THE INFLUENCE OF TIME ON THE DYNAMICS OF CRIME: INTEGRATING KOZYREV'S TEMPORAL FLOWS INTO THE HOMEOKINETIC APPROACH IN CRIMINOLOGY

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Abstract

This article examines the integration of Nikolai Kozyrev's theory of time into the homeokinetic approach for analyzing the dynamics of crime as an open system of interaction within the "criminal-victim-environment" triad. It demonstrates that time in this context acts not as a passive backdrop but as an active modulator of flows of matter, energy, and information that shape criminal events. The theoretical foundations, practical cases with statistical trends, and critical limitations of the approach are explored. New directions for research and preventive strategies are proposed, taking into account temporal dynamics.

Keywords homeokinetics, criminology, time, Nikolai Kozyrev, crime, dynamics, spatiotemporal models, social physics, prevention, criminal behavior

Introduction

The analysis of criminality in complex social systems requires the integration of various scientific approaches that account for the multifaceted nature of spatiotemporal processes. Homeokinetics is a transdisciplinary theoretical model developed by Arthur Iberall in 1972, which views viable systems as open, dynamic entities with complex flows of matter, energy, and information [Iberall, A. S., 1972]. In this work, the homeokinetic approach is applied to understanding crime as a process occurring in the interaction between the criminal, the victim, and the social environment. Here, crime emerges from imbalances in these flows: matter (e.g., physical tools or spaces), energy (e.g., psychological aggression or resistance), and information (e.g., signals, stereotypes, or media influences). However, as noted in the foundational discourse, these exchanges occur not merely in space but along temporal trajectories, where time itself plays an active role in shaping outcomes.

To overcome this limitation, it is proposed to integrate the innovative, albeit controversial, theory of time by Nikolai Kozyrev, according to which time is a physical entity with density, direction, and instantaneous propagation that modulates energy balances and causal chains [Kozyrev, N. A., 1971]. Developed in the mid-20th century amid personal and scientific adversities, Kozyrev's ideas suggest that time influences irreversible processes, such as those in criminal acts, by altering energy balances and causal chains. By applying temporal flows to homeokinetics, we can reframe crime as a time-dependent dynamic, where the "flow of time" modulates the triad's interactions, potentially enhancing predictive and preventive strategies in criminology. This integration draws on dynamic theories in criminology that emphasize space-time patterns, while acknowledging the speculative nature of Kozyrev's work, which has faced significant criticism for lacking reproducibility.This synergy allows for viewing crime as a time-dependent dynamic process with new perspectives for forecasting and prevention.

Methodology

The study employs conceptual analysis and synthesis of theoretical models from homeokinetics and Kozyrev's concept of time. To illustrate practical significance, statistical data from the U.S. Bureau of Justice Statistics (BJS) for the period 1993–2023 are used, demonstrating trends in violent crimes and criminal victimization [Bureau of Justice Statistics, 2023a][Bureau of Justice Statistics, 2023b]. Additionally, more recent data from the Council on Criminal Justice (CCJ) reports for 2024 and mid-2025 are incorporated to extend the analysis [Center for Public Safety Initiatives, 2025][Council on Criminal Justice, 2024][Council on Criminal Justice, 2025]. A systematic review of scientific literature on social physics, complex systems theory, and criminology is conducted to identify the potential and limitations of the integrated approach.

Main Text

Homeokinetics as a Theoretical Basis

Homeokinetics views systems as open, self-regulating structures that maintain organization through continuous exchange of matter, energy, and information [Iberall, A. S., 1972]. In the criminological paradigm, this means studying crime as an interaction within the "criminal-victim-environment" triad, where:

- **Matter Flows** — material elements: tools of crime, physical objects, bodily actions, spatial conditions that influence the nature and consequences of the crime;
- **Energy Flows** — psychological and social dynamics: aggression, fear, resistance, emotional tension that changes the state of participants and affects the intensity of events;
- **Information Flows** — verbal and nonverbal signals, social stereotypes, and media influences that shape expectations, reactions, and model behavior.

We suggest [Tuliakov, V.,, 2013] that in modern criminology, crime is a disruption in the open system of criminal-victim-environment: the criminal introduces disequilibrium via aggressive energy flows, the victim responds with formational or energetic countermeasures, and the environment (society) amplifies or dampens these through socioeconomic factors. For instance, economic inequality might channel matter flows (e.g., access to weapons), while social media accelerates informational cascades, leading to a critical threshold where crime manifests. Critically, this is not static; exchanges follow trajectories over time. A provocation might build energy gradually, culminating in violence, or informational rumors could dissipate if interrupted. Yet, traditional homeokinetics underemphasizes time's intrinsic role, treating it as a mere backdrop rather than an active participant. This gap invites integration with theories that physicalize time, enhancing the model's explanatory power for both individual crimes and broader criminality patterns. Spiral escalation of aggression, rapid informational cascades on social networks, socioeconomic factors all of this leads to the accumulation of imbalances and the achievement of critical points of irreversibility that generate crime. These flows are dynamic in space and, importantly, in time.

Integration of Kozyrev's Theory of Time

Nikolai Kozyrev, a Soviet astrophysicist rehabilitated after Stalinist imprisonment, proposed in his 1958 work *Causal or Asymmetrical Mechanics in Linear Approximation* that time is not an abstract dimension but a physical "substance" with properties like density and directional flow. Unlike Einstein's relativity, where time is symmetric and indistinguishable from space in some contexts, Kozyrev argued time drives irreversibility: it flows from past to future, powering processes like stellar energy production or entropy increase. In contrast to the classical view of time as a passive background, Kozyrev proposes a physically active time with parameters of density, direction, and instantaneous propagation [Kozyrev, N. A., 1958][Kozyrev, N. A., 1971]. Specifically, time in this model:

- Changes in density in processes with irreversibility, potentially releasing or absorbing energy. Time's "thickness" varies near material bodies or during irreversible events, potentially releasing or absorbing energy. For example, in experiments, Kozyrev observed weight changes in gyroscopes spun against time's flow or during sugar dissolution, attributing this to altered temporal density.;
- Propagates instantaneously in space, allowing for rapid transmission of informational influences. Temporal influences spread instantly across space, unlike light's finite speed, allowing detection of stars' "true" positions via telescopes equipped with sensors.;
- Interacts with matter, contributing to the development of complex systemic dynamics. Time interacts with matter, converting into energy during irreversible processes, countering entropy's dominance.

While innovative supported by some replications, like 1991 Novosibirsk experiments confirming gyroscope effects, Kozyrev's theory has been dismissed as pseudoscience due to methodological flaws and non-falsifiability. Nonetheless, its emphasis on time as an active force resonates with quantum and systems theories [Ksenzhek, O. (2001)], offering a lens for criminology's dynamic models.

Applying this concept to the homeokinetic triad of crime means that temporal flows modulate matter, energy, and information, influencing their intensity, speed, and nature of interaction.

Temporal density influences the trajectories of matter, energy, and information exchanges. Crime, as an irreversible event, alters time's local density, amplifying disequilibria and creating feedback loops

Temporal Modulation of Flows in the Triad:

Matter Flows: Physical elements like weapons or spaces are trajectories shaped by time. Kozyrev's instant propagation implies that environmental disturbances (e.g., a distant economic crisis) instantly affect local time density, accelerating matter accumulation toward crime. For example, in a robbery, the criminal's access to a tool isn't isolated; temporal flow "condenses" around the act, making the event inevitable once a threshold is crossed, akin to how Kozyrev saw time fueling stellar fusion.

Energy Flows: Psychological dynamics like aggression or fear are energized by time's directionality. Irreversible escalations (e.g., a victim's provocative response) decrease temporal density, releasing "temporal energy" that intensifies violence, mirroring Kozyrev's gyroscope

experiments where counter-flow motion lightens weight. Time's flow thus dictates the pace: slow buildup in stalking versus rapid bursts in impulsive assaults.

Information Flows: Signals, such as media rumors, propagate instantly per Kozyrev, influencing expectations across the triad. A viral social media post about vulnerability could instantly alter time density in the environment, triggering informational cascades that precipitate crime, beyond mere communication delays.
In this integrated model, crime emerges at "critical temporal points" where flows misalignment, modulated by time's density, tips the system. The victim's active role (e.g., confident behavior diffusing energy) can counteract by aligning with time's flow, preventing irreversibility.

This approach explains both local and global temporal dynamics of crime, including pandemic influences, changes in social stability, and informational fleeting explosions.

Example of the Decline in Violent Victimization in the USA

Statistical data from the BJS from 1993 to 2023 demonstrate a sustained decline in violent crimes in the USA: from 79.8 cases per 1,000 persons in 1993 to 23.5 in 2022, with a further decrease of 11% in 2023, bringing the rate to approximately 20.9 per 1,000 persons aged 12 and older for nonlethal violent victimization [Bureau of Justice Statistics, 2023a][Bureau of Justice Statistics, 2024]. At the same time, the number of reports of crimes to the police has decreased. This example illustrates the increase in "temporal density" of societal systems, where stability and social cohesion support peaceful ways of discharging conflicts and inhibit the transition of conflicts into crimes.

The instantaneous dissemination of information in media and social networks illustrates Kozyrev's model of informational flows, which can both provoke and restrain criminality beyond traditional temporal-legal boundaries [Kozyrev, N. A., 1971]. The conducted analysis emphasizes the importance of temporal and spatial characteristics, both objective and subjective, in shaping the behavior of victims and criminals.

Regarding homicides, data indicate fluctuations but an overall downward trend in large cities. For instance, the homicide rate in the first half of 2025 was 17% lower on average than in the same period of 2024, representing 327 fewer homicides across studied cities [Council on Criminal Justice, 2025][Center for Public Safety Initiatives, 2025]. This aligns with the integrated model, where enhanced temporal stability through policy interventions modulates energy flows, reducing irreversible violent outcomes.

Discussion

The observed declines in violent crime and victimization rates in the United States, as evidenced by recent data, provide a compelling case for the application of the integrated homeokinetic-Kozyrev framework. Extending the analysis to mid-2025 trends, the Council on Criminal Justice reports a 17% reduction in homicides across 30 major cities during the first half of 2025 compared to the same period in 2024, equating to 327 fewer homicides [Council on Criminal Justice, 2025][Center for Public Safety Initiatives, 2025]. Of the 37 cities providing data, 26 recorded decreases, 9 saw increases, and 2 remained unchanged. Notable reductions include New York City (-34%), Detroit (-32%), Philadelphia (-42%), and Baltimore (-35%), while increases were observed in Memphis (+17%) and Dallas (+15%) [Council on Criminal Justice, 2025][Center for Public Safety Initiatives, 2025]. Broader comparisons show

homicides 14% lower than in the first half of 2019, indicating a return below pre-pandemic levels in many areas.

This continued downward trajectory supports the notion of increased "temporal density" within societal systems, as posited by Kozyrev's theory [Kozyrev, N. A., 1958]. In stable environments, temporal flows align to dampen energy imbalances—such as aggression or fear—in the criminal-victim-environment triad, preventing escalations to critical points of irreversibility. For instance, the instantaneous propagation of positive informational flows (e.g., community policing initiatives or media campaigns promoting social cohesion) can rapidly stabilize matter and energy exchanges, reducing the likelihood of violent disruptions. Cities with significant declines, like Philadelphia and Baltimore, which historically faced high homicide rates, exemplify how interventions enhancing social stability modulate temporal dynamics to foster resilience against crime.

Other crime categories also reflect this pattern: aggravated assaults fell by 10%, gun assaults by 21%, robberies by 20%, and motor vehicle thefts by 25% in the first half of 2025 [Council on Criminal Justice, 2025][Center for Public Safety Initiatives, 2025]. Property crimes, including burglaries and larcenies, decreased similarly, while domestic violence saw a slight 3% increase, highlighting areas where temporal misalignments—perhaps due to lingering pandemic stresses—persist. Compared to 2019, most violent offenses are now below pre-pandemic levels, with aggravated assaults down 5% and robberies 30%, though motor vehicle theft remains 25% higher, suggesting uneven recovery in certain flow domains.

However, the 2023 National Crime Victimization Survey (NCVS) data reveals disparities that complicate this optimistic view [Bureau of Justice Statistics, 2024]. While overall nonlethal violent victimization decreased by 11% from 2022 to 2023 (from 9.8 to 8.7 per 1,000 people), rates increased by 37% for Black Americans (to 12.3 per 1,000), driven by surges in robberies (79%), rape/sexual assaults (47%), and aggravated assaults (16%). In contrast, White Americans experienced a 14% decrease, Hispanics a 23% drop, and other racial groups a 21% reduction. These gaps widened racial disparities, with Black Americans 50% more likely to be victimized than Whites and 40% more than Hispanics in 2023 [Bureau of Justice Statistics, 2024].

From a homeokinetic perspective integrated with Kozyrev's temporal flows, these disparities indicate localized variations in temporal density [Kozyrev, N. A., 1971]. In marginalized communities, socioeconomic factors may dilute temporal stability, allowing informational flows (e.g., stereotypes or media biases) to amplify energy imbalances, leading to higher victimization. The instantaneous nature of temporal propagation implies that systemic inequalities can rapidly exacerbate risks across the triad, underscoring the need for targeted interventions to "condense" time in vulnerable groups through equitable policies.

Full-year 2024 data for 24 cities further contextualizes these trends, showing 70.8% of cities experiencing homicide decreases from 2023 to 2024, with rates ranging from 54.4 per 100,000 in St. Louis to 3.7 in Boston [Center for Public Safety Initiatives, 2025]. Cities like New Orleans (-32.4%) and Washington, D.C. (-30.7%) saw substantial drops, while Indianapolis (+24.0%) and New York City (+14.6%) increased. This variability highlights how temporal flows interact with local environments: in declining cities, aligned flows promote homeostasis, while in rising ones, disruptions (e.g., economic shifts) may lower density, fostering crime.

Overall, these trends affirm the model's utility in explaining macro-level dynamics, where global stabilizers like policy reforms enhance temporal coherence, reducing criminality.

We think that on meso- and macro-levels, temporal flows explain criminality patterns. Societal "temporal densities" vary: high-density areas (e.g., stable communities) resist disruptions, while low-density zones (e.g., amid crises) foster entropy via accelerated flows. Kozyrev's instantaneous aspect suggests global events (e.g., pandemics) instantly ripple, influencing crime waves.

This aligns with criminology's space-time ecology, where crime hotspots evolve dynamically over time.

This synthesis opens avenues for criminology: analyzing temporal trajectories could predict crimes by monitoring flow imbalances, using big data on informational propagation. Prevention might involve "temporal interventions," like community programs that increase social cohesion to stabilize time density, reducing irreversibility risks. However, as with homeokinetics' scaling issues, Kozyrev's application faces challenges: its pseudoscientific status risks unreliable models, and instant propagation complicates empirical testing.

Yet, persistent disparities call for nuanced applications to avoid oversimplification.

Critical inmplications and prospects

Kozyrev's ideas remain controversial due to limited replicability of experiments, risks of reductionism, and moral-ethical aspects of stigmatization [Kozyrev, N. A., 1958]. While promising, integration inherits flaws. Kozyrev's theory lacks mainstream validation, with critics citing experimental artifacts and philosophical overreach. In criminology, reducing complex social phenomena to temporal physics risks oversimplification, ignoring cultural nuances, and could lead to stigmatization if "temporal hotspots" label groups. Methodologically, measuring time density in social systems is elusive, echoing homeokinetics' meso-level difficulties.

Kozyrev’s theory of time as a physical substance with variable density and instantaneous propagation remains highly controversial and is often classified as pseudoscience within mainstream physics. Many of the experimental results cited, such as weight changes in gyroscopes or instantaneous stellar observations, lack independent reproducibility or suffer from methodological flaws, introducing a significant risk of basing criminological models on unverified phenomena.

Criminal behavior arises from deeply complex, multifactorial social, psychological, economic, and cultural processes. Attempting to reduce these to physical properties of time risks oversimplification and neglects human agency, meaning-making, and contextual factors. There is a danger that such physicalist models might obscure rather than clarify the contingencies and nuances of crime causation.

Unlike physical systems, social contexts cannot easily be quantified in terms of “time density” or measured temporal flows. The abstract nature of these constructs hampers operationalization in criminological research, making empirical validation nearly impossible with current tools.

If “temporal hotspot” regions or groups are identified based on perceived low temporal density or increased entropy, there could be ethical concerns. Such labeling risks reinforcing social stigma or stereotyping marginalized populations as intrinsically prone to crime, rather than addressing structural inequality or opportunity.

Kozyrev’s notion that temporal influences propagate instantaneously defies conventional causality and relativity, complicating predictive modeling. This immediate effect challenges traditional incremental approaches to crime prevention and raises paradoxical questions about intervention timing.

Practical Solutions and Concrete Examples Despite Limitations

Despite the speculative nature of Kozyrev’s theory, integrating the concept of temporal dynamics (understood metaphorically or heuristically rather than literally) into criminology offers several practical avenues grounded in empirical and systems theory perspectives:

Dynamic Temporal Mapping of Crime Patterns . Use advanced big-data analytics and space-time GIS (Geographical Information Systems) to map the temporal trajectories of criminal incidents. Example: Urban police departments analyze shifts in crime hotspots not only spatially but temporally to detect “critical time windows” when social disorder peaks, enabling targeted patrols or social interventions at key moments (e.g., late-night curfew enforcement in vulnerable neighborhoods).

Temporal Interventions to Regulate Social Flows Employ community programs designed to modulate energy and informational flows over time, such as conflict mediation sessions that interrupt escalating aggression early, acting as temporal dampeners to prevent irreversibility (violent outbreaks). Example: After-school youth engagement prevents energy buildup linked to boredom or frustration during after-class hours, reducing the temporal density of risk factors.

Early-Warning Systems in Social Media Monitoring. Leverage real-time social media monitoring to detect rapid informational cascades (rumors, incitements) that can precipitate crime waves, providing temporal markers for preemptive communication strategies. Example: Law enforcement uses AI to detect surges in online hate speech or calls for violence, immediately deploying counter-messaging campaigns to “align” informational flows with peaceful norms, mirroring the idea of stabilizing temporal density.

Temporal Resilience in Community Design. Build social environments and institutions enhancing temporal resilience by fostering continuous, positive social interactions that counteract entropy-like social decay. This involves stable employment, education access, public spaces, and trusted institutions that reinforce predictable, healthy temporal flows. Example: A neighborhood with vibrant community centers and strong local networks exhibits “high temporal density,” resisting crime escalation even amid broader societal crises.

Integrating Subjective Time Perception in Prevention Consider individuals’ psychological time perception in interventions (e.g., trauma often distorts time sense, impacting behavior, neutralizing SPSS). Tailored therapies focusing on time awareness may reduce impulsivity or aggression patterns. Example: Cognitive-behavioral programs for offenders incorporate exercises to recalibrate time perception, potentially stabilizing emotional and energy flows linked to violence.

Iterative Model Testing and Multidisciplinary Research. Encourage rigorous testing of temporal hypotheses using mixed methods: longitudinal criminological studies, neuropsychology, social network analysis, and complex systems modeling. This reduces reliance on unverified physical claims and enhances explanatory rigor. Example: A university criminology lab partners with physicists and data scientists to develop simulations incorporating temporal parameters abstracted as "flow rates" rather than literal time density, tested against real crime data.

\Therefore, methodological difficulties arise when scaling the model from the individual level to the group or societal level. Despite this, the integration of temporal flows and homeokinetics opens new spaces for multidisciplinary analysis of crime.

Proposed directions for further research include empirical studies of temporal characteristics of criminal processes, development of preventive strategies taking into account temporal dynamics, and construction of models that integrate temporal and informational flows.

Conclusions

The integration of Kozyrev's theory of time into the homeokinetic approach enables viewing crime as a time-constrained, dynamic process where temporal flows actively modulate interactions of matter, energy, and information. While Kozyrev's theory remains scientifically and philosophically contentious, the broader insight it offers, the importance of time as an active dimension influencing crime dynamics, resonates with existing criminological findings on space-time patterns, escalation processes, and informational cascades. By carefully distinguishing metaphorical vs. literal interpretations of temporal flows, criminologists can:

Develop temporally sensitive models recognizing that crime emerges from evolving trajectories, not isolated acts.

Implement data-driven, time-targeted prevention strategies that disrupt escalating flows before irreversibility sets in.

Avoid reductive pitfalls by integrating temporal concepts within multidisciplinary frameworks grounded in measurable social dynamics.

This balanced approach acknowledges Kozyrev's innovations while remaining anchored in empirical social science, ultimately fostering more nuanced and effective crime prediction and prevention methods. It deepens the understanding of the causality of crime, enhances prognostic potential, and opens effective preventive opportunities in the conditions of modern social systems. At the same time, it requires careful critical analysis and diligent application, taking into account ethical and methodological aspects.

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