

Mathematics in Reading Literature: Equations of Human Behavior in Select Novels

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Abstract: This study formulated mathematical equations to depict the complicated situations faced by representative characters in Bessie Head's *A Question of Power*, Shannon Ahmad's *No Harvest But A Thorn*, F. Sionil Jose's *Ermita*, Elechi Amadi's *The Great Ponds*, Chinua Achebe's *No Longer at Ease*, and S. Arundhati Roy's *God of Small Things*. The researcher made use of the descriptive-analytical research design to explicate and interpret data from the novels. The analysis was facilitated by Kurt Lewin's Field Theory, expressed in symbolic terms, $B = f(P, E)$ whereas; behavior (B) is the function of both the person (P) and the environment (E). The study concluded that the situations of the characters could be explained using mathematical equations. In the context, the characters experienced extreme trial; and the issue of survival and fatalism were apparent in their lives. Notably, they held on to their beliefs in the influence of religion despite the suffering. The study claimed the need of people to satisfy needs, hence offered some practical recommendations in varying propensities.

Keywords: Afro-Asian Literature, Mathematical Equations, Field Theory, Mathematics in Literature, Behavior of Characters, Psychology in Literature.

INTRODUCTION

The frames from which human beings are being studied and their appurtenances – nature, origin, emotion, needs, behavior, life cycle and countless more, can be organized into academic disciplines ranging from natural sciences such as biology, chemistry and physics to relatively more encompassing disciplines and areas of research such as philosophy, psychology and sociology, and in this case through the allied Science - Mathematics.

One basis of exploration needs not compete with the others, and one in logical and ethical considerations, needs not discredit or preempt the perspectives of several others. Aptly put, “knowledge is one,” (Mackinder, 503). Similarly elucidated,

“The reciprocal causation between situations and persons allows us to see people as either reacting to or acting upon their environment. Each perspective is correct for we are both the products and the architects of our social worlds (Myers & Twenge, 196).”

With the coming of time, literary attack and literary presentation, which are objects of literary studies, have to be re-translated into interpretations appropriate and fitting to the present time. We learn from traces of experience how things and situations can amplify and expand meanings, and how the thoughts in novels or stories could convey the meaning. Moscovici, (1986) proposed the study of imaginary groups from the literary world as if they were real. As these imaginary people or literary figures are given life by writers, who are

real people, and literature provides detailed elaborations of people's real life experiences, they could be subjected to an analysis as if they were real.

Along with choices, situations matter. Our inner attitude, predicament, mood, need, and aspiration to name a few, affect our behavior. Facing the same situation, different people may react differently (Myers 8). Given the same circumstances, the same age, experiences and situations may be different for different people. One's life space or the total environment of the individual and all significant others, have to be understood and researched in order to understand behavior.

Lewin's Field Theory considers the situation as a whole. By gaining an overview, one broadens the perspective from which one can study human behavior. He postulated that the better way to express this is with the use of the exact science of numbers – Mathematics. This in a way prohibits us to render hasty judgment, condemn or judge people who face the situation in point. Field Theory leads one to conclude that such a control comes from forces within the field, from completely understanding the situation where the individual is in.

Necessity dictates representation of everything and how these people differ in behavior, in reaction to their situation identified, and how their environment come into play.

Lipsey and Pasternack, (2020) posited that indeed, “there are many choices of literary art that serve the goals of integration well”.

This literary investigation departed itself from usual critiquing and analysis in varied perspectives. In its merit, the study embraced the task of exploring an established social psychological theory on human behavior, Kurt Lewin’s Field Theory, to explain and thereby offer scientific understanding of human behavior in select Asian and African novels of distinguished authors. In its distinctiveness, this literary study was done with the use of scientific terms and the formulation of mathematical representations.

Psychology and Literature

Fundamentally, people and their surroundings and conditions are interconnected, the same way they are depicted in literature. With the variety of available choices and possibilities, people create, if not choose their situations. In life by and large, people always react and interact with one another – positively or negatively as the case may seem appropriate or even actively and passively as the intensity is in consideration.

Kurt Lewin, a social psychologist, explored human behavior. In his Field theory, he proposed that human behavior (B) is the function of both the person (P) and the environment (E): expressed in symbolic terms, $B = f(P, E)$.

When processing someone’s behavior, there is oftentimes the tendency to either underestimate or overestimate its extent and impact as reflected on the person’s characteristic, trait and attitude. From this opaque, exact computation is necessary. Numbers and figures have their own language that are precise, hence their ability to determine exact location, exact difference, sameness, hence fair assessment in that respect.

Lewin’s Field Theory stemmed out of the idea that in order to explain behavior; one must look at all pieces of the puzzle, all dynamic interactions influence outcomes. Applying Field Theory to analyze human behavior requires acceptance of its very premise. In Lewin’s words,

“To understand or to predict behavior, the person and his environment have to be considered as one constellation of independent factors. We call the totality of these factors the life space of that individual, which includes both the person and his psychological environment. The task of explaining human behavior then becomes identical with (1)

finding systematic representation of the life space (LSp) and (2) determining the function (F) which links the behavior to the life space (Lewin, 239-240).

In literature, the novelist and literary writers tell us the story behind the behavior and development of characters by giving us detailed data about their parents and siblings, their attitude and perspectives in given concerns and issues, their maturity and intelligence, their engagements and occupations, their peers and friends, their status, and to some extent their social climb among some others. The genres give us these data in their specific interrelations, in a way showing as the parts of a total situation.

Contarello, (1996) shared systematically that using literature as data to verify and validate psychological theories including their allies is well enough and the suitability must rest on enriching understanding of things and phenomena around us. These socio psychological theories and models make way as they are supported by other studies (cf. also Contarello & Volpato, 1991; Volpato & Contarello, 1995).

Adamopoulos, (1982), for one, analyzed epic works in order to explore universal dimensions of personal relationships as maintained in Triandis, (1978) model. Classic epics and novels oftentimes portray crime, passion, and human suffering. Social Psychology’s most important lesson concerns how much we are affected by social environment. At any moment in fiction and in real life, things that come out from us through our words and actions depend substantially on our situation.

Mathematics in Literature

Essentially in this paper, why use mathematics in analyzing literature? Lipsey and Pasternack, (2020) believe that authors use mathematics in stories, plays or poems in a variety of different ways. In producing their art,

“Writers may call on mathematics to illuminate a theory such for instance those popularized by Dostoyevsky Tolstoy and Austen; be inspired by mathematical themes to create a work of art based on the themes; poke fun at typical experiences in learning mathematics or about mathematicians; produce an educational work; or craft the imagined life of an intriguing mathematician. Conversely in mathematics, topics such as logic, geometry, measurement, number theory, statistics, topology, set theory and calculus come naturally out from

the readings. In addition to discussing the general ideas of each assigned reading and the characters portrayed, we analyzed and developed the meaning of the mathematics that appeared, using mathematical concepts correlated with the literature” (Mathematics in Literature 1).

Nazaryan, (2012) noted in his article that even Hardy hints upon this, too:

“A mathematician, like a painter or a poet, is a maker of patterns. The mathematician’s patterns, like the painter’s or the poet’s must be beautiful; the ideas like the colors or the words must fit together in a harmonious way” (G.H. Hardy, *A Mathematician's Apology*).

In the University of Vermont, more than 1300 works of fiction were studied. Some happy and sad words that were documented were graphed to assess the arcs of emotion and hence found some few variations that are relative in nature (Fischetti, 2017).

In using literature to teach Math, Burns, (2015) elucidated that thru reading of books, mathematical ideas may be woven into engaging stories that are aimed to dispel the myth that math is by nature has the “dry” dimension, that it is unimaginative, and that somehow it is inaccessible.

Mathematical Equations of the Novels

Six representative novels from Asia and Africa were subjected to a descriptive analytical research design. Generally, the characters from all six novels and the situations they faced were found to be fitted for Mathematical equations. Some elements or key concepts were identified for the purpose of representations such as insanity for *A Question of Power*, survival for *No Harvest But A Thorn*, need for *God of Small Things*, suicide for *The Great Ponds*, prostitution for *Ermita*, and bribery for *No Longer at Ease*. The study yielded mathematical equations:

1. *A Question of Power* by Bessie Head

$$\mathbf{In} = \mathbf{Vw} + \mathbf{Amb} + \mathbf{SS} + \mathbf{PII} + \mathbf{Tfl}$$

Where:

In = Insanity

Vw = Vulnerability of a woman;

Amb = Absence of marital bliss;

SS = Social Stigmatization of a suffering child;

PII = Predicament of a loveless home; and

Tfl = Traumatic family life.

Bessie Head’s *A Question of Power* capitalized on the vulnerability of a woman and on the absence of marital bliss, on the social stigmatization and the horror of a suffering child, on the predicament of a loveless home, of a traumatic family life, the novel sidetracked boldly on the universal predicament of women and children whose rights were denied and whose happiness had been deprived in one way or another, thereby encapsulating insanity at its core.

Elizabeth’s life space incorporating real facts shrunk or collapsed inward while the section incorporating unreal facts maintained its bulk, its fullness, as in the case of her mental disorder. She dealt with fewer real facts altogether and acted as if the world of reality was very small indeed, populated by very few facts to which she must attend to.

Further in the novel, we recognized Elizabeth holding on to the belief that her position as a victim provided her the functions and mechanisms of power and that kept her whole throughout her madness. Paradoxically however, this belief paralyzed her strength to combat her perpetrators. Seemingly, throughout her madness also, Elizabeth appeared capable of mothering her son, whose presence was depicted as an important counterforce to madness, subtly telling us that mad women are capable of being good mothers.

Given the universal but realistic issues in this novel, Elizabeth personified the woman of contemporary times who battled with different social forces and who almost fell deep down, capped by her falling into madness, but was lucky enough to have recovered and overcome the forces, thereby meriting cleansing, if not redemption of herself.

All throughout, Elizabeth confronted contemporary social problems, especially the problems of apartheid in South Africa and that of discrimination in Botswana. Her personal story showed the magnitude and range of the experiences of a typical woman under the apartheid system. While apartheid may have been abolished, the novel cried out for greater accommodation and understanding of a ground level between and among Africans.

The political and social underpinnings of the insanity of main character, Elizabeth, were explicit in the novel. Irrefutably, she is a woman without a country (she is a refugee in Botswana), a race (she is neither black nor white, but colored), a culture (she is neither African nor European). Her

situation had repeatedly denied her any social identity, thus the intense pressure she endured, the mental torture that engulfed her, the extreme trial she withstood, which she hurdled all and overpowered in the end.

2. *No Harvest But A Thorn* by Shannon Ahmad

$$S = T + F1 + F2$$

Where:

S = Survival;

T = Toil;

F1 = Faith; and

F2 = Fate.

The novel's constant imposition on the value of toil, of working in the field day and night, and on the need to have faith to combat the deepening anxiety about the future and the struggle for subsistence were paradoxically combined with a total and unshakeable trust in divine providence, hence the fatalistic view of life – acceptance of fate.

The issue of survival in vicious cycle was very clear. It started with Lahuma, the father being head of the family, the able provider, the hard worker and passionate father who instilled the value of labor and whose efforts were rendered futile by the *nibong* thorn, Jeha, the wife, succeeded him, but fell short of her capacity to bear all in stride. The fatalistic attitude that conquered Jeha interfered with her daily existence. She never questioned Allah, the Almighty. When Lahuma cut his foot by the *nibong* thorn, Jeha began to paddle the row, even against the tide, for her seven daughters, for their field, for their rice, for their future. When Lahuma's condition worsened, she did not bark at the misfortune, but she carried her rightful duty as a wife, as a mother, and when everything became dark and unbearable, she had no one but herself, and her own created world to grapple with.

Too much responsibility on her shoulder, the uncertain future for her seven female children and herself after her husband Lahuma died, and the many challenges that came with every day's existence in that part of the world where scarcity and abundance were really two poles apart, were undeniably predictable grounds for a soft and fragile heart to go numb at first, then eventually go wild and uncontrollable. The children would have to continue what the parents had started.

Suggestive of the quest for survival was the rhythmic, repetitious quality characteristic of the novel as a whole, creating that sense of cycle, of

timelessness, of continuity, and apparently of its inevitability.

3. *Ermita* by F. Sionil Jose

$$P = S - C$$

Where:

P = Prostitution;

S = Sex; and

C = Conviction.

Prostitution was one of the most alienating forms of labor according to a survey conducted by the International Labor Organization. In 2003, it was estimated that there were up to 500,000 prostitutes in the Philippines. Over 50 % of the women surveyed in Philippine massage parlors said they carried out their work with a heavy heart and 20 % said they were conscience-stricken because they still consider sex with customers a sin. Interviews with Philippine bar girls revealed that more than half of them felt nothing when they had sex with a client; the remainder said the transactions saddened them.

In the Philippines, prostitution caters to local customers and foreigners. Surveys of women indicated that 34 % of them explained their choice of work as necessary to support poor parents, 8 % to support siblings, and 28 % to support husbands or boyfriends. More than 20 % said the job was well-paid but only 2 % said it was easy work and another 2 % claimed to enjoy the work. Over a third reported that they had been subject to violence or harassment, most commonly from the police, but also from city officials and gangsters.

The novel, *Ermita*, presented Maria Ermita Rojo, an unwanted child, conceived out of the chaos that ensued during the liberation of Manila at the end of the Second World War. Hidden and ignored because of her lineage, she was kept away under the care of Sister Constancia in an orphanage. At ten, she had to face life at the Rojo mansion, living in the garage of the Padre Faura house with Arturo and Orang and their children, Mac and Nanet, to keep her hidden from suspecting eyes.

Predicament after predicament, injustice after injustice, unable to carry the burden, the pressure inflicted by unjust poverty, and overcome by despair to seek vengeance, Ermi (Maria Ermita's pet name) dwelled on prostitution. Under the roof of Camarin, she advertised her body, at a very commendable price to foreign dignitaries like the Great man, to senators, to journalists and to

military generals to name a few. She allowed her body to be invaded by men, possessive of money and power yet hungry of beauty, sex and pleasure.

Prostitution was given full account while the novel wove the story of family lineage, hypocrisy, identity search, indebtedness, and true love. Ermi, a Filipino female character represented all others who capitalized on good looks, capabilities, appurtenances and distinct features that spelled out peculiarities towering ordinary ones.

4. *The Great Ponds* by Elechi Amadi

$$S = Mt + Pt + St$$

Where:

S = Suicide;

Mt = Mental Torture;

Pt = Physical Torture; and

St = Social Torture.

Depicting the long standing feud of two villages – Chiolu and Aliakoro, this novel, *The Great Ponds*, of Amadi presented the time when Africans still heeded to the power of the supernatural, and of traditional healers, of divine intervention and of sacrificial offerings to appease angry gods. The story was told against the backdrop of the great influenza of 1918 or Pandemic flu as it was widely recognized and its devastating effect, killing people dramatically, recording more casualties than World War I and even looming than the victims of the spread of AIDS in 24 years.

The war broke out as the people of Chiolu, one of the two villages, took action to protect ownership of the pond of Wagaba against the neighboring village of Aliakoro. The fight instilled bitterness and vengeance on the warriors and people of the two races. To resolve the growing conflict between tribes, Olumba, the lead warrior of Chiolu was chosen and was forced to take an oath under the god of night, Ogbunabali at isiali, a neutral village that intervened. As agreed upon during the negotiation, if Olumba would not die in six months, the pond would belong to Chiolu.

Rituals and ceremonial traditions were carried out to protect him against evil spells but not from psychological pressures and dilemmas imposed directly by a dibia (Igwu), and indirectly by his society, as he was expected to live a mechanical life, so to speak, in the next six months, albeit giving up the responsibilities to his three wives and numerous children.

Elechi Amadi addressed the painful effects of the Influenza virus that swept the world in 1918 and

ably incorporated universal issues of injustices, while fusing psychological concerns that confronted humanity not only in Africa but the world over as he bravely emancipated the fear and the destruction of war. The duties of a husband to his wife, to his children, over duties of a warrior to his fellowmen, to his village, to his society and in the larger spectrum, to his deities, to his gods, to the supernatural around him and the beliefs, the traditions, the rituals, the ceremonies and the repercussions that went with all these, all were given vivid pictures while picturing Africa in its old days.

Relatively, no living person can be happy or even continue to exist if his/her needs are not sufficiently in proportion to his/her means. Otherwise, whether they require more than can be granted, or simply something different, those needs will be in constant conflict and can bring only pain. Taking the case of the brave fighter and defender, Wago, when all built up and the only recourse was death for the suffering mind, suicide was imminent. While Olumba suffered waiting for his time, Wago, his opponent, ended what he considered to be the beginning of his torture, the nature of which was too encompassing – mental, physical, social – by suicide. He drowned himself at the cursed great pond of Wagaba, ownership of which caused too many conflicts, destroyed many dreams, and exacted too many innocent lives.

5. *No Longer At Ease* by Chinua Achebe

$$B = Ef + Wp$$

Where:

B = Bribery;

Ef = Exchange favors; and

Wp = Willing providers.

Accounting individual propensities, accountabilities, responsibilities as Africans on the one hand and as part of a bigger society on the other, that accommodated bigger and larger denominations of people's ways of acting and thinking, the novel pictured the varied spectacles that confronted humanity in general when people were no longer at ease, when comfort would not any more suit its purpose, and when purpose would not serve its repercussions. Bribery happened because there was the need for exchange favors and there were willing providers.

In the so-called cycle of life, history maybe said to repeat itself. The nature of human behavior at a time given the same circumference and circumstances could be predicted reflective of the

social stigma prevailing at that particular time and space. Obi Okwonko's case, the lead character in the novel would not speak much of indifference, rather of same latitude where people measure each and the other.

Chinua Achebe's reflections may well be taken from the following assumptions: (1) the interaction of individuals, groups, institutions, nations and the world community influence our society and created unique sets of interactive problems that were social; (2) the content and processes inherent in the elements of culture and the social structure at a given time contributed to the development and maintenance of problems that were social; (3) these variables were the social problems that they created; thus, a given problem could not be solved in isolation (Field Theory in Social Science, 1944).

None of these assumptions is totally new or unique. Relatively, change may differ quite markedly from periods of relative social stability: (a) Change and constancy are relative concepts; group life is never without change, merely differences in the amount and type of change exist. (b) Any formula which states the conditions for change implies the conditions for no-change as limit, and the conditions of constancy can be analyzed only against a background of "potential" change (Lewin, 199).

Human life and the history of our society may be best studied by taking their accounts related and intertwined in all matters. Presumably, though, people do not see troubles and their circumstances in terms of historical periods and social milieus. This is in the same respect with how people view triumphs and leaps. Other contributory factors are recognized, not always how they are bound with the social period they are historically connected.

6. *The God of Small Things* by S. Arundhati Roy

$$N = Ps + Os$$

Where:

N = Need;

Ps = Personal self; and

Os = Outside self.

Different lifestyles experienced at home, within different contexts of material affluence, significantly determine children's behavior. There appeared to be a connection between level of affluence customarily experienced at home and degree of self-orientation displayed in interpersonal interactions. If one "abstracts from individual differences, (38)" there is no logical way back from these generalities to the individual

case. Such a generalization leads from individual children to children of a certain age or certain economic level and from there to children of all ages and all economic levels (Field Theory and Learning, 60).

Lewin, (60) posited that children surrounded by abundance would come to expect that their needs would be met for the asking and would feel justified in taking what they wanted when they wanted it, believing that they deserved such treatment. If there was one integral part played impeccably in the order and scheme of things in Arundhati Roy's *God of Small Things*, one would easily consider the role children played in the manner things purposely happened. The need is both personal and outside self.

The egg-twin – Estha and Rahel, their cousin, Sophie Mol, each equally accounted, if not weighted. Not so much with their acquaintance or non-acquaintance with the other people in the novel or their companionship with each and the other, but more on the indispensability of each character, for the events were unlikely without each and the other. There could be no egg-twin without Estha and Rahel, whose souls had been intertwined long before their birth; there could be no ceremonies in the yellow church and the expected death and disappearance of Velutha, the paravan, without Sophie Mol. These young characters in the novel wove the story line. They dramatically did so that they became microcosm of individuals, young and old, whose fate had been exacted, harsh maybe. How fate determined whose' who and for whom remained to be part of the mystic reality we face every day.

Presumably, we satisfied the "self" and thereby blocked our concern for the fate of others. Velutha's life was sacrificed to save Ammu. It just needed a "yes" from Estha. Velutha, the gift giver, the adorable carpenter-mechanic, builder, self-sacrificing figure to Estha, to Rahel, to Ammu, to Mamachi, to the whole clan on the one hand, but at Baby Kochama's maneuver through Estha, the very people whom he loved exacted his fate ironically.

But fate had its way of taking toll. When you least expect it, when you would not welcome its appearance, when you would not even want to take a glimpse of its shadow. Death, love, passion, fate, each speaks volume. In the novel, each raced to triumph and in the end faith willed.

Judgment about how persons ought or ought not behave stemmed from an individual's view about what behavior was required in a given situation, where the definition of a situation was based on the individual's perceptions of objective reality, of supra personal values, social or group norms, explicit and implicit contractual obligations, role expectations and the like. Hence, the need of one, child or not, is both personal and outside self.

CONCLUSIONS

Novels can be studied in a way that is mathematical, that is formulating a formula by which the situations can best be remembered. This can be one systematic way of literary investigation. Generally, the characters all experienced extreme trial or suffering. This was manifested differently, insanity for characters like Elizabeth in *A Question of Power*, Jeha in *No Harvest But A Thorn*, and Estha in *God of Small Things* although indifference for Estha was more appropriate, suicide for Wago in *The Great Ponds*, sickness and death for Lahuma, thus the issue of survival in *No Harvest But A Thorn*, prostitution for Maria Ermita in *Ermita*, and bribery for Olumba in *No Longer at Ease*. The issue of survival and fatalism were seemingly apparent in the lives of peasant farmers both in Asia and Africa. Lahuma, Jeha and their seven daughters, along with other village farmers, witnessed and lived the ups and downs of working day and night in the field – a rigorous and rigid routine that rendered them futile all the more as they became poorer and poorer in the process. The same held true with Olumba, his three wives and children in the village of Chiolu. Poverty stricken villages that tested their endurance, their faith, their strength were prevalent. Both village people held on to their beliefs in the Supreme Being. Lahuma, Jeha and the village folks never once blamed Allah. Olumba and his men, the village chief and elders, the people of Chiolu, of Aliakoro offered sacrifices and prayers, performed rituals to win favor of the gods. The influence of religion, the power of rituals were prevalent as evident in the novels, specifically in Ahmad's *No Harvest But A Thorn* from Malaysia, and Amadi's *The Great Ponds* from Africa. The conditions of health and sickness could not be defined abstractly or absolutely. In different forms and degrees, its value, its effect was obviously acknowledged. It was highly encompassing as it embraced not only the physical but all other aspects as well. The resultant force varied – insanity for one and few others, suicide for another, seclusion, isolation, indifference for

some others. The need to satisfy needs – physical, psychological, social, had reverberated throughout times and locations as shown in the novels. In fact, all the characters had their needs in varying propensities. They had their own type and the need of one is no less than that of another.

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