

Conceptual Metaphor and Text Development: a Narratological Perspective

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ABSTRACT: This study attempts to analyse the structural role of metaphor in a specific text-type. For this purpose, we chose a specific genre, a popular magazine about scientific topics, the *National Geographic* (NG), and one of the typical texts of that magazine, the story of a natural disaster, an earthquake. Hypothesizing that every text displays a specific metaphoric configuration that will, in a sense, constitute the metaphorical identity of that text, the study explains how we can identify in a specific text the structure of its metaphorical relations. Having identified the conceptual keys which link the experiential domains activated by the text in the conceptualization of a disastrous event like an earthquake, the study then explores the interaction between common metaphorical conceptualizations and their text-specific configurations through narrative processing. Using a Labovian framework, the research perspective attempts to describe how the metaphoric conceptualization of earthquakes is linked to text development and narrative processing. Thus, working along the interface between cognition and discourse, the study demonstrates the utility of uncovering *in text* the relationship between universal human conceptualization, social experience and discourse structure.

Keywords: conceptual metaphor, narrative structure, Labov, discourse, social experience, text cohesion, *National Geographic*.

RESUMEN: Este estudio pretende analizar el papel estructural de la metáfora en un tipo de texto específico. Con tal propósito, hemos elegido un género específico, una revista de divulgación científica, *National Geographic* (NG), y uno de los textos típicos de dicha revista, el relato de un desastre natural, un terremoto. Con la hipótesis de que cada texto dispone de una configuración metafórica específica que, en cierto sentido, constituye la identidad metafórica del texto, el estudio muestra cómo podemos identificar en un texto específico la estructura de sus relaciones metafóricas. La identificación de claves conceptuales que ligan dominios experienciales activados por el texto, al conceptualizar sucesos como los terremotos, nos permite explorar la interacción entre conceptualizaciones metafóricas y sus configuraciones específicas a lo largo del proceso narrativo. Un enfoque Laboviano nos permite un intento de describir la conexión de la conceptualización metafórica de los terremotos con el desarrollo narrativo. Así, la interfaz entre cognición y discurso muestra la utilidad de descubrir en el texto la relación entre conceptualización humana universal, experiencia social y estructura del discurso.

Palabras clave: metáfora conceptual, estructura narrativa, Labov, discurso, experiencia social, cohesión textual, *National Geographic*.

1. Introduction

The rationale behind this study lies in the hypothesis that conceptual metaphor (CM) has a structural role in text organization and development, and that this role is intrinsically related to genre or text-type, an issue discussed by Barcelona (1995), Caballero (2003), Ponterotto (2000, 2005); see also Otal Campo; Navarro i Ferrando; Bellés Fortuño (2005).

It has been suggested that when conceptual metaphor is present in text, it has a functionally complex role. To begin with, the role of CM is obviously cognitive, in that it helps organize the essential information content of the text; secondly, it is also affective, since it orients readers' evaluations of that informational content; thirdly, CM has a pragmatic role, because it directs the movement of the discursive phases of the text, thereby consolidating the text structure.

The aim of the analysis is two-fold. First of all, the intention is to analyze the structural role of metaphor in a specific text-type. For this purpose, we have chosen a specific genre, a popular magazine about scientific topics, the *National Geographic* (NG), and one of the typical texts of that magazine, the story of a natural disaster. Hypothesizing that every text displays a specific metaphoric configuration that will, in a sense, constitute the metaphorical identity of that text, it will attempt to explain how we can identify in the text types of this genre the structure of metaphorical relations. As an additional query, this research perspective seeks to verify if there is some connection between narrative structure and the presence of cognitive metaphor, and how that interaction is related to reader expectations and reader reception. Using a Labovian framework, it will attempt to understand how cognitive metaphors appear in specific configurations at specific moments of the narrative structure. This step should allow us to understand the text from the point of view of its reception. In other words, we shall propose that text decoding depends on how the reader grasps the interaction between common metaphorical conceptualizations and their text-specific configurations through narrative processing.

2. Metaphorical Conceptualizations of Natural Phenomena

In classical Cognitive Metaphor Theory, a CM is the result of a mapping between a source domain (SD) and a target domain (TD). For example TIME IS MONEY emerges from the mapping of SD: money with TD: time. As argued in many studies of CM, however, a mapping between SD and TD is never total. Some aspects of the domains are

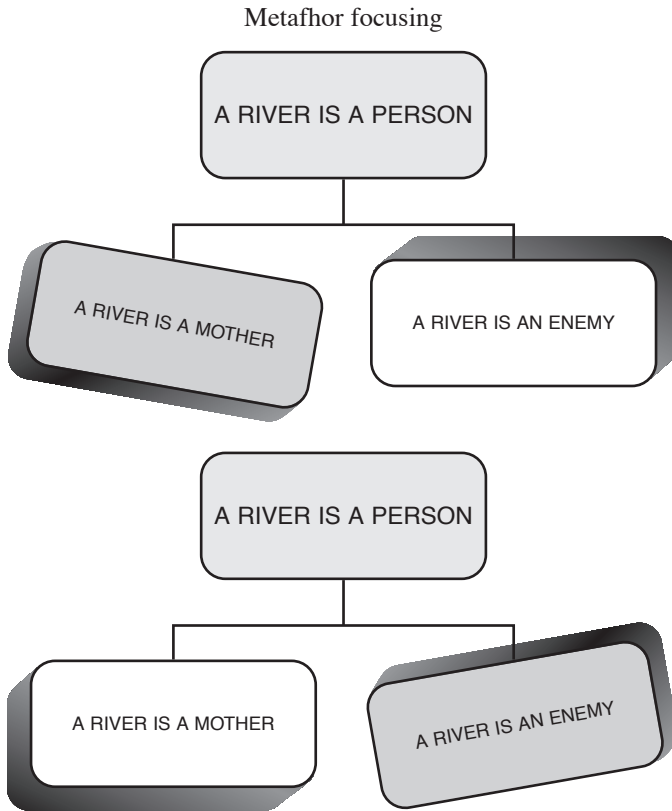
selected by the basic conceptualization involved. Thus, of all the semantic and cognitive possibilities that a particular domain can evoke, some aspects emerge as salient while others remain latent. This cognitive phenomenon has been referred to as “highlighting”, along with its obvious corollary operation, “hiding” (see Lakoff; Johnson 1980, Kovecses 2002). Lakoff; Johnson (1980:10) claim that:

The very systematicity that allows us to comprehend one aspect of a concept in terms of another (e.g., comprehending an aspect of arguing in terms of battle) will necessarily hide other aspects of the concept.

As suggested in Ponterotto (1987), a cognitive metaphor is a sort of astigmatic eye, which changes focus according to specific orientation. Focusing means naturally that while one element is foregrounded, other elements are pushed into the background. For example, if one looks at the articles in the *NG* related to the topic of climatology, specific conceptualizations seem to emerge. Let us consider the description of rivers and their behaviour. In a study by De Zuane (2005), a macrometaphor for geographical phenomena was identified in the CM: NATURAL PHENOMENA ARE PERSONS, to which a series of sub-metaphors seem to be related, such as A RIVER IS A PERSON, A RIVER IS AN ENEMY, A RIVER IS A MOTHER. Examples of similar utterances which we have found in other articles of *NG* are:

A RIVER IS AN ENEMY (destructive)	<ol style="list-style-type: none"> 1. ...flooding that over the centuries has killed hundreds of thousands of people" (Zich 1997:10) 2. The river rose 25 feet and thousands of acres of paddy fields were ruined. (O'Neil 1993: 2)
A RIVER IS A MOTHER (nurturing)	<ol style="list-style-type: none"> 1. From the plains of Anatolia to the eastern Sahara, rivers are lifeblood to this arid region Middle East Water (Vesilind 1993: 38) 2. This unique freshwater system is the pulsing heart of northern Botswana's wilderness (Lanting 1990: 8)

Thus, the texts in the *National Geographic* seem to highlight one or the other of the two contrasting images: destructive enemy and nurturing mother. However, a careful observation of the texts reveals that both CMs are sometimes present in the same text. For example, when describing the consequences of river overflow and flooding, a text may tell the story of how the river as a source of life is transformed into a tool of destruction. This phenomenon of highlighting/hiding could be represented in the following way:



3. Analysis

I shall attempt to demonstrate this by means of analysis of the earthquake story found in the *NG* article: *Earthquake: Prelude to the Big One* (Canby 1990; see appendix).

3.1. Conceptual Structure: the Role of CM

If we search for the figurative expressions which seem to refer to conceptual metaphors, we can note that three CMs seem to characterize the text:

- CM1: AN EARTHQUAKE IS A BASEBALL PLAYER
- CM2: AN EARTHQUAKE IS A SOLDIER
- CM3: AN EARTHQUAKE IS A MUSICIAN

Evidence for the identification of these metaphors lies in the numerous words and phrases chosen for the description of the earthquake which are part of the lexical sets

relating to the experiential domains of games and battles and to the perhaps less frequent but very salient set of lexical terms belonging to the domain of music and musical instruments. Some examples follow:

FIGURATIVE UTTERANCES	CONCEPTUAL METAPHOR
These <i>players</i> were tiring reaching the <i>breaking point</i> . Their <i>game</i> was in the <i>last inning</i> .	AN EARTHQUAKE IS A BASEBALL PLAYER
... <i>destroying</i> most homes and turning Main street into a <i>ghost town</i> . Hollister...Waves rolling north roiled the ground-... <i>shattering</i> Victorian houses...They <i>shook</i> San José...	AN EARTHQUAKE IS A SOLDIER
Here the waves found soil <i>in tune with their own vibrations</i> and <i>strummed it like a guitar string</i>	AN EARTHQUAKE IS A MUSICIAN

Thus, by way of choice of figurative utterances, the text activates CMS related to the experiential domains of 1. Sport, 2. War and 3. Music.

If we utilize the macrometaphor which seems to characterize our text type, NATURAL PHENOMENA ARE PERSONS, we could suggest that a kind of hierarchical relationship organizes the set of metaphors.

NATURAL PHENOMENA ARE PERSONS	NATURAL PHENOMENA ARE PERSONS	NATURAL PHENOMENA ARE PERSONS
SPORTS	WAR	MUSIC
LIFE IS A GAME	LIFE IS BATTLE	LIFE IS A SYMPHONY
AN EARTHQUAKE IS A BASEBALL PLAYER	AN EARTHQUAKE IS A SOLDIER	AN EARTHQUAKE IS A MUSICIAN

This aspect can be explained by the suggestion found in Lakoff; Johnson (1980) that metaphors can be described by their place in a hierarchy organized according to various levels of abstraction. We can also note Charteris-Black (2004: 245) who explains:

There are several advantages to placing individual metaphors from different domains of language use within a hierarchical model. The first of these is economy of description. If we can account for many metaphors with reference to a smaller number of conceptual metaphors, and many conceptual metaphors with reference to a still smaller number of conceptual keys, we will arrive at a more economical model for the description of metaphor. This permits us to understand cross-domain similarities in ways of conceptualising experience.

3.1.1. Conceptual Keywords as Cross-domain Links

Now the following question arises. How are these CMS related to each other in the textual space? Are they competing for interpretive control? Or rather are they complementary, co-constructors of meaning and co-orienters of reader interpretation? To answer this question, we would like to refer to the analytic suggestions made by Charteris-Black relative to cross-domain similarities. In his 2004 study, he posits the existence of conceptual keys which link domains of social experience; e.g. politics, press-reporting, or religion. For example, he notes that discourses of sports reporting, politics and religion share the notion of *struggle*. In the domain of politics, we can find metaphors deriving from LIFE IS A STRUGGLE FOR SURVIVAL; in the domain of press reporting, we find ECONOMIC LIFE IS A STRUGGLE FOR PROFIT; in the domain of religion, SPIRITUAL LIFE IS A STRUGGLE FOR SALVATION. Charteris-Black (2004: 246) clarifies this point in the following way:

These conceptual keys show that each of these discourse types has metaphors that communicates a fundamental outlook that characterizes the discourse. The notion of a struggle is shared across the domains—but the specific domain determines the salient discourse goals of the struggle. In politics the discourse goals are social ideals and values, in sports reporting they are victory in competitive sport, in financial reporting they are profits and in religion they are attaining a place in paradise. There is a superordinate conceptual relation between these discourses since they all share the notion of the struggle as necessary to achieve these objectives.

In the earthquake text, if we consider social events like sport, war and music as experiential domains, we can note that events within those experiential domains (games, battles and symphonies) have a similar event structure. The events all present:

1. *an initial phase*, which announces the main motifs of the event;
2. *a development stage*, in which activity is augmented and heightened, and which includes moments of tension, contrast and opposition;
3. *a restoration phase*, which resolves tension and moves towards conclusion and silence.

The following table clearly summarizes the similarity of event structure in the three domains that emerge in our text: sports (baseball game), war (battle) and music (symphony).

Experiential domain		SPORTS	WAR	MUSIC
Specific Event		Baseball game	Battle	Symphony

Phases of event structure	<ol style="list-style-type: none"> 1. Announcement of event 2. Development (acceleration of energy, activity and tension) 3. Deceleration (restoration of harmony and move to conclusion) 	<ol style="list-style-type: none"> 1. Warm-up 2. Competition 3. Victory and end of play 	<ol style="list-style-type: none"> 1. Call to arms 2. Combat 3. Victory and cessation of combat 	<ol style="list-style-type: none"> 1. Announcement of basic motif 2. Increase and contrast of voices 3. Restoration and conclusion
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Thus, all three events (baseball games, battles and symphonies) share similar structural aspects which allow them to be forceful candidates for source domains of a CM.

3.2. Discursive Structure: the Role of CM in Narrative Movement

3.2.1. Establishing the Referential Framework

As argued in Ponterotto (2005) when discussing advertising, headlines or titles have the function of establishing a framework for discourse reference. In this case, the title activates reference to the cataphoric, exophoric and anaphoric levels related to the social discourse about earthquakes.

The cataphoric reference regards the noun phrase *Prelude to the big one*. As people familiar with American culture will easily recognize, the noun phrase refers to the giant earthquake that is hypothesized to eventually strike Los Angeles. The exophoric reference resides in the noun phrase *the big one*, embedded in the cataphoric reference, which has become a fixed and repeated utterance in American discourse, carrying affective connotations of anxiety and fear regarding past and future earthquakes. The anaphoric reference is to a specific earthquake which occurred on October 17, 1994, the topic of this article.

That referential frame however is also sustained by the subtle role played by the lexical term *prelude* which seems to trigger all three referential operations. The lexeme *prelude* functions therefore as a cross-referential keyword, cohesively constructing the overall referential perspective.

Moreover, it should be remembered that the word *prelude* has a polysemic nature, encoding the meanings: 1. something that comes before; 2. a technical term for a short piece of music; 3. an introductory or opening performance or event. The word *prelude* is part of the lexical set normally associated with many experiential domains, including sports, war and music. It could be suggested then that, for this specific text, the word *prelude* functions as a key concept which links the three domains. The perception of similarity between the three domains by readers whose encyclopaedia includes

familiarity with the structure of the events of sports, war and music is in a sense cued by the word *prelude*, as in the following table:

Experiential domain	SPORTS	WAR	MUSIC
Shared key Concept	<i>Prelude</i>	<i>Prelude</i>	<i>Prelude</i>
Phases of domain structure	<ol style="list-style-type: none"> 1. Warm-up 2. Competition 3. Victory and end of play 	<ol style="list-style-type: none"> 1. Call to arms 2. Combat 3. Victory and cessation of combat 	<ol style="list-style-type: none"> 1. Announcement of basic motif 2. Increase and contrast of voices 3. Restoration and conclusion

This procedure then, which tries to describe interrelationships between apparently unrelated domains of experience, is based on the identification of a conceptual key. The initial referential framing around the event of earthquakes, which triggers reader assumptions about implicit meaning, is anchored in reader recognition of conventional social patterns of events. This aspect emerges also from the study by Ruiz de Mendoza and Diez Velasco (2005), who note:

Inferential activity is regulated by cognitive operations. A cognitive operation is a mental mechanism whose purpose is to derive a full semantic representation out of a linguistic expression (or another symbolic device, such as a drawing) in order to make it fully meaningful in the context in which it is to be interpreted.

Thus, we have identified:

- the conceptual metaphorical structure of the text;
- the event structure of the experiential domains;
- the referential frame introduced by the title;
- the shared key concept linking the domains.

By putting it altogether, we derive the following description of the relationship between common metaphorical conceptualizations and text-specific configurations:

Experiential domain	SPORTS	WAR	MUSIC
Specific Event	Baseball game	Battle	Symphony
Shared key Concept	<i>Prelude</i>	<i>Prelude</i>	<i>Prelude</i>

Phases of domain structure	1. Warm-up 2. Competition 3. Victory and end of play	1. Call to arms 2. Combat 3. Victory and cessation of combat	1. Announcement of basic motif 2. Increase and contrast of voices 3. Restoration and conclusion
CONCEPTUAL METAPHOR	AN EARTHQUAKE IS A BASEBALL PLAYER	AN EARTHQUAKE IS A SOLDIER	AN EARTHQUAKE IS A MUSICIAN

Finally, we can note that other lexical terms in the text along with the word *prelude* function to contribute to the cross-domain metaphorical structure; for example, the word *waves* and the word *vibrations*, which belong to the lexical sets associated both with the domain of music and with the domain of physics.

3.2.2. Establishing the Narrative Structure

How does conceptualization move from one possibility to another? In other words, how is it that at one moment, one element is highlighted while the other elements remain hidden? How does a formerly covert element come to centre stage?

Let us remember that this movement occurs in discourse. I would like to suggest therefore that it is determined by the interaction of metaphoric conceptualization and discourse structure. On the one hand the metaphoric configuration is stable and sustains the phases of the discourse. On the other hand, the text orients the metaphoric conceptualization and directs the discourse movement among the options made available by the specific metaphorical configuration.

As previously mentioned, although the *NG* speaks about scientific topics taken from various sub-fields of geography, it is nonetheless a popular journal addressed to non-expert readers. One will find therefore that its discursive format, rather than being totally argumentative, as in a scientific journal, is often basically that of narrative. A *NG* article tells stories, and often those stories recount the vicissitudes of a disastrous natural event, like an earthquake, a flood, a destructive bolt of lightning, etc. Consequently, it would be logical to analyze the *NG* text from the perspective of narratological theory.

The *NG* articles often include a story segment typical of news reporting. For example, the story of the article under scrutiny, the earthquake which occurred in California in 1991, emerges as a newsworthy event typical of press reportage. Now according to some researchers, news stories have a structure similar to that of oral narrative (cf. for example Bell, 1991; Thornborrow; Fitzgerald, 2004). Thus news stories have often been analyzed according to the narrative structure proposed by Labov (1972) and Labov; Waletzky (1967).

Following Labov, oral narratives are usually comprised by six phases: *abstract*, *orientation*, *complicating actions*, *resolution*, *evaluation* and *coda*. The evaluation phase is either an autonomous phase or a discursive thread embedded in other phases, as in the

case of this earthquake story. If we tried to divide our textual segment about earthquakes into the grid of a Labovian narrative structure, highlighting at the same time the figurative expressions, we would derive the following:

Abstract	Like thousands of other good Californians, Lee and Terry Peterson had gone to the third game of the World Series that evening to see the Giants try to <i>bounce back</i> against Oakland at Candlestick Park.
Orientation	<p>Eighteen kilometres beneath that home and peak <i>another contest was playing, in an arena</i> known as the San Andreas Fault. Here two enormous <i>plates</i> of earth's crust had been locked in a <i>planetary pushing match</i> since the Great Francisco earthquake of 1906. These <i>players</i> were tiring reaching the breaking point. Their game was <i>in the last inning</i>.</p> <p>The Petersons found their seats at Candlestick Park. Expectantly, they watched the teams warm up. The clock hands reached 5:04.</p> <p>Deep beneath the Petersons' mountain home a section of weak rock <i>snapped</i>. The two sides of the San Andreas <i>shot</i> past each other.</p> <p>Simultaneously the west side of the fault rose, lifting the mountain themselves.</p>
Complicating actions	<p>The <i>ripping</i> was unstoppable. For about eight seconds earth's crust unzipped at more than two kilometres a second, 20 kilometres to the north and south. The bucking Santa Cruz mountains <i>flicked the Peterson house off its foundation</i>, racking it like an eggshell. The faulting <i>released a frenzy</i> of seismic waves.</p> <p>They set the seismometer needles scribbling around the world and carried a <i>lethal</i> message to Californians. Waves rolling to the south <i>bludgeoned</i> the city of Santa Cruz, only 16 kilometres from the epicentre. They <i>took its commercial heart and snuffed four lives</i>.</p> <p>The waves <i>smacked</i> into Watsonville, <i>damaging or destroying</i> most homes and turning Main street into a <i>ghost town</i>. They <i>mutilated</i> Hollister and <i>churned</i> the rich sediments of the Salinas valley. Waves rolling north <i>roiled</i> the ground beneath picturesque Los Gatos, <i>shattering</i> Victorian houses and half the business district. They <i>shook</i> San Jose, but most buildings held. The waves <i>swept up</i> the peninsula, rattling securely planted cities, such as Palo Alto and Menlo Park.</p> <p>At Stanford University they found old, brittle structures and <i>twisted and cracked</i> them. Ahead lay Candlestick Park packed with 62,000 fans and ripe for <i>disaster</i>.</p>
Resolution	<p>The waves <i>shook</i> the Petersons and other bewildered spectators.</p> <p>But Candlestick sits on bedrock and it defeated the waves.</p> <p>Now the waves were weakening. With little effect, they <i>jiggled</i> Southern San Francisco and towns across the bay. A <i>tiring vanguard</i> of waves reached San Francisco's old Market Street area and marina district and Oakland's busy waterfront. These areas sit on man-made fill. Here the waves found soil <i>in tune with their own vibrations and strummed it like a guitar string</i>. More waves arrived and pumped in more energy. The earth grew alive and <i>danced</i>. The <i>vibrations</i> flowed upward into the buildings and highway structures. Picking up the <i>rhythm</i>, soil and structures <i>swayed to the strengthening beat like partners in a dance</i> Marina buildings <i>buckled</i>; many fell.</p>

	Column joints supporting Oakland's Interstate 880 failed, and 44 slabs of concrete deck, each weighing 600 tons collapsed on cars below. The waves <i>pushed</i> the Oakland end of the Bay Bridge 18 centimetres to the east and a 15 meter section crashed into the level beneath.
Coda	Within 15 seconds the <i>vibrations</i> faded. But 63 persons lay dead or dying. Some 3,800 others suffered injuries requiring medical attention. The <i>waves damaged</i> more than 24,000 houses and apartment buildings as well as 4,000 businesses. At least a thousand structures faced demolition. Measured in adjusted dollars, property damage approached that of the dreadful temblor of 1906, which unleashed 60 times as much energy. The Loma Prieto damage exceeded that <i>inflicted</i> by Hurricane Hugo during the hours it <i>lashed</i> the Southeast.

We can note, first of all, that each of the main narrative phases seems to focus primarily on one of the three CMs. In fact, the CMs which seem to be tied to the narrative phases are:

Orientation	CM: AN EARTHQUAKE IS A BASEBALL PLAYER
Complicating actions	CM: AN EARTHQUAKE IS A SOLDIER
Resolution	CM: AN EARTHQUAKE IS A MUSICIAN

What we can readily observe is the apparent shift in metaphor focus from narrative phase to narrative phase. As one metaphor is foregrounded in a specific narrative phase, the others shift to the background. It is then within the narrative movement that the process of highlighting/hiding is achieved.

Finally, we could suggest that the narrative perspective activates an evaluative judgement of the events which emerges from a kind of metaphorical synthesis: AN EARTHQUAKE IS A STRUGGLE BETWEEN COMPETING FORCES. In other words, this CM functions as superordinate metaphor or what Charteris-Black (2004: 246) calls the "fundamental outlook", adding further cohesion to the three basic CMs and their related experiential domains, thereby establishing a point of view on the narrated event.

Now according to Labov (1997), storytellers use the abstract phase of the narrative enterprise to posit the scenario in the realm of credibility. Often this grounding of story events in real-world experience is repeated in the coda. The abstract establishes time and place frames by reference to an actual baseball match. The coda presents a list of the damages left by the earthquake. Thus the entire narrative sequence could be described as follows:

Abstract	Narrator posits story within the realm of credibility (Real baseball game)
Orientation	CM: AN EARTHQUAKE IS A BASEBALL PLAYER

Complicating actions	CM: AN EARTHQUAKE IS A SOLDIER
Resolution	CM: AN EARTHQUAKE IS A MUSICIAN
Evaluation	CM: AN EARTHQUAKE IS A STRUGGLE BETWEEN COMPETING FORCES
Coda	Narrator concludes story within the realm of credibility (description of aftermath)

By doing so, we can then remark that the narrative phases of the earthquake story are characterized by different levels of metaphoricity.

Narrative structure	Level of metaphoricity
Abstract	Very low
Orientation	High
Complicating actions	Very High
Resolution	High
Evaluation	High
Coda	Low

Thus, we can note that the central phases of the narration show high levels of metaphoricity lending vividness to the narration. This could be due to the fact that the CM has an iconic function by way of evocation of a visual image which coincides with the source polarity of the mapping between source and target domains (SD: baseball player = TD: earthquake; SD: soldier = TD: earthquake; SD: musician = TD: earthquake).

4. Conclusion

The results of this analysis of an earthquake story in the *National Geographic* are essentially that:

1. The choice of the word *prelude* functions as a conceptual key within the referential frame established by the title and as cross-domain link.
2. This text is characterized by specific conceptual metaphors: AN EARTHQUAKE IS A BASEBALL PLAYER, AN EARTHQUAKE IS A SOLDIER, AN EARTHQUAKE IS A MUSICIAN.
3. These CMs refer to given experiential domains (Sports, War, Music) which display cross-domain similarities both in their event structure and in the lexical sets associated with them.

4. Within the narrative mode of the text, the CMS interact tightly with the phases of the narrative structure and contribute therefore to text development.
5. In this text, the central phases of the narrative structure are highly figurative.
6. The evaluative strategy of the narrative is embedded in all phases of the narrative linking the experiential domains and their relative CMS through a conceptual perspective represented by the CM: AN EARTHQUAKE IS A STRUGGLE BETWEEN COMPETING FORCES

In general, we can say that the study has attempted to demonstrate that a text can display a specific metaphoric configuration, which will constitute, so to speak, the metaphorical identity of that text. Moreover, it lends further support to the hypothesis that conceptual metaphor has a cohesive function in many texts, thereby contributing to discourse organization and reader interpretation. Finally, working along the interface between cognition and discourse, the study demonstrates the utility of uncovering *in text* the relationship between universal human conceptualization, social experience and discourse structure.

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Appendix

The Earthquake Story

(onset of article by Canby 1990 in the *National Geographic*, entitled *Earthquake: Prelude to the Big One?*)

Like thousands of other good Californians, Lee and Terry Peterson had gone to the third game of the World Series that evening to see the Giants try to bounce back against Oakland at Candlestick Park. Far south of the park the Petersons' new frame home, their pride and joy, clung to a shoulder of the Santa Cruz Mountains near a dark peak named Loma Prieto.

Eighteen kilometers beneath that home and peak another contest was playing, in an arena known as the San Andreas Fault. Here two enormous plates of earth's crust had been locked in a planetary pushing match since the Great Francisco earthquake of 1906. These players were tiring reaching the breaking point. Their game was in the last inning.

The Petersons found their seats at Candlestick Park. Expectantly, they watched the teams warm up. The clock hands reached 5:04.

Deep beneath the Petersons' mountain home a section of weak rock snapped. The two sides of the San Andreas shot past each other. Simultaneously the west side of the fault rose, lifting the mountain themselves.

The ripping was unstoppable. For about eight seconds earth's crust unzipped at more than two kilometres a second, 20 kilometres to the north and south. The bucking Santa Cruz mountains flicked the Peterson house off its foundation, racking it like an eggshell.

The faulting released a frenzy of seismic waves, They set the seismometer needles scribbling around the world and carried a lethal message to Californians.

Waves rolling to the south bludgeoned the city of Santa Cruz, only 16 kilometres from the epicenter. They took its commercial heart and snuffed four lives.

The waves smacked into Watsonville, damaging or destroying most homes and turning Main street into a ghost town. They mutilated Hollister and churned the rich sediments of the Salinas valley.

Waves rolling north roiled the ground beneath picturesque Los Gatos, shattering Victorian houses and half the business district. They shook San Jose, but most buildings held

The waves swept up the peninsula, rattling securely planted cities, such as Palo Alto and Menlo Park. At Stanford University they found old, brittle structures and twisted and cracked them.

Ahead lay Candlestick ark packed with 62,000 fans and ripe for disaster. The waves shook the Patersons and other bewildered spectators. But Candlestick sits on bedrock and it defeated the waves.

Now the waves were weakening. With little effect, they jiggled southern San Francisco and towns across the bay.

A tiring vanguard of waves reached San Francisco's old Market Street area and marina district and Oakland's busy waterfront. These areas sit on man-made fill. Here the waves found soil in tune with their own vibrations and strummed it like a guitar string.

More waves arrived and pumped in more energy. The earth grew alive and danced.

The vibrations flowed upward into the buildings and highway structures. Picking up the rhythm, soil and structures swayed to the strengthening beat like partners in a dance.

Marina buildings buckled; many fell. Column joints supporting Oakland's Interstate 880 failed, and 44 slabs of concrete deck, each weighing 600 tons collapsed on cars below, The waves pushed the Oakland end of the Bay Bridge 18 centimetres to the east and a 15 meter section crashed into the level beneath.

Within 15 seconds the vibrations faded. But 63 persons lay dead or dying. Some 3,800 others suffered injuries requiring medical attention. The waves damaged more than 24,000 houses and apartment buildings as well as 4,000 businesses. At least a thousand structures faced demolition.

Measured in adjusted dollars, property damage approached that of the dreadful temblor of 1906, which unleashed 60 times as much energy. The Loma Prieto damage exceeded that inflicted by Hurricane Hugo during the hours it lashed the Southeast.