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Influence of Historical Memory on the Dynamics of Social Tension

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Abstract – The article considers the influence of historical memory on the change of social tension. It is assumed that the memory is fixed on significant events in the past, which can be associated with current events. In case of conflict, the influence of negative historical memory can lead to its intensification, and significantly accelerate its escalation. Negative historical memory, due to legitimation of power, can cause a revolutionary situation. At the same time, a lack of memory of crises, similar to the current one, or a positive historical memory can lead to a conflict decline. The paper modifies the dynamic model of social tension of two interacting social groups: elites and the general public, taking into account the impact of changes in the economic situation and the impact of another social group. Modification of the model is that the exposure perception intensity of one social group regarding the state of the other one depends on historical memory. We revealed that such inclusion of historical memory in the model could have a significant impact on the simulation results, in particular, to explain why the stabilization or destabilization of the social system occurs under the same initial conditions. The cause of destabilization is the strengthening of positive feedback between the tensions of interacting social groups, caused by negative historical memory. It is shown that consideration of memory influence concerning the events of 1905 allows making a satisfactory model of the social tension change during the revolution of 1917.

Keywords – social tension, historical memory, mathematical model, revolutionary situation

I. INTRODUCTION

Currently, numerous works of sociologists are devoted to the influence of historical memory on the state of society. In the words of Derrida [1] "there is no political power without control of the archives, if not of memory". But according to Foucault "Since memory is actually a very important factor in the struggle... if one controls people's memory, one controls their dynamism" [2]. The presented pictures of the past are determined by modern needs and can pursue different goals, for example, the formation or preservation of national consolidation, positive image restoration of the present and the maintenance of the existing order, criticism of the current state and power [3–5].

In such a case, the events included in the historical memory are subjected to considerable schematization and are largely mythologized. They are subject to the conditions of the Kamenetsky E.

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current state and endeavours of society [6–8]. "Collective memory is not history, though it is sometimes made from a similar material. It is a collective phenomenon but only manifests itself in the actions and statements of individuals... it often privileges the interests of the contemporary" [9]. It can be said that, in many cases, according to D. Lowenthal, "false collective memory" arises [10]. Other historical events tend to be forgotten and in the public perception the history is a chain of discrete events, in which people often try to find cause-and-effect relationships. Events that cause the most intense emotional reaction are mostly remembered. Thus the main events defining the history of this social or ethnic group, and turning into symbols of the group, into part of its political outlook are allocated [6].

Many authors note that "historical memory" is a policy tool that can be used by various elite groups to achieve their goals, in particular, for incitement and resolution of conflicts [4, 13–15]. "In this regard, the political elites, through their "policy of memory", activate the old patterns in society, "including" cultural patterns that mobilize the population, suddenly remembered old grudges, humiliation and violence" [16]. This increases intergroup aggression and violence is seen as a rational and justified response to past aggression [7]. Emotional perception of the situation and historical memory play a crucial role in the conflict intensification [17].

According to R. Garagozov [13] by contrast with the widespread opinion that the socio-economic factor plays a major role in the emergence of the conflict, and cultural and religious factors are involved in the later stages of the conflict escalation, the true source of the conflict in Nagorno-Karabakh is the collective memory of two nations. In our opinion, it is unlikely that the conflict in Nagorno-Karabakh is significantly different from other ethnopolitical conflicts. In fact, the eruption of the conflict in Nagorno-Karabakh in the early twentieth century was also caused by socio-economic factors: the desire to control the border area with a mixed Armenian-Azerbaijani population. And the resumption of the conflict after the collapse of the USSR has largely relied on historical memory.

There have been cases, when a transfer of historical memory of conflicts with one ethnic group to another ethnic group was used, for example:

- the memory of the Armenian genocide in 1915 in Ottoman Turkey was used to escalate the Armenian-Azerbaijani conflict in Nagorno-Karabakh in 1991 [18];
- the celebration of the anniversary of the battle of Serbs with Turks on the Kosovo field in 1988-1989 was used by the Serbian Orthodox Church to incite conflict between Serbs and Bosnian Muslims in Bosnia and Herzegovina [19].

Also, the ruling elites widely use historical memory to legitimize power, which should protect against the arbitrary use of violence and defuse conflicts in society [8, 14]. In addition to the targeted use of historical memory by elites in crisis situations, the masses have spontaneous associations that can lead to a further intensification of the crisis. Perhaps this mechanism determines the "rule of the second famine", "the essence of which is that the government is forgiven the first misfortune or the first failure (it can always be explained by some "objective reasons"), but the second similar situation leads to the delegitimation of power" [20].

"An important component of memory policy is the 'forgetting' policy. Such political amnesia is demonstrated by the fact that certain events are displaced from the collective memory in order to avoid social conflicts and tensions" [14]. Such 'forgetting' can be not only the result of purposeful actions of the elite, but also spontaneous, which is a symptom of new trends in the development of society, leading to the distortion or destruction of some memory fragments [15]. In this regard, both positive and negative characteristics of the fragment of the past are levelled, distancing of the mass addressee from moral reflection on any events and counteraction to his emotional involvement is initiated; the communicative focus is shifted from the object of collective memory [3]. It should be noted that often the memory of the same events across different social groups involved in the conflict is significantly different. Fundamentally different versions of history arise, which contributes to the prevalence of conflict situation [13, 21]. Convergence of past events assessments is considered to be one of the ways to prevent the conflicts recurrence [21].

It should be also noted that the distortion of the past and its adaptation to the needs of a certain elite group is not completely arbitrary. Memory should be based either on information obtained in the initial stages of training or on experience [2]. Already fixed collective memory resists the creation of new narratives. They are limited by samples related to the identity of the group and based on a large amount of previously acquired information [18].

Thus, the influence of historical memory on the state of society can be very significant. It can lead to both the acceleration of the society destabilization and the stabilization of its state. Therefore, it is advisable to include historical memory in mathematical models describing the change of social state. It is especially important to take into account historical memory in pre-revolutionary situations when current events are often perceived through the prism of real or mythological historical events. In the literature known to the authors, there are no models of social tension that take into account historical memory. The dynamic model of interaction between the elite and workers (general public) described in the article is used as a mathematical apparatus [22]. The equations of the model are written as:

$$dP_1/dt = \gamma_1(U_1 - P_1) + g_1 (P_2 - P_1), \qquad (1)$$

$$dP_2/dt = \gamma_2(U_2 - P_2) + g_2(P_1 - P_2) + g_2\eta P_2(1 - P_1).$$
(2)

Here $P_1 = P_1(t)$ and $P_2 = P_2(t)$ – tension of the elite and the general public, respectively; $U_1 = U_1(t)$ and $U_2 = U_2(t)$ reflects the effect of economic changes on elite and the general public, respectively; t is time expressed in years; $g_1 = g_1(t) = c_1 P_2/(1 - P_2)$ и $g_2 = g_2(t) = c_2 P_1/(1 - P_1)$ – variable coefficients reflecting the perception intensity of another social group impact; γ_1 , γ_2 , c_1 , c_2 , η – constant parameters characterizing the studied society. The tensions values vary from zero to one $(P_i = 0 \text{ means no tension})$, and $P_i = 1$ means the maximum possible tension). It is significant that the growth of elite tension reflects the strengthening of intra-elite conflict, and the growth of general public's tension - the strengthening of their dissatisfaction with the existing situation. Values $P_i < 0.25$ are interpreted as satisfaction of the social group with the existing situation; $0.25 < P_i < 0.5$ – weak dissatisfaction, not manifested in active actions; $0.5 < P_i < 0.75$ – dissatisfaction manifested in active actions (peaceful protests, escalation of intra-elite conflict), $P_i >$ 0.75 - open conflicts (clashes of protesters with police, an elite struggle against the political opponents).

In equation (1), the first addend reflects the influence of changes in the economic situation on the elite tension, and the second – the influence of the general public. In equation (2) first and second addends also reflect the influence of the economic situation and the influence of elites on the general public tension; the third addend $g_2\eta P_2(1-P_1) = c_2\eta P_1P_2$ indicates that the elite is always a source of general public tension.

It should be noted that individual elite groups can use the dissatisfaction of the workers to redistribute power for their benefit. In this case, escalation of the general public tension is accompanied by the escalation of elite tension. Also, the conflict of elite groups can increase the general public tension. There is positive feedback, which, under certain conditions, leads to attempts to change the situation in a revolutionary way. If the feedback is negligible, i.e. the general public does not participate in the conflict of elite groups, the social system can remain stable.

We also note that the system of equations under consideration loses stability at certain values of constants, which is reflected in the absence of stationary values [22]. Apart from that, the time of reaching the values of group tensions close to one is quite large – about several years. This is not realistic since the loss of stability of the social system means the emergence of a revolutionary situation where events develop quite quickly and the time from the start of events to the overthrow of power or the suppression of revolutionary actions is about several months. Therefore, model adjustment is necessary for the correct assessment of changes in social groups' tension in case of stability loss by the social system.



This paper attempts to take into account the influence of historical memory on the interaction of the elite and the general public, thus to explain the rapid growth of tension at the initial stage of revolutions.

II. MODEL, RESULTS AND DISCUSSION

We believe that the social group's perception of the impact of another group depends on the historical memory of some significant event that occurred at a given moment $\tau\tau\tau\tau$, the memory of which can be considered constant over a sufficiently long period, i.e. in equations (1) - (2) multipliers

$$g_1 = g_1(\tau) = c_1 P_2(\tau) / (1 - P_2(\tau)) = \text{const},$$

$$g_2 = g_2(\tau) = c_2 P_1(\tau) / (1 - P_1(\tau)) = \text{const}.$$

Here $P_1(\tau)$ and $P_2(\tau)$) tension values (probably mythologized) during significant events in the past, perceived as a single, time-stretched event that is associated with the current events.

Then equations (1)–(2) will be written as:

$$dP_1/dt = \gamma_1(U_1 - P_1) + g_1 (P_2 - P_1), \tag{3}$$

$$dP_2/dt = \gamma_2(U_2 - P_2) + g_2 (P_1 - P_2 + \eta P_2(1 - P_1)).$$
(4)

If the tensions values P_1 and P_2 at the current moment *t* are less than at the moment $\tau\tau\tau$, the model (3)–(4) describes a situation where both the elite and the general public expect the worst-case scenario by analogy with the past. In the prerevolutionary situation, this leads to a rapid escalation of tension, i.e. to an increase in revolutionary processes. The values $P_1(\tau)$ and $P_2(\tau)$ can be considered constant over sufficiently long periods, which greatly simplifies the equations and allows us to obtain their approximate analytical solution. Equation (4) contains the non-linear term of the form $g_2\eta P_2(1 - P_1)\eta P2t1-P1t\eta P2t1-P1t\eta P2PP22ttt1-P1t1-P1t1 P1PP11ttt, which allows for a small value of the parameter <math>\eta$

PIPPI1ttt, which allows for a small value of the parameter η to look for a solution in the form of series in powers of η :

$$P_1 = P_{10} + \eta P_{11} + \dots;$$

$$P_2 = P_{20} + \eta P_{21} + \dots$$

Zero approximation is obtained from solving a system of linear inhomogeneous equations:

$$dP_{10}/dt = -(\gamma_1 + g_1)P_{10} + g_1P_{20} + \gamma_1U_1;$$
(5)

$$dP_{20}/dt = g_2 P_{10} - (\gamma_2 + g_2) P_{20} + \gamma_2 U_2.$$
(6)

Let us consider the case of a constant change in the economic situation: $U_1 = \text{const}$, $U_2 = \text{const}$. If we consider relatively small time intervals, for example, a year, in this case, such an assumption is quite acceptable. The general solution of the equations system (5)–(6) obtained by the elimination method is written as:

$$P_{10} = C_1 \exp(\lambda_1 t) + C_2 \exp(\lambda_2 t) + D_1,$$

$$P_{20} = 1/g_1 (C_1(\lambda_1 + \gamma_1 + g_1) \exp(\lambda_1 t) + C_2 (\lambda_2 + \gamma_1 + g_1) \exp(\lambda_2 t)) / + D_2,$$

where $\lambda_{1,2} = -(\gamma_1 + g_1 + \gamma_2 + g_2)/2 \pm ((\gamma_1 + g_1 - \gamma_2 - g_2)^2/4 + g_1g_2)^{1/2}$ – eigenvalues of the system (5)–(6), D_1 , D_2 are constants that depend on system parameters, and C_1 and C_2 are constants defined by initial conditions.

Both eigenvalues λ_1 and λ_2 are also relevant if $g_1g_2 < (\gamma_1 + g_1)(\gamma_2 + g_2gh < ekgh < ekgh < ek)$ is negative. The last inequation is always satisfied since all the coefficients in the equations as well as the values $P_1(\tau)$ and $P_2(\tau)$ are positive.

For the first approximation, the solution is cumbersome:

$$P_{1} = A_{0} + A_{1}\exp(\lambda_{1}t) + A_{2}\exp(\lambda_{2}t) + A_{3}t \exp(\lambda_{1}t) + A_{4}t \exp(\lambda_{2}t) + A_{5}\exp(2\lambda_{1}t) + A_{6}\exp(2\lambda_{2}t) + A_{7}\exp(\lambda_{1}t+\lambda_{2}t);$$

$$P_{2} = B_{0} + B_{1}\exp(\lambda_{1}t) + B_{2}\exp(\lambda_{2}t) + B_{3}t \exp(\lambda_{1}t) + B_{4}t \exp(\lambda_{2}t) + B_{5}\exp(2\lambda_{1}t) + B_{6}\exp(2\lambda_{2}t) + B_{7}\exp(\lambda_{1}t+\lambda_{2}t),$$

where coefficients A_i , B_i , i = 0, 1, ..., 7, – depend only on the constant system parameters (3)–(4) and initial conditions.

However, even such solutions provide useful information for understanding the process of tension changes. Since the eigenvalues λ_1 and λ_2 are negative, then for large values of *t* the solution tends to constant values. In addition, it is possible, at least in a first approximation, to answer the question of how fast the solutions approach these limit values. Provided that $\lambda_1\lambda_1\lambda_1\lambda_1\lambda_11$ is much smaller in absolute value than λ_2 a fairly fast approximation of the solution to the limiting values will occur when the coefficients A_3 , B_3 ; A_1 , B_1 ; A_5 , B_5 , i.e. the coefficients for terms containing $t \exp(\lambda_1 t)$, $\exp(\lambda_1 t)$ and $\exp(2\lambda_1 t)$ will be small. This allows you to select the parameters in equations (3) - (4) so that the limit values are reached over a period of six months to a year.

For purposes of illustration, we consider the events in Russia in 1917, believing that they had a significant impact on the memory of the 1905 Revolution – the events that took place from January 1905 to June 1907 in the Russian Empire. Significant events in 1905–1907 can be considered the shooting of a peaceful demonstration in St. Petersburg on January 9, 1905 ("Bloody Sunday"), when about 200 people died, and 800 were wounded; the uprising on the battleship "Potemkin" in June 1905; a wave of strikes in summer and early autumn of 1905; the uprising in Moscow in December 1905, during which more than 1,000 people died; the dissolution of the State Duma and the arrest of some deputies in June 1906; peasant unrest in 1906-1907, which did not lead to a large number of victims [23].

Thus, the elite tension in 1905-1907 was high, i.e. corresponded to the acute inter-elite struggle with suppression, but without the destruction of the counter-elite ($P_1(\tau) = 0.75$); and the general public tension – very high (clashes with law enforcement forces, numerous victims), $P_2(\tau) = 0.85$.

We simulate the situation in Russia from the beginning of March 1917 (t = 0) to the end of February 1918 (dates are given according to the Julian calendar or the old style), i.e. from the moment of Nicholas II abdication to the beginning

of large-scale hostilities (Civil war). We set the model parameters qualitatively corresponding to the described situation:

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- the coefficients characterizing the influence of the economic situation on the elite and the general public tension, according to our opinion, are the same: g1 = g2 = 0.3;
- option $\eta = 0.6$ characterizes the tendency of the general public to self-excitation;
- c1 = 1, c2 = 2.5 characterize the influence of the general public on elite and elite on the general public respectively;
- U2 = 0.59, which corresponds to an 11% decline in per capita GDP at comparable prices in 1916 [24]; U1 = 0.25, which corresponds to the stable welfare of the elite.

The initial conditions are $P_1(0) = 0.6$ and $P_2(0) = 0.5$. Slightly higher elite tension at the beginning of March 1917 was associated with dual power – the parallel existence of the Soviets and the authorities of the Provisional government. And the general public after the February Revolution expected changes for the better, this fact, in particular, is confirmed by the absence of any excesses during the victims funeral of the February events on the Field of Mars in Petrograd.

The results of numerical simulation in the presence of negative historical memory are shown in Fig. 1. For comparison, Fig. 2 the calculations of the model with the same parameters, but with a positive historical memory are given: $(P_1(\tau) = 0.1, P_2(\tau) = 0.2)$. Fig. 1 and 2 show that escalation of the tension in the presence of negative events in the past, which can be considered analogues of current events, is much faster. The general public tension over a year reaches a value of 0.9, which corresponds to intense armed clashes-the beginning of the Civil War. Under the same conditions, the presence of a positive historical memory stabilizes the situation, the tension of the general public over the year slightly increases, reaching a value of 0.55, which corresponds to a weak protest activity of the people.

To verify the model, we can compare the calculated tension change of the general public from March 1917 to February 1918 with the assessment of this tension according to the most significant events of this period. We list these events [23, 25] and assess the general public tension in these periods:

- March 1917: Abdication of Nicholas II from the throne. The provisional government promises the improvement of civil rights and freedoms, an amnesty for political prisoners and the organization of elections to the Constituent Assembly. The abolition of capital punishment. ($P_2 = 0.5$.)
- April 1917 A major demonstration in Petrograd against the continuation of the war $(P_2 = 0.6)$.
- June-July 1917: The demonstrations were first peaceful, demanding the transfer of power to the Soviets, and then armed, which were crushed by

troops (about 400 killed and wounded). Arrests of Bolsheviks. End of dual power. (P_2 rises from 0.75 to 0.85).

- August 2017: Kornilov's Rebellion ($P_2 = 0.85$).
- September 2017: Railway workers ' strike (about 700,000 people participated) ($P_2 = 0.85$).
- November 2017: Fights in Moscow (about 500 killed and wounded on both sides) ($P_2 = 0.9$).
- December 2017-February 2018: Armed clashes in various regions of Russia ($P_2 = 0.9$).











Fig. 3. The general public tension in the period from March 1917 to February 1918 (calculation and evaluation according to literary sources).



Figure 3 compares the tension of working population in Russia from March 2017 to February 1918 according to our estimates based on data from literary sources and according to the results of calculations using a model with negative historical memory. It can be seen that the model, taking into account negative memory, satisfactorily describes real historical events.

It should be noted that other scenarios are possible:

- Fear of the recurrence of past traumatic events can stabilize the situation if there is hope for the prevention of tragic events.
- The convergence of assessments of the parties to the conflict about past traumatic events helps prevent a renewed conflict.

Improving the model in order to include these scenarios is one of the possible directions for further work.

III. CONCLUSION

Thus, the presence of historical memory significantly affects social tension. Fixation of memory on tragic events, in case of crises, often leads to further conflict escalation. Conversely, the memory of prosperous times can have a stabilizing effect and defuse the crisis due to the positive expectations of the people.

The proposed modification of the dynamic model of interaction between the elite and the general public from [22] allows taking into account the influence of historical memory on the change in the tension of interacting groups. We have shown that this influence can be significant, in particular, accelerate the processes of society destabilization.

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