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DECODING THE ISRAELI-GAZA CONFLICT THROUGH COMPLEXITY THEORY

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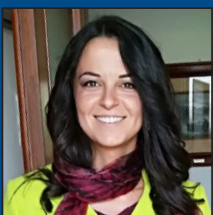**Decoding the Israeli-Gaza Conflict through Complexity Theory**
di Silvia Pizzigoni

EXECUTIVE SUMMARY

- Complexity theory, a branch of System Theory, has been applied in various fields, including human geography and international relations

- Complexity Theory allows for a comprehensive understanding of the conflict's nature and potential solutions by highlighting its non-linear and unpredictable dynamics. The structure of the conflict is characterized by a variety of actors, density of interrelations, and openness to outside events.

- The dynamics of the conflict exhibit non-linearity, unpredictability, feedback loops, sensitivity to initial conditions, emergence of properties, and non-hierarchisability.

- Patterns of non-linearity, feedback loops, attractors, self-organization, emergence, robustness, and resilience contribute to the perpetuation of the conflict. Despite periodic ceasefire agreements, lasting peace remains elusive. The intricate layers of the conflict call for a nuanced and comprehensive approach rooted in Complexity Theory to address the interconnected variables and actors involved, paving the way towards sustainable peace. ■

THE AUTHOR

Silvia Pizzigoni, (Piacenza, Italy, 1993) held degrees in Environmental Engineering and in Petroleum Engineering. Currently immersed in the professional world of Oil & Gas equipment. She's also member of Morobe Development Foundation (focused on environmental conservation and community development in Papua New Guinea), Labiba.org (journalism source on issues related to the Palestinian conflict), and Amnesty International. ■

Introduction

The Israeli-Gaza conflict, a seemingly intractable and long-standing dispute, is multifaceted and characterized by several variables and actors. By applying Complexity Theory – one of the natural evolutions of the System Theory - to this conflict, we can delve into its intricate nature and explore the interconnected variables that contribute to its continuation. Complexity theory offers a new perspective, highlighting the non-linear, adaptable, and unpredictable dynamics of conflict, thus revealing the real potential pathways and approaches towards sustainable peace. This article aims to analyze the conflict through the lens of Math and in particular System theory, rather than focusing solely on historical or ideological perspectives, allowing for a more comprehensive understanding of the conflict's nature and potential solutions.

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Understanding Complexity Theory

Complexity theory is a branch of System Theory. Emerged around 60's from the fields of physics, mathematics, and biology, it aimed to explain those systems consisting of numerous interdependent elements, governed by specific types of dynamics, different by those of traditional linear non-complex system. Complex systems are those systems which are difficult to be modeled and thus predicted, because of their interdependencies and relationships.

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The structure of a complex system can be usually distinguished by the presence of following three main features[1]:

- **Variety:** the number of actors involved in the systems is multiple, changing and evolving; it's also distributed on a multilevel framework and these levels as well are evolving, through change, interaction and combination.
- **Density of inter-relations:** the system is dense in terms of connections among agents within itself. Whatever are the elements that flows within the system, which changes

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[1]   https://academic.oup.com/isq/article/67/3/sqad063/7232791

according to the field in which we try to apply this theory, they flows in multiple directions, among agents and sub-agents, making or disrupting connections continuously. This means that all components of the systems are interdependently linked.

- **Openness:** the behavior of the system is affected not only by the players and their relationships but it's also governed by outside events which are not actors neither relationships but only extra-occurrences.

The dynamics of the system instead, in order to be classified as complex are characterized by following vogues:

- **Non-linearity:** outcomes and events are not automatically reducible to a transitive aggregate, that means they are not the sum of the events happening at the basic levels; the overall change is not equivalent to the sum of events happening within each micro-universe of its agents. Even if we are given a set of inputs, which could be the status of relationship among actors, or the number of players and existing situations, and considering basics type of behavior that each single agent if taken alone would undertake, in a complex system is not possible to predict the situation after a certain amount of time.
- This is what leads to another characteristic of the system: **unpredictability**.
- The previous behaviors are related to another behavioral feature of complex systems, which is the **presence of feedback loops**, both positive and negative: attempts to modify the system trend can be absorbed, and thus work, within the system, making it to return to the status quo, or can spiralize in an opposite direction making the system to exponentially proceed towards the initial deviation until a new equilibrium point is reached. The concept of feedback loops can be understood better as similar to vicious or virtuous circles.
- **High sensitivity to initial conditions**, which means that an infinitesimally small change in the initial set can abruptly create a turmoil within the system. This features is rhetorically recalled as "the butterfly effect", the metaphorical example that a tornado can be generated or influenced by minor perturbations such as a distant butterfly flapping its wings several weeks earlier.
- **Emergence of properties/emerging patterns:** properties of the system itself are not based on a list only, but are themselves appearing and evolving within the system and its agents. In the absence of a centralized and organized authority, spontaneous appearance of orders2 within the system results from the interaction among the agents, and the circulations of flows among them.
- **Non-hierarchisability of the system:** complex system is different from a centralized

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2   https://en.wikipedia.org/wiki/Spontaneous_order

hierarchical system - in which directions of flows among agents and agent-levels are defined and more or less stable - thereby making it less predictable and less firm.

Complexity VS Chaos theory

In this context of this prologue, it's worth to mention also the Chaos theory, first coined by H. Poincarè at the beginning of the 20th century, then empirically explained with the work of the meteorologist E. N. Lorenz: it describes the unpredictability of evolutions in the dynamics of a system. The Lebanese professor N. N. Taleb wrote in his mind-blowing masterpiece entitled Black Swan, the impact of the highly improbable that the modern world is increasingly dominated by rare events[3], and so happens in political, economical and social system. The two theories (chaos and complexity) actually shares many elements in common (non linearity, butterfly effect..), and often a complex systems shown in its trend period of apparently chaotic status. However, the two have properties which are typical only of one of them, for example the emergence (cited before) is typical of Complex system trends, while the scale Invariance (a feature of objects or laws that do not change if scales of length, energy, or other variables, are multiplied by a common factor, and thus represent a universality[4]) is a typical properties theorized for Chaotic systems only. While in chaotic systems uncertainty is due to the inability of knowing the initial condition of the system, instead, in complex systems, uncertainty is an inherent property due to the notion of emergence[5]. Also, while chaos theory studies deterministic systems, complexity theory studies non-deterministic systems. As such, to understand social systems that are non-deterministic by essence, it is better to use complexity theory[6].

Complexity theories in politics, geopolitics and human geography

Complexity theory, also known as complex systems theory, is as said above an important and active area of study in various fields such as physics, biology, economics, and computer science. The first use of Complexity theory in human geography was in the late 1990s in the article published in 1999, where N. Thrift suggested that complexity is "spatial"[7]. Other authors cited it international relations applications. Manson in a 2001 article argues that there are three

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3   Taleb, N. N. (2008). The black swan. Penguin Books

4   https://en.wikipedia.org/wiki/Scale_invariance#:~:text=In%20physics%2C%20mathematics%20and%20statistics,and%20thus%20represent%20a%20universality.

5   Lartey, Franklin. (2020). Chaos, Complexity, and Contingency Theories: A Comparative Analysis and Application to the 21st Century Organization. Journal of Business Administration Research. 9. 44. 10.5430/jbar.v9n1p44.

6   Lartey, Franklin. (2020). Chaos, Complexity, and Contingency Theories: A Comparative Analysis and Application to the 21st Century Organization. Journal of Business Administration Research. 9. 44. 10.5430/jbar.v9n1p44.

7   Thrift, N. (1999). The Place of Complexity. Theory, Culture & Society, 16(3), 31-69. https://doi.org/10.1177/02632769922050610

major divisions in complexity research: algorithmic complexity, deterministic complexity, and aggregate complexity. Of these, the last one seems the best that offers the opportunity for geopolitical[8] scholars, referring to it as the study of 'how individual elements work in concert to create systems with complex behavior'[9]. There is every reason why the complexity could fit in trying to explain not only to the global (dis)order system, but also to the microspheres in it, and for instance, to some of conflicts that fuels the globe, especially those that have been dragging on for years and which probably hides more complex features such as interconnectedness and continuous evolution of actors, multibranched reason conflicts… etc.

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The Israeli Palestine conflict under the lens of Complexity theory

The Israeli-Palestinian conflict, with its far-reaching geopolitical implications and intricate dynamics, invites the application of complexity theory as a means to comprehensively understand and explain its layers and its event sequences.

In its paper, H.B. Yehuda analyzed[10] a nearly 50-years of wars and war crisis overall the globe and calculated through a linear composite index and assessed the correlation between this index and the outcomes of the war (or war crisis). In common with this research, this article shares part of sorting categories of main complexity features through which a conflict can be assessed, but through this article, a new group has been introduced and used to assess the degree of complexity of the Palestinian-Israeli dispute and sort their traits. The additional category has been added considering one of the ontologies found in the field of the design, that is the triad "structure – function – behavior". The paper cited above addresses two main features through which a conflict can be analyzed in terms of complexity, namely the issue complexity, which is the substance and scope of conflict (the core issues behind it, our function), and the structure complexity, that represents the number, and their type and power amount of the actors involved in the conflict, our structure. We developed these features and ramify them, off-shooting in other new branches, and added other feature through which

8   Steven M Manson, Simplifying complexity: a review of complexity theory, Geoforum, Volume 32, Issue 3, 2001, Pages 405-414, ISSN 0016-7185,
https://doi.org/10.1016/S0016-7185(00)00035-X.(https://www.sciencedirect.com/science/article/pii/S001671850000035X)

9   Steven M Manson, Simplifying complexity: a review of complexity theory, Geoforum, Volume 32, Issue 3, 2001, Pages 405-414, ISSN 0016-7185,
https://doi.org/10.1016/S0016-7185(00)00035-X.(https://www.sciencedirect.com/science/article/pii/S001671850000035X)

10   Ben-Yehuda, H. (2008). War Complexity and Outcomes, 1946-2002. Journal of Conflict Studies, 28. Retrieved from https://journals.lib.unb.ca/index.php/JCS/article/view/11250

assessing complexity strictly linked to the general Complexity and chaos theory, which we will call for this purpose process complexity, our behavior.

Structure: Structural complexity

With the term structural complexity, Yahuda indicates the type and power rank of wars and war crisis adversaries[11]; while still borrowing this concept for our research, we will extend it and delve it to additional interpretations, such as the structure not only as a composition but also as a spatial layout, its space of action, indeed meaning the geographical framework and relative implications in which the conflict evolves.

Layout of actors involved in the debate: proliferating and interfering

The first reason shared by most of those conflicts that could be classified as complex is the number and the diversity of actors among which the conflict acts and develops; it's true that we've never heard more than two factions involved in this dispute, but it's also true that many state and non-state actors have been interacting in it through years, as mediators, supporters, or opponents.

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Without detailing all actors involved in the dispute (we prefer to refer to it as dispute since we are discussing about the whole story of the confrontation, even if at the time of writing, December 2023, the word conflict or war applies), which is not the scope neither the aim of the article, we will just give a short overview about them and their interactions.
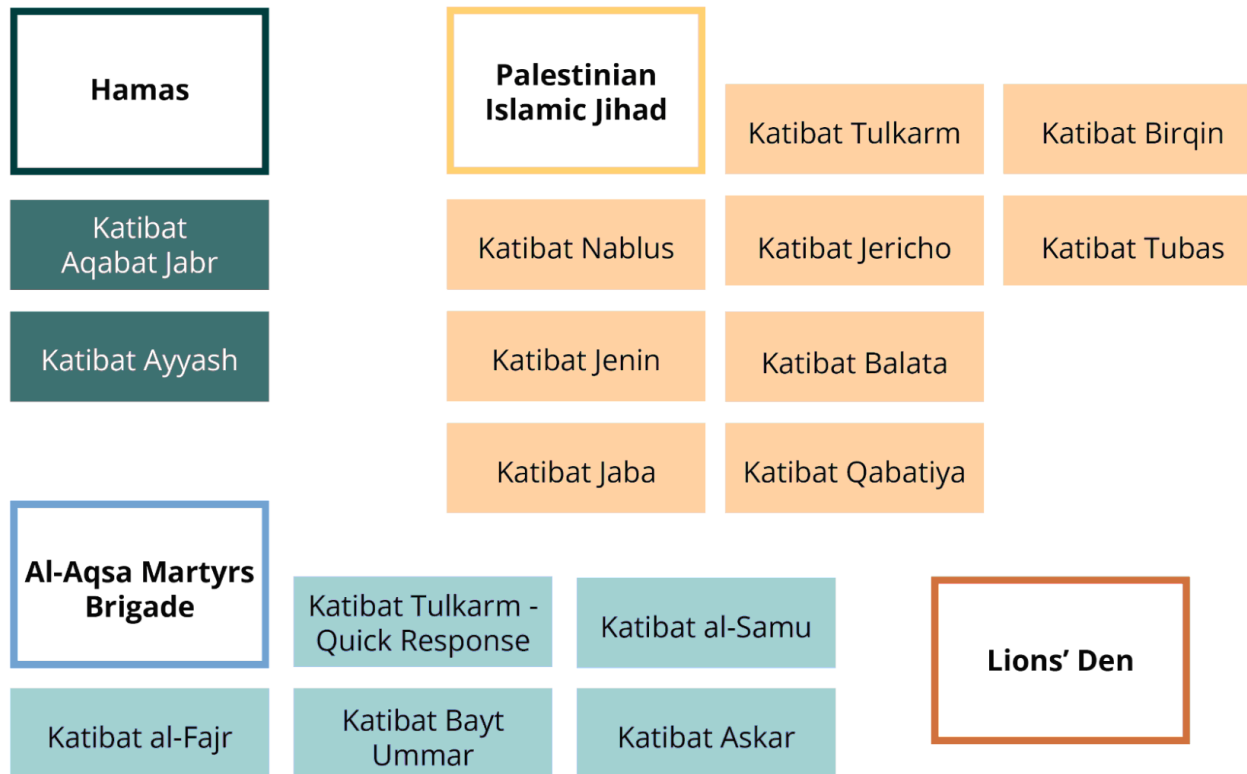
- **Palestinian leaderships,** mainly divided in the Palestinian Authority and Hamas group, but in the field of the conflicts both operating towards the liberation of Palestine, albeit with different ideas about details of areas involved and means to chase it.
- **Other Palestinians armed groups:** ACLED records 23 active armed groups[12] in the West Bank only, between October 2022 and September 2023.
- **Israeli establishment:** divided in a right-wing which is skeptical about a possible peace process, and a left-wing side which has become increasingly marginalized
- **European engagement:** historically, few international issues have break up the Brussels parliament more than those related to Middle East. In the 4 decades long conflict,

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11   Ben-Yehuda, H. (2008). War Complexity and Outcomes, 1946-2002. Journal of Conflict Studies, 28. Retrieved from https://journals.lib.unb.ca/index.php/JCS/article/view/11250

12   Dr. Ameneh Mehvar and Nasser Khdour; The Resurgence of Armed Groups in the West Bank and Their Connections to Gaza, 14 December 2023 https://acleddata.com/2023/12/14/the-resurgence-of-armed-groups-in-the-west-bank-and-their-connections-to-gaza/

Armed Groups in the West Bank
October 2022 - September 2023

Hamas	Palestinian Islamic Jihad		
		Katibat Tulkarm	Katibat Birqin
Katibat Aqabat Jabr	Katibat Nablus	Katibat Jericho	Katibat Tubas
Katibat Ayyash	Katibat Jenin	Katibat Balata	
	Katibat Jaba	Katibat Qabatiya	

Al-Aqsa Martyrs Brigade	Katibat Tulkarm - Quick Response	Katibat al-Samu	Lions' Den
Katibat al-Fajr	Katibat Bayt Ummar	Katibat Askar	

*The affiliations of new armed groups have been determined by the authors based on an analysis of the groups' self-identification and official statements of support by traditional factions.

Europe took each time a different and sometimes an ambiguous side. But in each countries it's possible to see how the support to one or the other faction has been highly correlated to trends, such as the political establishment in force (a shift towards pro-Israel position in times of Sarkozy for France, or in Italy when right held majority), or such as the general feelings that reign in a specific moment (such as a shift against Palestine for religious reasons after the fear of terror that spread after 11 September attack, or in case of how a specific group related to one or the other cause..).

- **Arab states of the area:** Arab states are linked by a religious bond to Palestine but taking for instance the six Gulf Cooperation Council (GCC) states, a spectrum of positions toward Israel reveals: from no ties (Kuwait) to pragmatic coexistence (Oman, Qatar, and Saudi Arabia) to full normalization (Bahrain and the United Arab Emirates). Other Arab states took parts in previous conflicts between Israel and Palestine like Iraq, and other like Egypt, Iraq, Jordan, Lebanon (and its Hezbollah party), and Syria had issues with Israel which would favors their position closer to Palestinian.

- **Humanitarian Organizations** UNRWA (United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA), established in 1949 by the UN General

Assembly, to supply emergency humanitarian relief to Palestinians displaced during the first Arab-Israeli war in 1948. Despite its neutrality, and its eventually its mediation-aimed intervention, in many occasion has been involved in the dispute, especially because their members are hired from local populations.

- **United States meddling:** many advocacy and lobbying groups are also involved in the conflict, seeking to draw international attention to the interests of both sides; in particular the Jewish-American Israel lobby has been an important actor in the Middle East conflict for decades, with considerable political weight in Washington.

Apart from main active actors, both factions have ties around the worlds, and often these partners may gets indirectly involved in the debate or somehow influence the general perspective about it:

- **Palestine** has connections with Arabs and Muslim communities, for religious and ethnic reasons, but draws also popular sympathy within former European colonies in Africa and Asia that having fought for their national liberation.

- **Israeli** side instead tends to aggregate the world's small Jewish population, but also all those parties that fear that underlying criticism of Israel is longstanding antisemitism, or also Evangelical Christian communities, for whom the conflict has biblical prophetic implications and for whom it echoes the historic struggle for the Holy Land[13]. Israeli also tends to gather communities in western liberal democracies for whom Palestinian militancy and Islamic-fueled resistance echoes Islamist terrorism post 9/11[14].

Geographical diversity and the Miscellany of terminologies

Given the fragmented and continuously-shifting nature of the Israeli-Palestinian conflict, where territorial boundaries have become fluid and subject to constant change, the application of complexity theory becomes crucial to understand the multifaced nature of this dispute. Since the concept of Sovereignty implies the existence of geographic space over which control is exerted, and being at its core the Israeli-Palestinian conflict a dispute over land, it's difficult to discuss about it on a spatial profile without a clear and stable geographical layout. As E. Weizman's book "Hollow Land" vividly illustrates, traditional notions

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13   Omar Shahabudin McDoom; How Unique is the Israel-Palestine Conflict? November 8th, 2023 https://blogs.lse.ac.uk/mec/2023/11/08/how-unique-is-the-israel-palestine-conflict/

14   Omar Shahabudin McDoom; How Unique is the Israel-Palestine Conflict? November 8th, 2023 https://blogs.lse.ac.uk/mec/2023/11/08/how-unique-is-the-israel-palestine-conflict/

of static borders have given way to dynamic and temporary lines of engagement, frontiers are deep, shifting, fragmented and elastic [..]. These borders are dynamic, constantly, shifting, ebbing and flowing[15] challenging conventional mapping techniques and the delineation of distinct territories. The proliferation of border-synonyms such "separation walls", "barriers", "blockades", "closures", "road blocks", "checkpoints", "sterile areas", "special security zones", "closed military areas" and "killing zones"[16] has further distorted the concepts of territory and sovereignty, making it difficult to provide a comprehensive explanation.

Function: issues complexity

Issues complexity can be a measure to tackle all complexities related to the core issues behind the conflicts, that include both substance and reasons of its existence. It basically reflect the layering degree of the conflict nature, and is intended as the function of the conflict in terms of its final purpose.

Issues and layers of the conflict

Intricated actors (and relative relationships) are moving end evolving, but there is an other aspect of the dispute which articulates on many pillars and intersecting layers, that can relate and demonstrate the complexity of the conflict: the issues, that are simply, the reasons behind it.

- **Ethnic:** Ethnic conflict arises when different ethnic groups compete for the same goal, that can be power, resources, or territory, and this definition can in part apply to the Dispute in the region; indeed, on October 2023, a UN human rights expert warned that Palestinians are in grave danger of mass ethnic cleansing[17]. The existence of this feelings even alone in the dispute concerns the degree of violences and perpetration of itself, indeed there is proved evidence that there's a correlation between stronger ethnic group identities and violent features of conflicts[18].

- **National**: Nationalism is a belief and an ideology that emphasizes the interests and welfare of a particular nation or group of people, often advocating for the recognition and promotion of their identity, culture, and values. Israeli nationalists justify their belief of creating an Israeli state over the Palestinian land as their natural right for self-

15   Weizman E. (2007). Hollow land : israel's architecture of occupation

16   Weizman E. (2007). Hollow land : israel's architecture of occupation

17   UN expert warns of new instance of mass ethnic cleansing of Palestinians, calls for immediate ceasefire 14 October 2023 https://www.ohchr.org/en/press-releases/2023/10/un-expert-warns-new-instance-mass-ethnic-cleansing-palestinians-calls

18   Vitaly Naumkin; Ethnicity and Violence in the Modern World: the Case of Israeli-Palestinian Conflict; April 24, 2014 https://russiancouncil.ru/en/analytics-and-comments/comments/ethnicity-and-violence-in-the-modern-world-the-case-of-israe/
Myers, D. (1988). History as Ideology: The Case of Ben Zion Dinur, Zionist Historian "Par Excellence"
Jawad, S. A. (2006). The Arab and Palestinian Narratives of the 1948 War. In R. I. Rotberg, Israeli and Palestinian Narratives of Conflict: History's Double Helix

determination: the Israelis claim that the state of Israel is built on their original land 18 (historical Palestine) and they existed there two thousand years ago, hence, they have the right to own it (Myers, 1988), while the Palestinian nationalist justify their resistance against the Israelis as their right to defend their nation. The Palestinians believe that they have the right to claim the state of Palestine and end the occupation as it was their land for thousands of years (Jawad, 2006). Both people are ready to kill or die for the sake of the nation.

- **Historical**: historical narratives have always been employed (created and propagated) by states, population groups and communities to share their history, their cohesion and their relationship with external entities. Histories have been used for record-keeping, to reinforce the group identity, but have also been widespread used to animate and coordinate population toward a common enemy, or to justify wars ant territorial conflicts[19], serving political and geographical purposes. In the case of Israeli-Palestinian conflicts, we have more than one century of history in which narratives and ideologies moved populations one against the other, leading to an ever surviving climate of resentment and violence perpetration. The roots of the conflict can be traced to the late 19th century; at that time most of the Jews worldwide lived outside Palestine[20], predominantly in eastern and central Europe. Was before the I World War that national movements like Zionism and Arab nationalism rose, bringing their goals to surface through different narratives. Though the Jewish aspiration to return to Zion had been part of Jewish religious thought and narratives for centuries earlier, the Jewish population began to more actively discuss and disseminate narratives onto immigration back to the Land of Israel, and the re-establishment of the Jewish Nation, only in the second half of the nineteenth century (also as a response to the widespread persecution of Jews and antisemitism in Russia and Europe).

- **Ideological** (ideologies not cited in previous points): an Ideology can be defined as a set of ideas that constitute the goals and interests of a group within a society. Regarding the ideologies in the political spectrum, left wings around the world sees them as an oppressed class of people whose racial subjugation is underwritten by capitalist and imperialist nations[21] such as the United States and United Kingdom while progressives see the dispute and land deprivations from Israeli will in human rights and humanitarian terms[22].

- **Religious:** with a majority of Palestinians identifying as Muslim (85% of the West Bank

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19   https://www.kreddha.org/activities/history-and-international-law-projects/understanding-conflicting-historical-narratives

20   https://en.wikipedia.org/wiki/History_of_the_Israeli%E2%80%93Palestinian_conflict#:~:text=The%20history%20of%20the%20Israeli,of%20Israel%20in%20Jewish%20tradition.

21   Omar Shahabudin McDoom; How Unique is the Israel-Palestine Conflict? November 8th, 2023 https://blogs.lse.ac.uk/mec/2023/11/08/how-unique-is-the-israel-palestine-conflict/

22   Omar Shahabudin McDoom; How Unique is the Israel-Palestine Conflict? November 8th, 2023 https://blogs.lse.ac.uk/mec/2023/11/08/how-unique-is-the-israel-palestine-conflict/

and 99% of Gaza[23]) and a majority of Israelis identifying as Jewish (74%[24]), religious beliefs and narratives play a significant role in shaping attitudes, perceptions, and actions. The conflict is indeed often framed in religious terms, with holy sites and religious symbolism being integral to the narratives of both sides, with immense religious significance for Muslims and Jews, making any potential compromise on these issues particularly challenging. Extreme religious Zionists in Israel, who view themselves as custodians of the Jewish state[25], often hold uncompromising positions and resist concessions to Palestinians, especially for locations like foundation of the First and Second Jewish temples and where, the Dome of the Rock. Similarly, Islamist groups in Palestine and other parts of the Islamic world place religious justifications at the forefront of their resistance against Israel, arguing for the liberation of what they perceive as sacred territory (for instance where the Al Aqsa Mosque is located). The intertwining of religious beliefs and political motivations creates a complex dynamic that fuels tension and spur efforts towards peaceful resolution.

Behavior: Process complexity

The last side of the conflict – and probably the main relevant one - that shows typical complex traits is the process. Process complexity includes factors such as power dynamics, communication patterns, decision-making processes, and the emergence of behavioral tendencies that contribute to sustain and feed the conflict in a dangerous spiral of violence.

Non-linearity and Feedback Loops:

Complexity theory highlights how interconnected events in a conflict can progress in an expected way, both combining together and realizing or approaching what they aim to obtain, like when constructive interference occurs if two identical waves are superimposed in phase; or they can combine causing zero effect at all, or realizing the opposite, thus behaving in a non-linear dynamics, and in the case of the main dispute under this article, contributing to the perpetuation of violence. The actions of both Israeli and

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23   https://en.wikipedia.org/wiki/Islam_in_Palestine

24   https://en.wikipedia.org/wiki/Demographics_of_Israel#:~:text=As%20of%20March%202023%2C%20Israel's,%25%20 (around%202.048%20million).

25   Slater, J. (2012). Zionism, the Jewish State, and an Israeli-Palestinian Settlement: An Opinion Piece. Political Science Quarterly, 127(4), 597–625. http://www.jstor.org/stable/23563220

Palestinian actors often produced unpredictable reactions from the other side, creating a vicious cycle of retaliation and escalation.

Retaliation: is a strategic response to aggression, aimed at achieving deterrence. It involves employing a disproportional use of force against an aggressor state that has initiated hostilities. The intention behind massive retaliation is to discourage any future attempts of aggression by demonstrating the severe consequences of initiating an attack. However, in the case of this conflict, aggressive violence only created diffused desires of revenge.

From the Nakba to the Intifadas, we have witnessed a never-ending pattern of oppression followed by war, exploitation followed by retaliation[26]. This non-linearity challenges a (traditional) linear approaches to conflict resolution: One act of destruction leads to another, which leads to other acts of subjugation, which in turn lead to still more acts of violence — such is the nature of a vicious cycle, the unfortunate reality of historical contingency[27].

Complex systems experience tipping points, where small changes can lead to sudden and significant shifts in the overall behavior. The Israeli-Gaza conflict has witnessed events triggering cascading effects, such as political assassinations, terrorist attacks, or large-scale military operations, which in turns brought waves of revenge attacks and retaliatory violences. These events can alter the dynamics of the conflict, pushing it towards further escalation or, conversely, providing opportunities for de-escalation if leveraged effectively.

These types of events described above are recalled in complex theory also as feedback loops: A feedback loop is a process in which the outputs of a system are circled back and used as inputs, and the process (the conflict, in this context) proceeds by itself with no need of new external sources, triggers or reasons. In Conflict Theory, the importance of feedback loops to maintain and exacerbate a conflict are recalled by the expert R. Collins, who affirmed yet decades ago that conflict escalates through a series of feedback loops[28], who provided many examples, one of them described hereafter: external conflict increases solidarity within the attacked group, but solidarity also be critical to relationship with the aggressor and became the trigger to the escalation, in two ways: groups with high solidarity are on the one side more motivated to mobilize and fight, and on the other side more sensitive to threats to their boundaries.

Presence of attractors

Despite a complex system may at a first glance appear as a random and disordered environment, it will displays a type of order in it's process: there is an underlying pattern of order that is

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26   Fawwaz Malki Shoukfeh, Trapped in a Vicious Cycle: Reflections on the War in Gaza, October 13, 2023 https://harvardpolitics.com/reflections-on-gaza-war/

27   Fawwaz Malki Shoukfeh, Trapped in a Vicious Cycle: Reflections on the War in Gaza, October 13, 2023 https://harvardpolitics.com/reflections-on-gaza-war/

28   Collins, R. (2012). C-Escalation and D-Escalation: A Theory of the Time-Dynamics of Conflict. American Sociological Review, 77(1), 1-20. https://doi.org/10.1177/0003122411428221

recognizable when the phase space of the system is mapped, known as a strange attractor[29]. Complexity science and dynamic systems theory provide insights into how the various factors affect conflict development, progression, and change over time, and the attractor mentioned above is one concept of this theory; an attractor is any coherent, consistent, persistent, and stable state within a system, and its stabilizing force tends to keep a given system in a particular state over a long period of time[30].

And indeed, the Israeli-Palestinian conflict manifests stability and perseverance over the years, and some of the attractors sustaining the conflict over time around an "ordered turmoil" can be mentioned hereafter:

- When a conflict survive over a certain amount of time, groups involved in this ongoing and protracted live the strife through years, decades, and the hostilities eventually flows and transform through generations, preserving and enhancing antagonistic attitudes, especially through narratives, images, stories, stereotyping and generalizations
- Denigrating and vilifying the adversary throughout the long years of contention
- When an external threat occur to a strongly bonded community, what can happen is that the collective identity may become even more consolidated and the cohesion increases against the enemy, contributing to following a path of counterattack and abandoning any possibility of mediation and bargaining

Barriers include structural, psychological and strategic impediments that cripple the interaction between the belligerent sides[31].

- Parties are most vulnerable to fall back into the trap of rancor and discord shifting reticently from the comfort zone of defiance to the uncertainty of compromise. Next communicational and psychological sources of intractability in the Palestinian-Israeli strife are probed to finally come up with several suggestions of how to tackle the pattern of recurring confrontation toward a better future for both parties.
- The presence of an even small accumulation of emotional frame can sparks a process of bias and distortion of future information about the conflict and help corroborating a preconceived selected and skewed view of the other. Such biased predispositions are to be found both on the Israeli-Jewish side and the Palestinian-Arab side.
- If cultures are bonded to the collective mythologies of heroism, glory and sacrifice (also on a religious point of view), the perpetration and resilience in a climate of conflict will prevail. In his book, Antonio Bandura names "moral disengagement"[32] these devices

29   Ben Ramalingam and Harry Jones with Toussaint Reba and John Young;
https://realkm.com/2019/03/18/exploring-the-science-of-complexity-series-part-16-concept-7-strange-attractors-and-the-edge-of-chaos/

30   Michaels, J.L. (2017). Social Forces Sustaining the Israeli-Palestinian Tensions: A Dynamical Psychology Perspective. International Journal of Conflict and Violence, 11, 1-17. doi: 10.4119/UNIBI/ijcv.255

31   Peleg, Samuel. (2015). QUINTESSENTIAL INTRACTABILITY: ATTRACTORS AND BARRIERS IN THE PALESTINIAN-ISRAELI CONFLICT. Cardozo Journal of Conflict resolution.

32   Bandura, Albert (2015). Moral Disengagement.

that allow us to disengage from moral rules (such as those of peace) and to come to terms with our moral criteria, while still managing to maintain a sense of integrity.

- On the Israeli side, a siege mentality accentuated by an extended experience of isolation and alienation coupled with an acute and tormenting recollection of the Holocaust, contributes to an incessant suspicion of Arab intentions: analogies of Nazis with Arabs, then with Palestinians keep resurfacing with any new flare of disputation. On the Palestinian side, a severe sense of victimization has been compounded with every historical calamity they suffered. This historical attachment allows both parties to cling to an internationally recognized narrative to gain support from the world, and can also be called as the fallacy of the insidious analogy.
- Narratives spread, like the "colonialist" vs "primitive" or "civilizator" vs "terrorist".

Self-Organization and Emergence:

Complexity theory suggests that within complex systems, self-organized patterns emerge without central control. In the Israeli-Gaza conflict, both Israeli and Palestinian societies exhibit emergent behaviors where groups and organizations come together around shared identities and objectives. These emergent patterns can hinder peacemaking efforts as fragmented groups impose their agendas, further complicating the pursuit of a comprehensive solution.

Robustness and Resilience:

Complex systems tend to be robust and resilient, adaptable to changing circumstances. Similarly, the Israeli-Gaza conflict has showcased an enduring resilience, with periodic ceasefire agreements that temporarily reduce violence, but rarely provide a long-term resolution. This resilience arises from various factors, including historical narratives, deep-rooted identities, geopolitical considerations, and external influences.

Addressing complexity: a political strategy or a changing opportunity?

Chaos may be part of Israeli strategy, which sounds strange if promoted by the country on the top 10 list of powerful countries in the world[33] according to UN News&World Report. Chaos has indeed its own advantages: Henry Kissinger coined the term constructive ambiguity, to define the voluntary blurring of conflicts limits to disguise an inability to resolve a contentious issue on which the parties remain far apart and to do so in a manner that enables each to

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33   Staff, Toi (2023) Israel ranks among 10 most powerful countries in annual list;
https://www.timesofisrael.com/israel-among-10-most-powerful-countries-in-the-world-in-annual-list/

claim obtaining some concession on it[34]. This strategy of elasticity of borders, approach and geography can help in obfuscate and naturalize the fact of domination, unleashing processes that would create conditions too complex and illogical to make any territorial solution in the form of partition possible (many of the settlements were indeed constructed With the aim of creating an irresolvable geography) while pretending that it is only the Israeli government that has the know-how to resolve the very complexity it created[35].

Applying complexity theory to the Israeli-Gaza conflict underscores the need for comprehensive approaches that consider the interplay of multiple factors at various levels. A successful resolution will require acknowledging the dynamic and non-linear nature of the conflict, breaking away from conventional approaches that oversimplify the complexities involved, here below are some possible pillars:

- Embracing Complexity: Recognizing the complexity of the Israeli-Gaza conflict requires engaging with multiple stakeholders, including diverse communities, non-governmental organizations, and international mediators. Consensus-based solutions should be developed, fostering dialogue that incorporates various perspectives and priorities.
- Addressing Causes: Complexity theory emphasizes the importance of addressing the underlying causes of conflict. To achieve sustainable peace, the grievances of both Israeli and Palestinian communities, such as land disputes, access to resources, and self-determination, need to be addressed through a holistic approach.
- Adaptive Governance: Creating adaptive governance systems that can adjust to changing circumstances is crucial. Flexibility and strong institutional structures can enable policymakers to respond effectively to emerging challenges and opportunities throughout the peace process.
- Stakeholder Empowerment: Complex systems thrive on decentralized decision-making and empowerment. Empowering local actors to shape the peace process can generate innovative solutions and promote ownership, strengthening the chances of lasting peace.

Applying complexity theory to the Israeli-Gaza conflict helps to comprehend the intricate dynamics that perpetuate the dispute. By acknowledging the non-linearity, emergent behaviors, tipping points, and resilience of the conflict, we can develop more robust and adaptive strategies to foster sustainable peace.

Yet peace remain elusive. ■

34   https://en.wikipedia.org/wiki/Constructive_ambiguity#:~:text=Constructive%20ambiguity%20is%20a%20term,is%20often%20disparaged%20as%20fudging.

35   Weizman E. (2007). Hollow land : israel's architecture of occupation
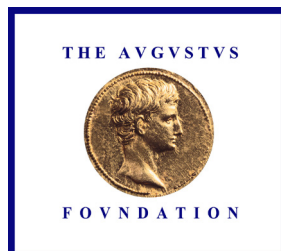
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