The Mental Mechanism of "Building Cause-and-Effect Relationships": The Foundation of Adaptive Thinking

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Annotation

In this article I disclose in detail such a mental mechanism as the construction of cause-and-effect relationships, which is the first and fundamental element of the communicative-cognitive framework of the personality. Drawing on the works of philosophers of history (R.G. Collingwood, H. White, M. Foucault), works on cognitive psychology (D. Kahneman, A. Tversky), as well as on contemporary research in the field of behavioral economics and pedagogy, I show that cause-and-effect thinking is not merely an analytical skill, but a fundamental intellectual habit on which depends a person's ability to see the world as a system of interconnections, and not as a chaos of random events. I pay special attention to why this mechanism is undervalued in the mass school, how cognitive biases hinder its development, and in what way its purposeful formation can prevent conflicts, manipulation and the repetition of historical mistakes.

Keywords: cause-and-effect thinking, mental mechanisms, cognitive biases, philosophy of history, critical thinking, diagnostics, CCFP.

First Among Equals

In my model of the communicative-cognitive framework of the personality, the construction of cause-and-effect relationships occupies a special, first place. This is neither an accident nor a tribute to order. This mechanism is the foundation on which everything else is built: critical thinking, forecasting, constructive argument, emotional intelligence. Without the ability to see causes and consequences, all the other mechanisms lose their effectiveness.

But why is this mechanism so undervalued? Why is it not given due attention in the mass school? Why does the overwhelming majority of people not possess this skill at the level of an intellectual habit? The answer, as it seems to me, lies in the very nature of this mechanism. The construction of cause-and-effect relationships is not merely analysis. It is an intellectual habit of seeking truth, checking facts, and not being satisfied with superficial explanations. And such habits are not formed through memorizing ready-made answers - they are formed only through constant practice of independent search.

It is precisely here that the main problem of the modern school lies. The conveyor-belt school teaches memorization of facts, but does not teach analysis of causes. It gives ready-made interpretations, but does not teach one to build one's own. It encourages quick answers, but does not encourage slow, thoughtful investigation. It is as if a child were taught to assemble a puzzle by being shown the finished picture and required to remember where each piece goes - but were never allowed to try for himself whether a piece would fit in another place.

The Habit of Asking "Why"

The construction of cause-and-effect relationships is the ability to understand why particular events occur, to see connections between facts and phenomena, to determine causes and foresee consequences. It is not merely a logical operation, but a way of perceiving the world. A person with developed cause-and-effect thinking does not simply state facts - he asks: why did this happen? What led to this? What consequences will this entail?

Cause-and-effect thinking is the cornerstone of the entire framework. Without it critical thinking is impossible, because one can evaluate the reliability of information only by understanding causes and consequences. Without it forecasting is impossible, because one can foresee the development of events only by identifying the connections

that govern them. Without it constructive argument is impossible, because one can explain one's position and understand the opponent's position only through an understanding of causes. Without it emotional intelligence is impossible, because one can manage emotions only by understanding their causes. Without it spatial imagination is impossible, because one can understand the connections between the form and function of an object only through cause-and-effect analysis [1].

In the terms of my model, this means that the mechanism of constructing cause-and-effect relationships belongs to the core - to the six mechanisms that directly constitute the act of solving a difficult problem [14; 15]. The distinction between core and support was introduced in the article on the structure of mental mechanisms [14] and substantiated in the article on epistemological recursion [15]. The core is MM-1, MM-3, MM-5, MM-6, MM-10, MM-11. Support is MM-2, MM-4, MM-7, MM-8, MM-9. Cause-and-effect thinking belongs to the core, because without it the act of solving a difficult problem is logically incomplete: a researcher who does not distinguish correlation from causality is doomed to the correlation trap [15]. That is precisely why I place this mechanism in the first place: it is not merely useful - it constitutes the solution itself.

In this article I will show that cause-and-effect thinking is not merely a skill, but a way of existing in the world. A person who possesses this mechanism sees the world not as a chaos of random events, but as a system of interconnections. He is less susceptible to manipulation, better understands other people, and makes more conscious decisions. That is precisely why the development of this mechanism is the paramount task of my pedagogical model [13].

History as Interpretation

One of the most important discoveries of the philosophy of history of the 20th century consists in the understanding that facts do not exist outside interpretation. This may seem paradoxical, but it is precisely so. It is customary to think that in history there are irrefutable facts, and that precise knowledge about the past is built on these facts. However, this is precisely the delusion. One can extract any interpretation and any approach to the past from history. To do this, you take only the facts you need. I emphasize: not the entire aggregate of facts. In history there is an enormous quantity of facts. But you take the sample you need and use it to confirm your view of history [13].

If you want to evaluate or propose an interpretation of the Stalinist period of Soviet history, you can, depending on your initial position, choose either positive or negative facts. Both will be true - but it will not be the whole truth, but only that part of it which confirms your position. Here it is appropriate to recall the old parable of the three blind men who were feeling an elephant. One said that the elephant is a rope, another that the elephant is a pillar, the third that the elephant is a snake. All three were right. And all three were mistaken. The truth was not in each separate sensation, but in their combination.

The English philosopher R.G. Collingwood in his work *The Idea of History* (1946) showed that historical cognition is not simply knowledge about the past, but the re-enactment of the thoughts of people of the past in our own consciousness [2]. The historian does not simply know facts - he tries to understand why the people of the past acted in one way and not another, what motives guided them, what causes led to particular decisions. Collingwood wrote that history is not knowledge about dead events, but knowledge about living activity that continues in the present [2]. This means that historical understanding requires not simply memorizing dates and names, but the ability to enter into the position of the people of the past, to understand their motives, and to see the causes of their actions.

The American philosopher Hayden White in his work *Metahistory* (1973) showed that historical knowledge is always a narrative - a narration that is structured in a particular way [3]. The historian does not simply describe facts - he chooses a particular plot, a particular point of view, a particular way of organizing the material. White showed that the same facts can be organized into completely different narratives - tragic, comic, romantic, satirical. And the choice of narrative depends not on the facts, but on the worldview of the historian, his cultural and ideological presuppositions [3].

The French philosopher Michel Foucault in his works *The Order of Things* and *The Archaeology of Knowledge* showed that historical knowledge is not simply a reflection of reality, but a construction that is formed within the framework of particular epistemes - systems of knowledge that determine what can be said, what can be thought in a particular epoch [4]. Foucault showed that what we consider facts is in fact the product of particular

discursive practices. And a change of episteme leads to the same events beginning to be understood in a completely different way [4].

All these philosophical discoveries lead to one important conclusion: cause-and-effect thinking is not simply the analysis of facts, but the ability to see how facts are organized into particular interpretations, and to critically evaluate these interpretations. A person with developed cause-and-effect thinking does not simply see causes - he understands that causes are always chosen within the framework of a particular interpretation. And he knows how to critically evaluate how well grounded this interpretation is, how far it corresponds to all the available facts, and how far it is logically consistent [2; 3; 4].

The Traps into Which the Mind Falls

One of the most significant cognitive biases hindering cause-and-effect thinking is the fundamental attribution error [11]. This is the tendency to explain the behavior of other people by their personal qualities - greed, vengefulness, vanity - and to underestimate situational factors: pressure, circumstances, context. Research in the field of social psychology shows that people systematically overestimate the role of personal factors and underestimate the role of situational ones when explaining the behavior of others [11]. This leads to our seeing enemies where in fact circumstances are at work.

Another important bias is confirmation bias [12]. This is the tendency to seek and find those facts that confirm our already existing position, and to ignore those that contradict it. As I have already shown above, this is especially vividly manifested in historical thinking. People choose those facts that confirm their interpretation and ignore the rest. This leads to cause-and-effect chains being built not on the basis of all the available facts, but on the basis of a selective part of them [12].

The third important bias is the optimism bias. This is the systematic overestimation of the probability of good outcomes and underestimation of the probability of bad ones. People are inclined to think that it will not happen to them, that their situation is special, that they will be able to cope where others have failed. This leads to people not drawing lessons from history, not seeing recurring patterns, and making the same mistakes as their predecessors [1].

A special variant of the optimism bias is the illusion of historical uniqueness. This is a cognitive bias in which people consider that their situation is fundamentally different from all previous ones, and that therefore the lessons of the past are not applicable to them. This bias is especially dangerous, because it blocks learning itself. If a person considers that his situation is unique, he sees no sense in learning from others' experience. That is precisely why politicians and statesmen often make the same mistakes as their predecessors: they consider that this time everything will be different [1].

Another important bias is the third-person effect. This is the tendency to consider that other people are more susceptible to the influence of propaganda and manipulation than we ourselves are. This bias leads to people not seeing how they themselves are being manipulated. They consider that others believe propaganda, but that they themselves do not. This makes them especially vulnerable, because they do not see how they are being manipulated [1].

Finally, base rate neglect - the tendency to ignore statistical information about how often particular events occur, and to rely on concrete, vivid examples or on one's own sensations [10].

The School That Teaches Memorization

The main reason why cause-and-effect thinking is undervalued is that the traditional school teaches memorization of facts, and not analysis of causes. The conveyor-belt school encourages quick answers, but does not encourage slow, thoughtful investigation. As I have already shown in previous articles [1; 13], the mass school is oriented toward the transmission of knowledge, and not toward the development of thinking. Teachers teach children to memorize dates, names, and events, but do not teach them to analyze why these events occurred, what causes led to them, and what consequences they entailed.

The second reason is the absence of the habit of seeking truth. As I have already noted, cause-and-effect thinking is not merely a skill, but an intellectual habit. And such habits are formed only through constant practice. The conveyor-belt school does not form this habit, because it encourages the memorization of ready-made answers, and not

independent search for truth. As a result, the majority of people do not have the habit of seeking the true root causes of events - they are satisfied with superficial explanations imposed from outside [13].

The third reason is cognitive laziness. As D. Kahneman showed in his work *Thinking, Fast and Slow*, the human brain is so constituted that we are inclined to make quick, intuitive decisions (System 1) and rarely engage slow, analytical thinking (System 2) [1]. The construction of cause-and-effect relationships requires precisely System 2 - effort, time, energy. And it is precisely this system that the modern school does not train. As a result, the majority of people prefer quick, superficial explanations to slow, thoughtful analysis [1].

The fourth reason is the institutional inertia of the education system. The conveyor-belt school, created for the needs of industrial society, needed simple, scalable methods of instruction. Memorizing facts is simple: assign the task, check it, give a grade. Analyzing causes is complicated: it requires an individual approach, the development of critical thinking, and a creative approach. As a result, the education system chose the simple path - memorizing facts - and abandoned the complicated path - the development of cause-and-effect thinking [13].

How History Is Rewritten

One of the most vivid examples of how cause-and-effect thinking works (or its absence) is the way history is rewritten. With each new politician, with each new turn in politics and economics, one or another revision of history occurred. And this revision was reflected in textbooks. The Bolshevik coup of 1917 was initially called precisely that - the "Bolshevik coup." And subsequently a coherent monumental conception was constructed, showing that the entire course of national history, at least from the turn of the 19th-20th centuries, from the moment of the appearance of Vladimir Ilyich Ulyanov in active political life, was nothing other than a preparation for the October Revolution [13].

This is a classic example of how interpretation precedes facts. First a particular position is formed (in this case, an ideological one), and then the facts that confirm this position are selected. And cause-and-effect chains are built not on the basis of all the available facts, but on the basis of a selective part of them [13].

Another vivid example is the way people draw false conclusions about the behavior of others. Family quarrels, conflicts in the work collective, conflicts between peoples and countries, between partners and competitors in business - all of this is often because people, as they themselves have determined for themselves, do not understand each other. However, the causes lie not only in the fact that people are characterized by greed, vengefulness, vanity and the like, but in the fact that people are characterized by an absence of the habit of seeking the true motives in the behavior of people, an absence of the habit of seeking truth, of the truth [11]. Armed with unverified information, a person assures himself of the correctness of his actions, convinces himself that he is acting in the name of justice, in the name of the good of himself and/or another person. And all of this is from an absence of cause-and-effect thinking.

The third example is the way cognitive biases lead to conflicts. When people do not see the true causes of the behavior of others, they are inclined to explain this behavior by personal qualities: he is wicked, she is stupid, they are greedy. This leads to our seeing enemies where in fact circumstances are at work [11]. And this is especially dangerous in politics and foreign policy. When politicians do not see the true causes of the behavior of other countries, they are inclined to see enemies in them and to act accordingly. This leads to conflicts that could have been prevented if the politicians had possessed cause-and-effect thinking [11].

A Laboratory of Human Behavior

The first and main principle of developing cause-and-effect thinking is the analysis of situations, and not the memorization of facts. Genuine historical thinking is not knowledge of facts, but the ability to see the structure of situations, to identify recurring patterns, and to understand the dynamics of events. This turns history from boring rote learning into a laboratory of human behavior. Instead of memorizing dates and names, students must analyze why particular events occurred, what causes led to them, and what consequences they entailed [13].

The second principle is the comparative analysis of different situations. It is important not simply to analyze one situation, but also to compare it with others, to identify common patterns, and to extract common lessons. This is especially important for overcoming the illusion of historical uniqueness. When students see that similar situations

lead to similar consequences, they begin to understand that the lessons of the past are applicable to the present as well [13].

The third principle is the search for alternative explanations. It is important not simply to build one cause-and-effect chain, but also to seek alternative explanations, to check how well grounded they are, and how far they correspond to all the available facts. This is especially important for overcoming confirmation bias. When students learn to seek alternative explanations, they begin to understand that facts can be organized into different interpretations, and that it is important to critically evaluate each of them [12].

The fourth principle is the checking of facts and logic. It is important not simply to build cause-and-effect chains, but also to check how reliable the facts on which they are based are, and how consistent the logic by which they are built is. This is especially important for overcoming the fundamental attribution error and other cognitive biases. When students learn to check facts and logic, they begin to see where their thinking may be distorted [11].

The fifth principle is the training of perspective thinking, of the ability to see a situation from the point of view of another person, to understand his motives and limitations. This is especially important for overcoming the fundamental attribution error and preventing conflicts. When students learn to see a situation from the point of view of another, they cease to see an enemy and begin to see a person who is also acting under the influence of circumstances [11].

From a Short Chain to a Multidimensional Picture

For pedagogical diagnostics it is important to distinguish the levels of development of cause-and-effect thinking [16]. At the initial level the chain of reasoning is short, often consists of one or two links, is not always logical, and is based on unverified facts. Example: he shouted at me because he is wicked. At the basic level the chain consists of three to five links, is logically connected, but not always verified. Example: he shouted at me because he had had a bad day, and the bad day was because he had quarreled with his wife. At the developed level the chain is expanded, the facts are verified, and the context and alternative explanations are taken into account. Example: he shouted at me. Perhaps this is because he had had a difficult day. But it is also possible that I touched a nerve. We need to check the facts: maybe he did not sleep, or he has problems at work. Alternatively, this may be my interpretation: perhaps he was not shouting, but simply speaking loudly because of the noise. At the expert level there is multifactorial analysis, the taking into account of probabilities, and systemic vision. Example: the analysis of complex social, economic or political situations taking into account a multitude of factors, their interaction and probabilistic scenarios.

Roots and Branches

Cause-and-effect thinking is connected with each of the other mental mechanisms. With critical thinking - because one can evaluate the reliability of information only by understanding causes and consequences. A person who does not see cause-and-effect connections cannot critically evaluate information: he accepts it on faith or rejects it without grounds [1]. With forecasting - because one can foresee the development of events only by identifying the connections that govern them. A person who does not see causes cannot foresee consequences [1]. With constructive argument - because one can explain one's position and understand the opponent's position only through an understanding of causes. A person who does not see causes cannot argue his position in a well-grounded way or understand the position of another [1]. With emotional intelligence - because one can manage emotions only by understanding their causes. A person who does not see the causes of emotions cannot manage them either in himself or in others [1]. With spatial imagination - because one can understand the connections between the form and function of an object only through cause-and-effect analysis. A person who does not see these connections cannot create and understand complex spatial structures [1].

How to Measure Progress

To assess a student's progress in the development of cause-and-effect thinking, I propose to use dynamic diagnostics - an assessment not of a static level of knowledge, but of progress in the development of a skill [16]. The principle of dynamic diagnostics, substantiated in a separate article [16], means that we assess not whether the student is able to establish cause-and-effect connections (yes/no), but how his ability to build these connections has changed over the past six months. This requires the fixing of reference points and regular comparison: which, as I will show below, can be done with the help of specially designed tasks and, in perspective, with the use of artificial intelligence.

An example of a diagnostic task: the analysis of a historical event. The student is invited to analyze a historical event (for example, the outbreak of the First World War) and to build a cause-and-effect chain explaining why this event occurred. What is assessed is not the correctness of the answer, but the depth of analysis, the taking into account of context, the search for alternative explanations, and the checking of facts. A second example: the analysis of a personal situation. The student is invited to analyze a personal situation (for example, a conflict with a friend) and to build a cause-and-effect chain explaining why this conflict occurred. What is assessed is the ability to see situational factors, and not only personal ones, the ability to change perspective, and the ability to seek alternative explanations. A third example: the analysis of current events. The student is invited to analyze a current event (for example, a political crisis) and to build a cause-and-effect chain explaining why this event occurred. What is assessed is the ability to gather information from different sources, to check the reliability of facts, and to build multilevel chains of reasoning.

For the collection and analysis of data on the development of cause-and-effect thinking, I propose to use artificial intelligence [16]. It could analyze students' answers, identify patterns, track dynamics, and propose individual recommendations. This is especially important for the individualization of learning. Each student develops in his own way, and artificial intelligence could help the teacher understand which particular aspects of cause-and-effect thinking need to be developed in each specific student [16].

A Citizen Who Knows How to Think

It is important to connect the development of cause-and-effect thinking with democratic culture. Democracy requires citizens capable of analyzing political decisions, understanding their causes and consequences, and critically evaluating information. Without this, democracy degenerates into manipulation and populism. John Dewey, one of the greatest philosophers of education, wrote that democracy is not simply a form of government, but a way of life requiring educated, thinking citizens [6]. It is precisely such citizens that the CCFP model prepares.

The absence of cause-and-effect thinking leads to conflicts. But the development of this thinking can be an instrument for preventing conflicts. When people understand the causes of each other's behavior, they cease to see an enemy and begin to see a person who is also acting under the influence of circumstances. This does not mean justifying bad deeds, but it does mean a deeper understanding of the situation and the possibility of seeking constructive solutions [11].

The Path to Wisdom

Cause-and-effect thinking is not merely an analytical skill. It is the path to wisdom, to an understanding of how the world is structured, why people act in one way and not another, and what consequences our actions will entail. A person who possesses this mechanism sees the world not as a chaos of random events, but as a system of interconnections. He is less susceptible to manipulation, better understands other people, and makes more conscious decisions. He does not repeat the mistakes of the past, because he sees recurring patterns. He does not see enemies where circumstances are at work.

That is precisely why I place cause-and-effect thinking at the cornerstone of my CCFP model. It is the foundation on which everything else is built - critical thinking, forecasting, dialogue, emotional intelligence. Without this foundation all the other mechanisms will be incomplete and unstable [1]. The development of cause-and-effect thinking is not simply instruction in analysis. It is the formation of an intellectual habit that changes the way the world is perceived. And it is precisely this habit that is the key to a person's being able to live consciously, understand others, and make wise decisions. As one of the greatest philosophers of the 20th century, Karl Popper, precisely formulated it: we not only learn from mistakes, but also learn to seek mistakes [5]. And it is precisely this - the ability to seek mistakes in our understanding of causes and consequences - that is the very mental mechanism that I propose to develop in my CCFP model.

References to Primary Sources

1. Kahneman D. Thinking, Fast and Slow. - Moscow: AST, 2014.
2. Collingwood R.G. The Idea of History. Autobiography. - Moscow: Nauka, 1980.

3. White H. Metahistory: The Historical Imagination in Nineteenth-Century Europe. - Yekaterinburg: Ural University Press, 2002.
4. Foucault M. The Archaeology of Knowledge. - St. Petersburg: Humanitarian Academy, 2004.
5. Popper K. The Logic of Scientific Discovery. - Moscow: Progress, 1983.
6. Dewey J. Democracy and Education. - Moscow: Pedagogika-Press, 2000.
7. Geary D.C. The Evolved Male in the Modern Classroom // The ANNALS of the American Academy of Political and Social Science. - 2024.
8. Gruskin K., Griffin M., Bansal S., et al. Stakeholders' Roles in Evolutionizing Education: An Evolutionary-Based Toolkit Surrounding Elementary Education // Behavioral Sciences. - 2025. - Vol. 15, No. 1. - Article 92.
9. Evolutionary Mismatches Inherent in Elementary Education // Encyclopedia. - 2025. - Vol. 5, No. 3. - Article 105.
10. Tversky A., Kahneman D. Judgment under Uncertainty: Heuristics and Biases // Science. - 1974. - Vol. 185, No. 4157. - P. 1124-1131.
11. Ross L. The Intuitive Psychologist and His Shortcomings: Distortions in the Attribution Process // Advances in Experimental Social Psychology. - 1977. - Vol. 10. - P. 173-220.
12. Nickerson R.S. Confirmation Bias: A Ubiquitous Phenomenon in Many Guises // Review of General Psychology. - 1998. - Vol. 2, No. 2. - P. 175-220.
13. Kleymenov A. History: Causality, Multiplicity of Interpretations and Strategic Thinking // Fractal Academy. - 2026. - Issue 4. - Art. 10. https://fractal-academy.com/articles/article-4-10/
14. Kleymenov A. Basic Mental Mechanisms: The Structure of the Communicative-Cognitive Framework of the Personality // Fractal Academy. - 2026. - Issue 1. - Art. 5. https://fractal-academy.com/articles/article-1-5/
15. Kleymenov A. Epistemological Recursion in Cognitive Science: Mental Mechanisms as an Instrument for Overcoming the "Hard Problem" of Consciousness // Fractal Academy. - 2026. - Issue 3. - Art. 1. https://fractal-academy.com/articles/article-3-1/
16. Kleymenov A. Diagnostics and Development of Mental Mechanisms: From Theory to Pedagogical Practice // Fractal Academy. - 2026. - Issue 1. - Art. 6. https://fractal-academy.com/articles/article-1-6/
17. Kleymenov A. New Subjects: Logic, Rhetoric, Psychology, Project Activity // Fractal Academy. - 2026. - Issue 4. - Art. 15. https://fractal-academy.com/articles/article-4-15/
18. Kleymenov A. Extracurricular Activity as a Space for the Development of Mental Mechanisms // Fractal Academy. - 2026. - Issue 4. - Art. 16. https://fractal-academy.com/articles/article-4-16/

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