A Cognitive View of Poetic Metaphor in Pandemic Meditations, a Mathematical Visual Poem

Abstract
If you are not familiar with mathematical visual poetry then let me express that it is a poetic genre whereby metaphorical expressions are created using mathematical structures. Within the structure, the poetics are understood by the cross-mapping of numerous conceptual domains including visual, lexical, and mathematical. 'Pandemic Meditations', the title for the mathematical visual poem shown below serves as one example for this type of poetic expression. This paper is focused on one particular mathematical visual poetic structure of what I call a "Similar Triangles Poem" or "Proportional Poem". Furthermore, I will discuss how the mathematical poem uses the mechanisms of 'poetic metaphor' in the context of the embodied mind. Let me mention the intent of this paper is not to explain this poem for explanations of poetry serve only to kill it. Instead, the purpose of this paper is to give one the tools to access similar triangles poems in general, and this expression in particular and show how it functions within the definitions of poetic metaphor. An additional benefit is this paper can be used as a template to study all similar triangles visual poems, furthermore, a source to study visual poetry in general.
A Jury Of 13 Acute Anxieties
In A Shouting Match

A Dark Cloud of 13 Vultures
Encircling The Corpse That My Soul Dragged

eleven plus two = twelve plus one

Figure 2. Pandemic Meditations Digital Mathematical Visual Poem, 2020 (© Kaz Maslanka).
Inspiration For Pandemic Meditations

I have always had an affinity to eastern wisdom and I have been fortunate enough to have been introduced to a few Korean Seon (Zen) masters. It is their insight that continues to help me with the endeavor. I continue to practice meditation which through much effort has kept me sane during the pandemic. More specifically, meditation keeps me grounded in the present moment. When one is in the present moment one can detach from the discontentment that is inherent within the human condition. In these recent days of the COVID-19 pandemic, I have not achieved this state easily, to say the least. The chaos surrounding the affliction has made my meditation challenging. The poetic expression, 'Pandemic Meditations' (see figure 2) was inspired during an anxiety-ridden meditation I experienced. Observing my mind was a trial as the ideas and visual elements seemed to jump about incessantly. The stress of watching the bodies in New York City being stored in refrigerated trucks due to there being nowhere else to put them was extremely disturbing for me. There have been endless news cycles constantly reminding me of my age as well as the volatile populations that remain at risk. The latter, among other issues during this crisis, have kept me up at night thinking about family.

During one particular meditation session, thirteen anxieties were spinning around my mind - empty - yet, I was attached such that I could count them. It was a dark space and this is not particularly how I'd like to report meditation. Yet, it provided me an experience where I could see relationships in a way as to point me in the direction of where more practice is needed. I collected my thoughts, arranged, ordered them, and created this expression. Meditation is the most successful way to minimize anxiety and it helps provide inspiration to continue my poetic expressions.

Cognitive Linguistics

I want to discuss the mechanisms of poetic metaphor but before I can do this let's achieve an understanding of 'basic' or 'conventional metaphor.' Conventional metaphor is the type of metaphor we use in our normal conversations and must be understood in order study literary metaphor. A comprehensive study of metaphor is beyond the scope of this paper however, I would like to put forth some initial concepts and definitions concerning metaphor. A conceptual domain is any construction of coherent thoughts that can be understood in reference to our experience. While limited, for expediency, you may want to start off by just thinking of a conceptual domain as a mental construction, idea, or concept. Concerning conceptual metaphor, Lakoff states, "Each such conceptual metaphor has the same structure. Each is a unidirectional mapping from entities in one conceptual domain to corresponding entities in another conceptual domain. As such conceptual metaphors are part of our system of thought. Their primary function is for us to reason about relatively abstract domains using the inferential structure of relatively concrete domains."[4] We perform an ontological mapping across the source domain to the target domain. That is, we understand all the elements of the target domain in terms of what we know about all the elements of the source domain. The source domain expresses concrete concepts where the target domain expresses relatively abstract concepts. To better understand these mappings we need a nomenclature to discuss them. Cognitive linguists name the metaphors using the mnemonic, TARGET IS SOURCE. To illuminate how the nomenclature works for analyzing conventional conceptual metaphor, Lakoff describes the process as: “Aspects of one concept, the target, are understood in terms of non-metaphoric aspects of another concept, the source. A metaphor with the name A IS B is a mapping of part of the structure of our knowledge of source domain B onto target domain A [2].” Lakoff gives us the example LOVE IS A JOURNEY. In this metaphor, we understand the ontology of love in reference to the ontology of a journey. In conventional metaphor, a metaphorical expression is the language used to convey a metaphor. It is important to note that a metaphorical expression is not a metaphor. The metaphor is at a superordinate level relative to the metaphorical expression. One metaphor can be thought of as the root of many metaphorical expressions in other words many metaphorical expressions share the same common metaphor. Lakoff states, "If metaphors were merely linguistic expressions then we would expect different linguistic expressions to be different metaphors" [3] When we look at LOVE IS A JOURNEY we can see
that many metaphorical expressions are built from that single metaphor. Here are three of numerous examples Lakoff gives that use the metaphor, LOVE IS A JOURNEY: "We've hit a dead-end street" "We can't turn back now" and "Their marriage is on the rocks". [3] Again, one can see from these expressions that we are understanding the target domain LOVE from what we understand about the source domain, JOURNEYS. Again, there are numerous examples of metaphorical expressions that utilize this metaphor.

Poetic Metaphor

Up to this point, I have only talked about conventional metaphors and not addressed 'poetic' or 'novel metaphor.' Concerning poetic metaphor, Lakoff puts forth the same premise as conventional metaphor thus pointing out the relationship between thought and language. "The generalization governing poetic metaphorical expressions are not in language but in thought. They are general mappings across conceptual domains". [3]

Lakoff and Turner tell us there are three basic mechanisms for interpreting linguistic expressions as novel metaphor: Extensions of conventional metaphors; Generic-level metaphors; Image-metaphors. [3] What I would like to show is that successful similar triangles poems use all three mechanisms within the one construction. As an example, I will analyze "Pandemic Meditations" to illustrate this poetic investigation.

Extension of conventional metaphor is recognized as an expression that is a novel use of a metaphor that we use in our everyday language. Lakoff goes into great detail illuminating conventional metaphor in his book, Metaphors We Live By. Suffice it to say that the extension of conventional metaphor evokes a creative realization that gives us an understanding of something common yet, in a very different way.

The next mechanism is image-mapping, and Lakoff gives us an example from Andre Breton wherein a line of his poetry we read, "My wife ... whose waist is an hourglass." This is the superimposition of the image of an hourglass onto the image of a woman's waist by virtue of their common shape. [3] Let us note that image-metaphor and image-schema are different and I will address that later in this paper. That said, Mark Johnson of the University of Kansas states, "(Image-schemas are) the recurring patterns of our sensory-motor experience by means of which we can make sense of that experience and reason about it" [1]

When using a similar triangles poetic scheme the cognitive structure of the similar triangles provides the overall image-schema for the equation. The terms for the equation provide the conceptual domains. There are multiple ways these domains can be grouped to construct a metaphorical expression. (see figure 8.) That said, what is consistent in every grouping is that we map the conceptual values of the source domain to the corresponding conceptual values in the target domain. The image-schema inherent in the analogy of the proportional legs of the triangles will always be compared to the image-schema created by the proportional analogy of the conceptual domains that are being expressed. The terms of the equations have 'values' which are open to interpretation but are generally experienced as contextual importance or magnitude. As in all poetry, it is up to the reader to find meaning in the expression. The important factor and the subsequent strength of the metaphoric expressions will be judged on the clarity in the symmetry expressed when finding a cognitive pattern across the corresponding ontologies between the source and target domains. In a mathematical visual poem, there will always have some imagery (image-metaphors) that we can map to each other or to the lexical or mathematical expressions (conceptual domains). (see figure 9.)

The third mechanism is generic-level metaphors which extend to a large array of metaphoric expressions. That said, I will focus on a subset of the generic-level metaphors, the GENERIC IS SPECIFIC metaphor. When we get a general understanding of something by merely reading a specific case for it we are experiencing a GENERIC IS SPECIFIC metaphor. Proverbs operate in this manner because they make specific statements that can be used in numerous 'general' situations. Lakoff and Turner explain: "There exists a single generic-level metaphor, GENERIC IS SPECIFIC, which maps a single-level schema onto an indefinitely large number of parallel specific-level schema that all have the same generic-level structure as the source domain schema." [2] It is interesting to note that when applied, a pure mathematical equation automatically expresses a generic-level schema in a couple of ways. In a first way we
see the single equation structure provides numerous applied mathematical specific-level schemas. For instance, in physics, we have the equations for force: \( F = ma \), Distance: \( d = vt \), or Ohms law: \( E = IR \). And there are many more of these all being specific-level expressions with the same generic-level structure, that is \( a = b \) times \( c \). In addition, within an equation, each variable has the ability to express infinite levels of values. In essence those values, or in the context of mathematical poetry, *levels of importance or magnitude* function in relation to each other as different specific-level schemes expressed in the form/scheme of a general-level equation. In other words, the equation is at the general level and any fixed set of values for the variables would be a specific-level schema. At the end of the paper, I will address this metaphor in the context of Pandemic Meditations. Let us see how the mechanisms function within the context of

![Image 3](image.png)

**Similar Triangles Image-schema**

The equation used in Pandemic Meditations uses a similar triangles image-schema (see figure 4). So intrinsically, these poems contain an image-schema whereby the structure of a pair of similar triangles is part of the metaphorical mapping. What makes this method captivating, is that aspects of this structure lend itself directly to mapping metaphoric expressions across the horizontal bar and the equal sign of the equation.

**Similar Triangles Equation**

Before getting further into the methods for analyzing these structures for poetics let's examine how similar triangles can be used as a language to solve the dilemma of finding the height of a Mission Beach palm tree. (see figure 6 and figure 7) The photo/diagrams are a good example of how to analyze similar triangles or proportional equations.

Notice a man and a palm tree. (see figure 6.) If I were to give you a tape measure and ask you to tell me how tall the palm tree is, would you be able to do it? It is easy if you understand the relationship between similar triangles and are able to set up the equation.
An interesting factor about similar triangles is that there is a proportional relationship between the sides of the two triangles. In the second diagram, you can see this proportion relationship in that the tree's height is to its shadow as the man's height is to his shadow. In algebra, we can set up the equation to express this relationship (see Figure 5).

The tree's height divided by the tree's shadow is equal to the man's height divided by his shadow. (see Figure 7) We can physically measure both of the shadows and the man's height, plug them into the equation and solve the equation for the tree's height. This method will give us the answer to how tall the palm tree is.
Figure 6.

Figure 7.
Mapping Cognitive Domains

Within the similar triangles poem structure, there are 8 important mappings that we can focus on. We use algebra to solve for each cognitive domain (variable) and analyze the results. A successful proportional poem is a creation whereby the source domain and target domain share a cognitive pattern. It is up to the reader to parse through the four syntactical Arrangements and

Four Syntactical Arrangements

a IS to b AS d IS to e
\[ \frac{a}{b} = \frac{d}{e} \]

b IS to a AS e IS to d
\[ \frac{b}{a} = \frac{e}{d} \]

a IS to d AS b IS to e
\[ \frac{a}{d} = \frac{b}{e} \]

d IS to a AS e IS to b
\[ \frac{d}{a} = \frac{e}{b} \]

Four Syntactical Aspects

As a approaches infinity e approaches zero
\[ a \rightarrow \infty \Rightarrow \frac{a}{e} \rightarrow 0 \]

As b approaches infinity d approaches zero
\[ b \rightarrow \infty \Rightarrow \frac{b}{d} \rightarrow 0 \]

As d approaches infinity b approaches zero
\[ d \rightarrow \infty \Rightarrow \frac{d}{b} \rightarrow 0 \]

As e approaches infinity a approaches zero
\[ e \rightarrow \infty \Rightarrow \frac{e}{a} \rightarrow 0 \]

Figure 8.
the four syntactical aspects (see figure 8.) There are two redundancies in the syntactical arrangements for we will find two mappings are reciprocals of the other two. This means that we will be swapping the target and source domains to see what happens. If the poem is strong then two of the arrangements will resonate strongly while the other two may only provide interesting nuances. That said, a strong expression will make sense in each of the four syntactical aspects. Figure 11 shows one aspect of the Pandemic Meditations poem yet, all four aspects are listed below.

Image-Mappings

Figure 9.
Due to there being images metaphors and image-schema in a mathematical visual poem we are able to 'image map' numerous metaphorical expressions in this structure. Not only can we map image-metaphors across each other but we can map them to image-schema in the mathematical and lexical domains as well. (see figure 9.) In other words, we can map image-schema to abstract target domains that don't contain image-schema. For instance, we can map an image-metaphor to one of the target domains in the similar triangles equation. (see figure 9.) We also need to be cognizant that image-schema metaphors are not the same as an image-metaphors. As Lakoff states: "Image-metaphors map rich mental images onto other rich mental images. They are one-shot metaphors, relating one rich image with one other rich image. Image-schema, as the name suggests are not rich mental images; they are instead very general structures, like bounded regions, paths and centers (as opposed to peripheries), and so on. The spatial senses of prepositions tend to be defined in terms of image-schemas (e.g., in, out, to, from, along, and so on). [2] This leads us to notice within the similar triangles image-schema of 'Pandemic Meditations' a container image-schema can be found as well. Therefore we have image-schema within image-schema. In Pandemic Meditations the container-schemas are expressed as, "In a shouting match" or "encircling the corpse that my soul drags".

In this poetic expression, you will notice the number 13 provides a schema as well, for it is repeated in numerous ways including the 'circled' letters in the reflecting anagrams (eleven plus one = twelve plus two). There is an ominous sky, large raven, three skeletons, and a swinging/jumping monkey seen among the 'circling' image-schema. (see figure 3.) The reader is to map the images to the domains searching for a cognitive pattern connecting us to the metaphors. The image-schema of 13 circles connecting the identical letters to each other easily map to the image-schema created by the domain of 13 vultures. The 13 vultures map to the skeletons which map to the raven with a 3-way connection to the concept of death. The A JURY OF 13 ACUTE ANXIETIES IN A SHOUTING MATCH map to the 13 vultures due to the connecting container schema. The Buddhist concept of "monkey mind", an analogy of our disquieted mind, maps to the 13 circles schema as a path-schema for the monkey to follow. The Skeletons, Raven and Vultures map to the target domain of A JURY OF 13 ACUTE ANXIETIES IN A SHOUTING MATCH or to the target domain of the NON-ATTACHED MIND (or lack of)

I am fascinated while solving similar triangles equations, for within the numerous ways of solving them. We map across the horizontal bar as well as the equal sign enabling the target and source domains to move around the equation creating new syntax and richer meaning. We also change meaning by assigning different values or levels of importance to the variable concepts as shown in the 4 syntactical aspects. (see figure 8.) That is, aesthetic value is found as one creates values for the poem as they read it much like finding personal meaning in a traditional lexical poem. Therefore, there are multiple values present in this semantically dynamic equation. Let's look at the Pandemic Meditations equation and a few ways we can manipulate the algebra.

**The Equation**

I have shown the Equation for "Pandemic Meditations" written in the syntax of the poem and also in a serif font: (see figure 10)
Non-Attached Mind = A Jury of 13 Acute Anxieties in a Shouting Match multiplied by My Corporeal Body and that product is divided by A Dark Cloud of 13 Vultures Encircling The Corpse My Soul Drags (see figure 11.)

Because proportional poems carry the "image-schema" of similar triangles, they can be read as 'a' is to 'b' as 'd' is to 'e'. (see figure 4.) The mappings of the target and source can be reversed in such that the structure can be read lexically in 4 different ways. (see figure 8) Let's focus on two different ways it can be viewed and then look at four attributes to take into consideration:

The value of NON-ATTACHED MIND IS to the value of A JURY OF 13 ACUTE ANXIETIES IN A SHOUTING MATCH AS the value of MY CORPOREAL BODY IS to the value of A DARK CLOUD OF 13 VULTURES ENCIRCLING THE CORPSE MY SOUL DRAGS. (see figure 12.)

-or it can be mathematically manipulated again to express the following:

The value of NON-ATTACHED MIND IS to the value of MY CORPOREAL BODY AS the value of A JURY OF 13 ACUTE ANXIETIES IN A SHOUTING MATCH IS to the value of A DARK CLOUD OF 13 VULTURES ENCIRCLING THE CORPSE MY SOUL DRAGS. (see figure 13.)

**Four Aspects** (see figure 8.)
To illustrate the dynamics inherent in these equations, let's view four syntactical attributes inherent in the solutions for each variable of the expression—note that these values vary from zero to infinity and everything in-between. (see figure 8) The math expression is in a dynamic flux while these statements are only snapshots in this semantic space:

When the value of NON-ATTACHED MIND becomes near-infinite the value of A DARK CLOUD OF 13 VULTURES ENCIRCLING THE CORPSE MY SOUL DRAGS becomes near zero.

When the value of A DARK CLOUD OF 13 VULTURES ENCIRCLING THE CORPSE MY SOUL DRAGS becomes near-infinite then the value of NON-ATTACHED MIND becomes near zero.

When the value of A JURY OF 13 ACUTE ANXIETIES IN A SHOUTING MATCH becomes near-infinite then the value of MY CORPOREAL BODY becomes near zero.

When the value of MY CORPOREAL BODY becomes near-infinite then the value of A JURY OF 13 ACUTE ANXIETIES IN A SHOUTING MATCH becomes near zero.

**Conclusion**

The paper set out to show how the mechanisms of poetic metaphor are present in Similar Triangles Poems. While there are many examples, let's highlight at least one example for each of the 3 mechanisms of poetic metaphor in relation to the mathematical visual poem, Pandemic Meditations:

1.) extended conventional metaphor: When we map the values in the source domains of A DARK CLOUD OF 13 VULTURES ENCIRCLING THE CORPSE MY SOUL DRAGS and MY CORPOREAL BODY to the target domains of A JURY OF 13 ACUTE ANXIETIES IN A SHOUTING MATCH and NON-ATTACHED MIND we are performing an example of an extended conventional metaphor. The conventional metaphor used in these expressions is the MIND IS BODY metaphor. These metaphorical expressions are not conventional in the sense that they are not part of our basic use of language. As you solve the equation in the numerous ways you read many expressions of the MIND IS BODY metaphor.

2.) image-mappings There are numerous present in this poem but, I would like to focus a couple. (a) The image-schema of the similar triangles mapping one to another is an example of mapping an image-schema to a similar image-schema. In other words, similar triangles ensure the image-schema is consistent across the expressions. And (b) The image of the 13 circles moving between the letters of the anagrams to the 13 anxieties and again to the 13 vultures uses the same circling image-schema which is another example of image-mapping expressed in the poem.

3.) The generic-level metaphor can be realized in this poem by noticing the GENERIC IS SPECIFIC metaphor exists within the specific-level expression of A JURY OF 13 ACUTE
ANXIETIES IN A SHOUTING MATCH AS A DARK CLOUD OF 13 VULTURES ENCIRCLING THE CORPSE MY SOUL DRAGS. Due to vultures being symbols of death we see that we have the conventional metaphor DEATH IS A DEVOURER and with our mapping, we see the expression, DEATH IS ANXIETY. This can be understood as not only 13 specific-level omens of death but countless specific-level omens of death for every anxiety that is encountered during the pandemic. Furthermore, I will reiterate the equation structure alone affords numerous values within the variable terms/domains. This means that the conceptual domains are variable and thus able to express countless fixed specific-level expressions for the 4 conceptual domains within the equation. For example, NON-ATTACHED MIND can be expressing a mind of enlightenment or a mind in hell, furthermore, it expresses everything in-between. (see figure 8.) Of course, the proportional schema means that when you change the value (importance) of a conceptual domain one of the other conceptual domains must change importance as well due to the similar triangles schema must be consistent.

I would like to note the aesthetic beauty that I have found within a mathematical visual proportional poem lie in an alternating cognizance between the two experiences below:
1.) The beauty found in analyzing the lexical and mathematical multiple dynamic cross-domain mappings inherent in the similar triangles image-schema.
2.) The conflation of lexical and sensorial visual imagery.

[1] Mark Johnson; From perception to meaning: Image-schema in cognitive linguistics, Mouton de Gruyter 2005
[4] George Lakoff; Rafael Nuñez, Where mathematics comes from 2000

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