Rules of Engagement: A Metaphorical Analysis of Genomic Functionality

This essay will be analyzing the New York Times article, "A Family's Shared Defect Shed Light on the Human Genome". Genetics is a rich area of discourse where we can find plenty of rich metaphors. The analysis will be split into two sections; Both sections will look at metaphorical concepts used: the first will look at the text, and the second will look at the image. We will not be able to explore all of the techniques used, but we will explore, in my opinion, the most important techniques.

Part I: Analysis of the Text

The purpose of this article is for genetic researchers is to communicate to an audience the importance of topologically associated domains (TADs) to an audience. In order to convey the mechanism and architecture in a language that the audience can understand, they have relied upon metaphors. As we have learned in class, a metaphor is a unidirectional mapping projecting conceptual material from one structured domain called the source domain to another one, called the target domain. As well, to ensure that the audience will fully understand the explanation, they also supplement the metaphor with a series of techniques, including metonymy and similes.

A metaphor present to describe the architecture of the genome is: GENOMES ARE CITIES

- Source Domain: Cities
- Target Domain: Genomes
- Conceptual metaphor: GENOMES ARE CITIES
- Metaphorical expressions used in the text: "walkable zones", "45 blocks north", "town", neighbouring estates, neighbourhood, "jurisdiction"
- Conventional/Novel expressions – "you're better off taking the subway"

A metaphor present to describe the functionality of genes in a genomes: GENES ARE FACTORIES; GENES ARE FACTORIES FOR PROTEIN PRODUCTION

- Source Domain: Factories
- Target Domain: Genomes
- Conceptual metaphor: GENES ARE FACTORIES FOR PROTEIN PRODUCTION
- Metaphorical expressions – "switches", "production", "gear"
- Conventional/Novel expressions – "flick protein production on", "pump it into high gear"

Essentially, TADs function in increasing or decreasing the activity of genes within its vicinity. In order to highlight the powerful function of TADs, the authors uses frame metonymy to helps readers understand both the purpose and functionality on a different magnitude:

- INSTITUTION FOR LOCATION
    - Note: The paragraph is added for context; the locations are bolded.
        - Because **TADs can be quite large, the way the Upper West Side of Manhattan comprises an area of about 250 square blocks**, a genetic enhancer located at the equivalent of, say**, Lincoln Center on West 65th Street**, can amplify the activity of a gene positioned at the **Cathedral of St. John the Divine**, 45 blocks north.

The text also relies upon simile. In comparison to the metaphor, which is a productive mapping, the simile is an explicit one-off comparison. To further describe where the TADs are in within the genome, and its function, the authors use both narrow-scope and broad-scope simile.

- Narrow-Scope Simile
    - "They're like the dotted lines on a paper model kit"

        - The frames evoked assume a specific dimension of similarity.

- Broad-Scope Simile
    - Genes and regulatory elements are like people," Dr. Dekker said. "They care about and communicate with those in their own domain, and they ignore everything else
        - We see in this sentence, that the word "like" is necessary for the simile to work. As well, the central feature of broad-scope simile is present: the need to find the conceptual link between the source (people) and the target (genes and regulatory elements).

Part II: Analysis of the Image

Needless to say, this image is rich and powerful in its meaning. Attached to this essay, is an image of the popular 1900 board game, Monopoly; we will be looking at how this board game functions as an input to create a blend. The benefit of this blend is that board games are products that are accessible, easy to understand, and timeless. It is understood that board games involves pieces moved or placed on a pre-marked surface according to a set of rules, but incorporate strategies and an element of chance. As well, there are varieties of board games in which they can represent real-life situations. In particular, Monopoly is meant to simulate real-life financial situations so that players may better understand wealth creation. Therefore, by creating a blend by incorporating Monopoly as an input, the authors are better able to communicate to the audience how TADS in relation to the genome contribute to genetic diseases.

Generic Space:
Actions and uncontrollable forces that can alter the composition of a system to benefit or harm the owner of the system.

Input 1: Monopoly (The Board Game)

- Demonstrate an economic system that is susceptible to an influx and efflux of wealth.
- Promote economic theories:
    - Players move around the game-board buying, trading, or selling properties, developing their properties with houses and hotels, and collect rent from their opponents
- 'Game of Life', as it contains all the elements of success and failure in the real world, and the object is the same as the human race in general seem(s) to have i.e the accumulation of wealth."
- The board is circular and never-ending. Similar to life. You are always playing.
- Monopoly combines strategy e.g buying property with a little bit of luck
- Players have no control over what they roll and where they land on the board
- A potential bad move could result in giving all the money to your opponent

Input 2: Developing Genetic Diseases in the Body

- The body is a system that is susceptible to a higher pre-disposition or lower pre-disposition of illnesses, diseases, and/or defects.
- Promote health theories:
    - Players move around life.
- 'Game of Life', as it contains all the elements of good health and bad health in the real world, and the object is the same as the human race in general seem(s) to have i.e maintain a healthy, defect-free, body.
- The body is long-living and life only ends at death. You are always playing.
- Prevention of genetic diseases combines strategy e.g good diet and exercise, with a little bit of luck
- As individuals are born with the sets of genes given to them, they have no control over what they roll and where they land on the board.
- A potential bad move could result in developing the genetic defect.

The Blend: Acquiring a Genetic Defect is Understood as a Game

- The human body is constantly playing a game that requires strategy and luck in preventing genetic diseases
- Functional TADs are a component in the game to help prevent genetic diseases in the players.
- Everybody is at risk of "losing" and acquiring a disorder that can affect overall quality of life.

As well, we see the authors use other concepts including metonymy, image schemas, and event structure metaphors to highlight how an image of a board game is advantageous in communicating to the audience who is at risk for genetic defects and how they are at risk.

- Frame Metonymy
  - PRINCIPAL PART FOR WHOLE
    - Dice and Cards: Meant to show how chance and luck is just as important for how one acquires a genetic disease.
  - ATTRIBUTE OF PERSON FOR PERSON
    - Diversity of skin-tones to reflect that it genetic defects are ubiquitous.
    - Bow-ties and ties to represent males. Pony-tails and skirts to represent females.
  - STATE FOR DURATION
    - The individuals on the board games are healthy for the moment, but they are susceptible to acquiring a genetic defect at any given moment.
- Image Schema
  - Path
    - The individuals on the board are either walking or not walking on a path towards acquiring the genetic defect/illness. Or they are already partway there but other factors have prevented the development of genetic defects.

We can link this image schema with the following Event Structure Metaphor:

- CAUSATION IS FORCED MOVEMENT
  - Because the players have inherited the sets of genes, and were either not lucky or did not make smart choices, they are forced to walk on a path towards acquiring a genetic disease.
- STATES ARE LOCATION
  - Different locations on the board can reflect whether an individual will remain healthy or acquire a genetic defect.

In conclusion, in this short essay, I have identified concepts that I have found important and critical to analyze, and explain for this paper. We can see that genetics is a rich area for metaphorical analysis.