film *A Cinderella Story*, whose resonator graph is shown in Figure 10C. It shows the fourth harmonic of the V plot, hence a VVVV structure. A verbal description of the plot can be found in the Appendix.

2.4 The absolute and the relative of plot shapes: Scales, tempos, and rhythms

The axes of the resonator graph mainly represent relative intensity and relative time, rather than absolutes. Hence, a relative-intensity change in one story's plot might not be as absolutely intense as a relative change in another story. The extremes of the graph only show the extreme points relative to that one story and its protagonist's experientiality. The same relative plot shape could correspond with very different absolute intensity experiences in different stories. Each story's plot establishes a system of emotional-intensity scaling from lowest to highest intensity within that story. Hence, the increments of the resonator graph vary relative to the emotional extremes of a given story. This is different from musical notation, where pitch-interval sizes are fixed in each clef, and an expansion of pitch space is achieved by placing notes above and below the clef, but where the increments are always constant. The "plot scales" in the resonator graphs are the reverse. They are *normalized* relative to the highest and lowest points in a particular story. Hence, the increments in the resonator graph vary in absolute shift-size between different stories. In principle, one could create an absolute scale that places all stories on the same plot scale, where more-intense stories would have larger shifts than less-intense stories. However, the current approach employs a system of relative scaling for each story. While this makes stories less comparable in absolute terms, it still permits us to compare stories with regard to their plot shapes, since the shapes only require relative information about rises and falls, not absolute information.

As with intensity on the y axis, the timeline on the x axis of the resonator graph represents a relative scale. While a 90-minute film version of *Cinderella* will show the events as longer scenes than a 10-minute cartoon version, the relative timing of the events might be the same, since the feature film will merely be an expansion of the folktale or cartoon version. That said, the *tempo* of a plot can vary. Some stories have frequent shifts (fast tempos), while others have few (slow tempos). This leads to the idea that plots also have a *rhythm*. Most plot rhythms have a duple structure, showing a regular alternation between rises and falls, as based on a hypershift organization. But plots can also be punctuated by neutral scenes (non-shifts), double-rises, and double-falls that change the rhythm of the plot. A regular oscillation between rises and falls comprises a *regular* rhythm, whereas one that includes other elements or that has asymmetric pairings between rises and falls makes an *irregular* rhythm. Asymmetry can apply to both intensity and duration. For example, a large rise can be paired with a small fall. Likewise, a long/slow rise can be paired with a short/fast fall. This will be quite evident in viewing the plot shapes in resonator graphs.

3 Plot-shape analysis of folk tale corpora

The previous section offered detailed case studies of two individual folk tales. In the current section, we present an analysis of 470 classic stories across two large folk tale corpora, namely the 288 Grimm Brothers' fairy tales from Germany (Grimm and Grimm 1812/2003) and the corpus of 182 Afanasyev folk tales from Russia (Afanasev 1855/2017) that was analyzed by Vladimir Propp (1928/1958) in his seminal study of narrative structure. A trained rater (not one of the authors) categorized the plot shape of each story according to the four-letter classification shown in Figure 3 by coding the valence of the protagonist's initial and final emotional shifts. For completeness, the rater included the simple rise (/) and simple fall (\) as possible shapes. We originally hypothesized that there would be significant cultural differences in the plot shapes of the German and Russian folk tales. However, we did not observe such differences and therefore combined the two corpora into a single analysis of 470 stories in Figure 11. A second rater (the second author) who was blind to the codings of the first rater coded the plot shapes of a random selection of 25 % of the 470 stories (i.e., 118 stories). The inter-rater reliability was very high, with agreement on 92 % of the stories.

An analysis of the final shift of these stories (panel A) reveals that a large majority of the folk tales in the two corpora had a happy ending (84 %). This uniformity renders the ending a rather uninformative feature for folk tale classification since most tales show the identical pattern. By contrast, only 68 % of the stories had a happy beginning (calculated by summing the N, Λ, and / categories in Panel B). While this 68 % value is still removed from a 50/50 binary split, it is much closer to it than the 84 % value observed for happy endings. In other words, *there is much more variation in the beginnings of stories than in the endings*, making the beginning a more informative feature for story classification than the ending. Some exploratory analyses have similarly suggested that the beginnings of stories may have more variation than the ends of stories due to writers wanting to create different ways of engaging their audience (Kuster 2015). Elkins and Chun (2019) also observed that the beginnings of stories were more difficult to model using sentiment analysis than other parts of stories. Thus, the protagonist's initial emotional shift could establish a new parameter for story classification – beyond the standard happy vs. sad ending distinction – since the initial shift shows more variation across stories than the final shift. In Tu and Brown (2020), we described this with regard to valence as a distinction between a "striving" (happy-beginning) story and a "coping" (sad-beginning) story using the initial shift.

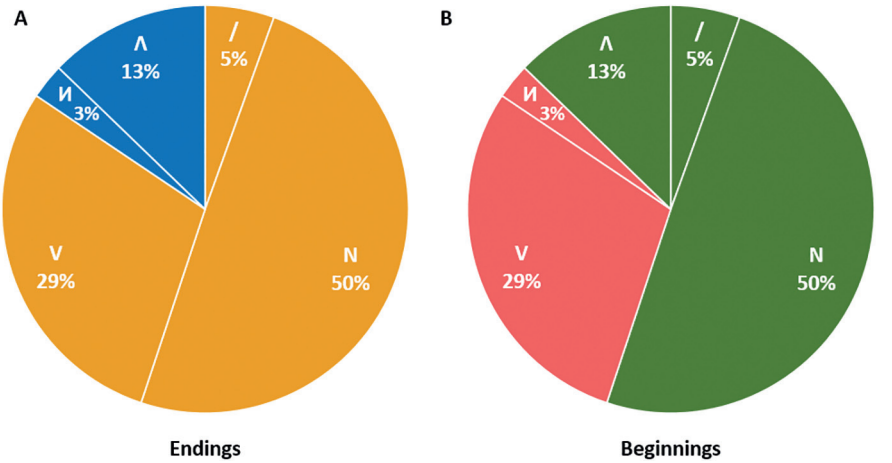

Figure 11: An analysis of the plot shapes of 470 classic folk tales from two cultures. (A) The percentage of stories with happy endings is 84 % (orange) and with sad endings is 16 % (blue). (B) The percentage of stories with happy beginnings is 68 % (green) and with sad beginnings is 32 % (pink). Hence, there is more variation in the beginnings than in the endings of folk tales.

Finally, as an exploratory analysis to look at emotional shifts in narratives cross-modally (to be reported elsewhere), we looked at the emotional shifts and plot shapes of 65 feature films, 11 novels, and six video games. Not only were we able to identify oscillations between positive and negative emotional shifts across all narrative media, but we could precisely assess the magnitude of the shifts. Across all stories and media, the average shift size was a shift of 1 (in either the positive or negative direction), whereas larger shifts were less common. This similarity in average shift sizes across narrative media provides support for the generalizability and reproducibility of the Resonator method.

4 Limitations

The Resonator approach, as with sentiment analysis, is a descriptive model of plot. While the approach is based on the protagonist's psychological mechanisms laid out in our Embodied Plot model, the resonator graphs themselves do not account for the causes of the emotional shifts, but merely depict the valence and intensity of these shifts over the course of a story. As such, the Resonator approach can be conceptualized as simply being a series of reversals, where the reversals are of emotional state, rather than of fortune. This raises the question, for both the Resonator model and Vonnegut's model, of what these shifts and reversals correspond to from a narratological standpoint. Unlike Vonnegut's more

abstract model, the shifts of the Resonator model map onto the cognitive processes of the Embodied Plot model in a 1:1 manner. However, despite every shift in a resonator graph being psychologically accounted for, the Resonator model does not outline what type of narrative event would be significant enough to constitute an emotional shift for the protagonist. Chatman (1978) stated that there is a hierarchy of events in narrative, with certain narrative events being more important to a plot's progression than others, and that removing any of these events would result in a disruption to the narrative logic. Chatman called these crucial narrative events "kernels" and called the minor events "satellites" (1978: 53). The aim of the Resonator approach is to model emotional "kernels" in a plot. However, differentiating kernels from satellites is a subjective interpretation that can cause coding inconsistency between raters.

Coding reliability. In the Introduction, we criticized sentiment analyses because of their inability to attribute emotions to specific sources. Our approach has something of the opposite drawback since it is based on a rater's interpretive analysis of a story, which may be unreliable and/or biased. Resonator graphs and their constituent emotional shifts are the result of a subjective narrative analysis of a story's events, compared to the relatively unbiased and automated procedure that is used in word-based analyses. We are well aware of the fact that the resonator graphs for a story can vary across raters based on how such raters interpret the episodes of the plot and the protagonist's reactions to them. Different raters may identify different emotional appraisals at the beginning of a story as being the protagonist's first significant appraisal. In addition, they may identify a different number of shifts from a given series of episodes, resulting in different harmonic structures for the same story. For example, there might be significant variability in the coding of minor emotional shifts (i.e., Chatman's "satellites"). Likewise, raters may assign different intensity ratings to the shifts of a story. Hence, while a sentiment analysis of the type of Reagan et al. (2016) will most likely always produce the same objective result for a given story (once the sentiment categories are assigned to words), our method may produce multiple results for a given story based on the way that different raters interpret the events and emotions of a story. Hence the approach is more subjective and potentially less reliable. We feel that this criticism can be dealt with not only by having multiple raters coding every story in the analysis (as in the current study of folk tales) but by eventually developing a set of standardized guidelines for coding stories.

Narrative formats. While the presentation of resonator graphs was limited to short folk tales in the current article, we have done extensive work on longer narrative media (novels, films, and video games) that will be reported elsewhere. In addition, we have done work on multi-protagonist stories and stories with nonlinear plots. These analyses have thus far shown that the Resonator approach

works well across both long and short stories, both diegetic and mimetic formats of storytelling, and both improvised and fixed narratives. One of our long-term objectives is to determine which characteristics are unique to a particular narrative medium and which ones transcend media. In the current study, we started out at the simplest level by analyzing short folk tales with archetypical characters. Fairy tales tend to have little variation in their middle section, with most plots averaging four total shifts across an entire story in our corpus analysis. Novelists might worry that the Resonator model is too focused on periods of emotional change to be applied to characters in novels, who may experience long periods of emotional stasis, for example self-revelations that may be neither positive nor negative. However, we argue that, just as with people in real life, characters have polarized emotional appraisals of objects and events in the environment, and therefore that they experience reversals and/or accentuations of emotion (i.e., shifts) such that all stories will end up having a wave-like plot structure.

Action-based narratives, such as fairy tales and films, may be the most straightforward types of narratives to model. Changes in the protagonist's emotions and intentions are often less ambiguous to audiences in films than they are in novels, where more inference of subtle psychological changes is typically required. For instance, the protagonist in the novel *Slaughterhouse-Five* is an indifferent and passive character, but the protagonist in the film adaptation is more emotionally expressive. Creating a resonator graph for the film version may be less ambiguous than making one for the novel, but that is because the audience only sees what the protagonist chooses to externalize, which may not be an accurate representation of the protagonist's true feelings according to the novel. The result is that there may be more emotional shifts in the resonator graph for the film adaptation of *Slaughterhouse-Five* than that for the novel.

The middle section. The Resonator model categorizes plots according to the protagonist's emotional appraisals at the beginning and end of a story, and argues that the middle section is constrained to connect the initial and final shifts of the story, often times through an oscillation between emotional rises and falls. This might suggest that the middle section is a slave to the beginning and ending. At the same time, the middle section is also the part of the story that permits the most variation, elaboration, and creative exploration, since it is typically in the middle section where the writer attempts to distinguish a given plot from other plots and to even subvert the audience's expectations established by the beginning. For instance, in an experimental study in which people were asked to improvisationally generate stories based on 3-frame comics, the middle sections of their stories often varied from each other, even though they were generated from the same beginning episode (Brown et al. 2019). Likewise, the various adaptations of *Cinderella* that were described in Section 2 demonstrated that, even though the

stories all had the same beginnings and endings, they had different harmonic patterns due to the variations in their middle sections.

At the most basic level, stories vary in the number and duration of episodes that make up the middle section, including the presence of sub-plots. It is also here where the "fabula" (the story proper) and the "syuzhet" (its manner of presentation) can become most dissociated from one another (Chatman 1978), such as when writers or filmmakers present the episodes of a story outside of their chronological sequence (Simons 2008). While we have presented the case for there being four basic plot shapes, it is unquestionably in the middle section where violations may occur as a result of acts of creative storytelling. Further analyses will be required to establish principles for how the middle of a story operates. One mechanism that we observe in certain longer genres of narrative is a process of "intensification" whereby emotional shifts start out small at the beginning of a story and become progressively larger as the story progresses. This might underlie the Aristotelian phenomenon of "reversal" in certain plot types.

The reader's experience. Another possible point of concern for narrative theorists may be that the Resonator model does not account for the experience of the reader. It is important to point out that many well-established plot models, such as Freytag's five-act structure and Campbell's hero's journey, were devised independently of concerns for the reader experience. Both models are ways of representing plot structure using the experience of the protagonist as a focal point. The reader's emotions and knowledge have no influence over the experience of the protagonist in the story, who is directing the trajectory of the plot. There may be moments in a story when the writer wants the reader to feel sympathy for the protagonist, for example by using a suspenseful scene in which the reader is made aware of something that the protagonist does not yet know. But the reader's knowledge does not change the protagonist's story, as the reader is merely a spectator who reacts to what they see in the protagonist's world (Zillmann 1991). Suspense and dramatic irony are narrative devices that are used to inform the reader/viewer of an impending change, but they should not be confused with the plot itself. Studies have shown that the reader constructs "situation models" around the protagonist, suggesting that the reader's reading experience is largely dependent on the protagonist's emotions (Komeda and Kusumi 2006; Vega 1996). The function of stories is to simulate social situations in which perceivers can engage in mentalizing and empathy (Zunshine 2006). As such, the focus of stories and their plots is about the characters, and not about the readers. Furthermore, because reader experiences vary from person to person, it is not feasible to create a generalizable plot model and classification scheme based on subjective reader experiences.

5 Conclusions

We have presented a new way of thinking about the shapes of story plots by introducing a Resonator model and an associated resonator graph to visually depict plot shapes. This psychological approach to narrative analysis should serve as a complement to sentiment analyses of story classification and to plot-shape methods that use automated procedures to analyze text alone. The Resonator model is based on the Embodied Plot model, which posits that the narrative arc of a story is a direct reflection of the psychological experientiality of the protagonist in their storyworld. As a result of this, the shape of a plot is based on changes in the valence and intensity of the protagonist's emotional state throughout a story, what we refer to as shifts. There are three basic planks of the Resonator model.

1) *Plots as waveforms*. The model conceptualizes plots as a series of waveforms that oscillate based on shifts in the emotional state of the protagonist. The vertical dimension of the resonator graph represents an emotion space, and the horizontal dimension tracks the location of the protagonist's current state in that emotion space over the course of a story. Importantly, the resonator metaphor points to a critical constraint in the way that plots are assembled: once the emotional shifts of the endpoints of a story are specified (i.e., the initial and final shifts), the story is constrained to oscillate between rises and falls so as to connect these endpoints. This principle suggests a fundamental dynamic for plot analysis and perhaps even for plot construction by writers.

2) *Four basic plot shapes*. Using the notion of a shift as a fundamental building block for a plot, we argue that there are four prototypical plot shapes based on a 2 x 2 crossing between the initial and final shifts of a story, namely N, V, Λ, and И. Actual stories have more-complex shapes than these letter shapes due to the fact that shifts occupy all different vertical positions in the emotion space. However, they still abide by their prototypical shapes. We have suggested that the initial shift is an important, but under-appreciated, parameter that can be useful for story classification, as was demonstrated in our analysis of 470 classic folk tales.

3) *Harmonic structure*. The resonator metaphor suggests that plots have a harmonic structure to them. Plots can expand in length and increase in narrative complexity by increasing the harmonic number of the plot while still maintaining a prototypical shape. This often occurs through the addition of contrastive hypershifts, such as rise-fall pairings. We demonstrated this phenomenon graphically in the analysis of three different versions of *Cinderella* that varied in harmonic structure and thus in shift number and story length.

The Resonator model can be applied to narratives of all different media, lengths, and complexities. It can be applied to stories that are texted and those

that are not. It can be applied to stories that have multiple protagonists and that have non-linear sequencing. The model is able to provide a simple visualization of the analyses using resonator graphs. As such, it can be readily used to compare stories among themselves and to classify entire corpora of stories. The resonator metaphor provides insight into the dynamic mechanisms of plot progression by highlighting the oscillatory nature of plot, as well as the constraints that the end-points of a story impose on the internal content. Finally, the model is based not simply on the linguistic properties of the text but on the psychological experience of the protagonist in their storyworld. Hence, the model offers an explanatory framework for the dynamics of a plot in a manner that descriptive methods based purely on word analysis cannot.

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Appendix

A verbal description of the emotional shifts in *A Cinderella Story (2004)*, as shown in Figure 10C

The protagonist of the film is a high school student named Sam, who is the proxy of the Cinderella character. Sam lives happily with her widowed father until he remarries and then killed in an earthquake soon after. Sam is left in the care of her step-mother who has taken over the diner that was owned by Sam's father. Sam grows up emotionally abused by step-mother and step-sisters. These events in her childhood mark a fall to -3 for Sam who is unhappy about her family situation (Shift 1 in Figure 10C). Sam dreams of leaving home to attend Princeton University, which marks a rise to -1 (Shift 2) since Sam has the goal and ambition to improve her situation. During this time, Sam also begins an online relationship with a pen pal named Nomad. On the night of the school Halloween dance, Sam must work the night shift at the dinner, which marks a fall down to -2 (Shift 3), but her co-worker convinces her to get a costume and attend the dance. When Sam arrives at the dance, she is thrilled to finally meet Nomad in person, who turns out to be Austin, a popular quarterback at school, marking a rise from -2 to +2 for Sam (Shift 4). However, Sam is forced to leave at midnight, therefore falling down to -1 (Shift 5). Sam continues her correspondences with Austin after the dance and considers revealing her identity to him, which marks a small rise to 0 (Shift 6) because Sam is hopeful. However, Sam's step-sisters soon find out about Sam's secret correspondences with Austin and mockingly reveals Sam's identity to everyone at school. Sam's step-mother also presents to her a false rejection letter from Princeton. Thus, Sam falls down to -2 (Shift 7) because she feels humiliated. However, soon Sam decides that she can no longer tolerate her step-mother's abuse and finally quits her job at the dinner and takes the initiative to move out and live with her co-worker. Sam's defiance against her step-mother marks the beginning of a rise because Sam is taking a proactive, goal-directed action to improve her situation. Sam also confronts Austin about his passivity for neglecting her after finding out who she is, and he apologizes. Sam then claims back her father's diner from her step-mother after finding her father's will hidden in her book of fairy tales. The film ends with Sam and Austin attending Princeton together. Sam ends at a +3 (Shift 8) because she has not only overcome her conflict with her step-family, but she has also achieved her academic goals. Similar to the 1950 film adaptation of Cinderella, *A Cinderella Story* preserves the core rise-fall hypershift of the story, which is Cinderella finally being able to go to the ball but then forced to leave abruptly. *A Cinderella Story* adds two rise-fall hypershifts before this, thereby resulting in the fourth harmonic of the V-plot.