

Development of Critical Thinking Skills in Romanian Society. Possibilities and Limits

Viorel ROTILĂ¹

¹ Professor PhD, "Dunarea de Jos" University of Galati, Romania; Director of the 'Solidaritatea' Research and Development Center, Galati, Romania, viorelrotila@yahoo.com

Abstract: *The research aims to identify the current situation of critical thinking (CT) in the Romanian mentality, from the perspective of interventions necessary to increase specific skills. We start from an analysis of the main approaches of CT specific to Western educational practices, these being the reference for a comparative analysis of the situation in Romania. Because we cannot exclude the possibility of the existence of certain CT specific contents camouflaged in the Romanian educational practices (that correspond to the western ones but they have other names), we carry out an analysis of the specific CT contents to observe the differences and possible similarities. Considering that CT involves the ability to discover boundaries (e.g.: discovering one's own cognitive boundaries), we look at the issue of potential boundaries. The approach includes analyzing the risk of CT marketing and the limits of specific CT interventions outlined by the mindsets of different communities. The research includes the evaluation of the existence of cultural limits possibility, starting from the question: "Is there a cultural place of CT (is it a value) in the Romanian mentality?". We evaluate the coherence of CT with social values, considering that in the absence of values that enhance its possibility, the probability of success of CT is diminished. Since we cannot a priori exclude the risk of importing models that do not match the mentality and values of this society, we analyze the problem from the perspective of the shapes without fond theory (a relevant questioning paradigm for Romanian society).*

Keywords: *Critical thinking; skills; cultural boundaries; rationality; education.*

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1. Introduction

The starting point of our research is the investigation of what seems to be a commonplace of contemporary beliefs (conveyed at the level of experts): the school and university training in Romania lacks some of the skills specific to everyday practical thinking, this lack influencing both personal life as well as daily existence. Given that the skills associated with critical thinking are part of this pragmatic approach, we use them here as a case study to verify this hypothesis that seems to reflect a social expectation.

The identification of a gap is based on the information provided by the comparison with a standard (usually procedural) in the specific area and with an ideal model (designed as an objective to be achieved). Both the ideal and the road that seems to bring us closer to this ideal, take the West as a reference. In other words, one of the commonplaces specific to the Romanian mentality (its part that is concerned with the re-establishment of the educational system) is the belief that, in the field of critical thinking skills, the West offers the best example. Therefore, because a good part of the meditations aimed at correcting the deficiencies in the field of critical thinking, specific to the Romanian cultural space, are based on comparisons with the Western model, an evaluation of this model is one of the reference points in this topic analysis. One of the consequences is the comparative evaluation of institutional approaches that aim to provide specific skills for critical thinking in the two generic cultural spaces (Western and Romanian) to observe the differences and possible similarities, as one of the directions of investigation. Within these comparative approaches we do not exclude the possibility of the existence, in the educational practices in Romania, of certain contents that correspond to the western ones, but have other names.

Considering that the main advantage of critical thinking is the thematization of thinking, as the essence of the human being at risk of sometimes being affected by inadequacy, our approach includes the transparency of beliefs and beliefs that influence attempts to increase critical thinking skills. We are, thus, on a critical area of critical thinking, trying to discover the degree of justification of some proposals and the possibility of limits in such an approach, including the unwarranted confidence generated by the exaggerations specific to the marketing of critical thinking. (See also Căstăian, 2018)

The article aims to contribute providing the cognitive context necessary for understanding thinking and rationality. We want to open a questioning framework, without claiming to have exhausted the problem, considering at the same time that the case study (Romania's situation) can be

an example of approaching the issue. We are concerned about what we should do in terms of future research directions, suggesting an outline for a possible approach model.

2. Methodological clarifications

In this article we carry out an analysis of the specific contents of critical thinking in order to observe the differences and possible similarities between Western practices and those specific to the Romanian mental space. Our approach considers the fact that we cannot exclude the possibility of the existence of certain contents in the educational practices in Romania that correspond to the western ones, but have other names.

In our approach, there are two levels of questioning:

- A formal one, meant to identify similarities and differences, through the latter generating the possibility of action directions designed to increase the degree of compatibility.

- Another one of depth, which launches several questions on what thinking is, the possible answers to them outlining the possible horizon of action of critical thinking. We do not intend to provide definitive answers to such questions in this article or to indicate all the answers we consider possible, but only to suggest a general outline of a necessary query framework.

3. Some conceptual clarifications

There is a lack of uniformity in the definition and, above all, the approach to critical thinking issues at the international level. The comparative analysis of the themes and methods of treatment is relevant. There are obvious loans from the theory of knowledge and numerous overlaps with other disciplines. Critical thinking is an instrumental field of knowledge that is in full effort to define.

Most Western approaches tend to focus critical thinking skills on the goal of correct argumentation. The approach is appropriate if we consider that the level of correct argumentation competence reflects the one of thinking. However, it risks two limitations:

- A formal one, which supports a series of discussions: to consider that thinking is only communicated thinking (or at least communicable). We will not debate this issue here, but the proposed definition is trying to avoid it.

- Another one of depth, which is similar to that of logic, because the correct argumentation is based to a considerable extent on the transposition of the rules of logic.

To avoid these potential risks, we prefer to use a broader sense of critical thinking, which includes in critical thinking the problem of decision, the different types of additional behaviors, additional to the communicative one, and the adaptation to the characteristics of the environment.

3.1 The proposed model

In a general approach, we can consider that critical thinking affirms the growing importance of knowledge for human and humanity, indicating the growing risks of wrong cognitive approaches. However, the emphasis on critical thinking can also be read from the perspective of new dangers brought by new technologies, increasing the possibilities of mass manipulation being just one example. In addition, it means an increase in the importance of thinking as a criterion for differentiation.

How feasible is the human model proposed by proponents of critical thinking? What are the features of the model? Is he a face of the transition to something else? Compared to the totality of expectations, critical thinking could be a component part of the new humanism; we maintain here the position of the continuous adaptation of the humanism concept (Rotilă, 2017). But what are the defining perspectives of the new humanism? Are they foreign to expectations of emotional origin or desires arising against the background of a failure to take reality?

3.2 'What is' and 'what is not' the critical thinking?

The definition of critical thinking can be done both from a procedural perspective, indicating the steps that should be followed, and from a teleological one, highlighting the expected results. Both directions of definition have their own risks: while the focus on procedures could risk missing out on performance checks, the focus on results could be affected by ideological expectations.

Critical thinking is closely linked to science education, often being an integral part of it. The evolution of the two has a high level of correlation, not being able to exclude even causal influences.

Critical thinking involves a level of knowledge democratization, each person being considered a potential cognitive source. The desire to form critical thinking skills is situated in an egalitarian horizon, contradicting the proponents of elitism. The presumption of relatively similar cognitive

possibilities is part of the model of unlimited rationality that emerged with modernity.

Although critical thinking should not be confused with correct thinking (correctness of political thinking), the relationship between the two is not yet clear, the problem being part of the category of types of cognitive outcomes that do not enjoy unanimous appreciation. The definition of critical thinking depends on the meaning we give to thinking.

3.2.1 What does it mean 'to think'?

In order to have a good perspective on critical thinking we must first have an average/reasonable understanding of thinking. With the advent of artificial intelligence to understand thinking, we must possess an adequate meaning of intelligence.

Pinker (2021, p. 386) states a difference between intelligence and rationality. Somehow, intelligence represents power, while rationality indicates the right choices for the exercise of intelligence, doubled by the observance of procedures and mastery of cognitive tools. Cognitive style is also an indicator of difference, rationality being specific to the reflexive approach.

The connection point between thinking and intelligence could be rationality, meaning the ability to solve problems reflexively. What does it mean to be rational? The simplest answer: to use reason (whenever possible) to identify the appropriate solutions to the problems we have.

3.3 What is the ideal of thinking?

What is the ideal in the field of thinking? We should be interested in it because, depending on this, can be chosen the 'ways' (methods) that could lead to its achievement. The lines on the unlimited rationality theme can be considered part of the critical approach of one of the ideals.

From a social perspective, the problem is partly connected with educational ideals, with official approaches (e.g.: defining ideals in the law of education) providing a point of reference. We will perform a brief analysis of the existing provisions on critical thinking skills to provide an image from this perspective.

Success in the labor market, often conveyed as the supreme value of education, does not necessarily define an ideal of rationality, being intensely dependent on context and likely to be ideologically influenced. Even if it seems to be compatible with a model of ecological rationality, judging rationality, according to success in the social environment, risks being

influenced by the reference to social values (level of respect for them) and the variation of appetite to risk.

Who, how, where, when... sets the ideal in the field of successful thinking? We give a few variants of response, such as: a) the law, through behavioral prescriptions and sanctions applied for deviations from them; b) groups of intellectuals, through references established for some categories of success; c) teachers, through the skills they are called to form (from a pragmatic perspective, they often do not demonstrate success in real life); d) businessmen, through the success they demonstrate in what they do (with the mention that their success is also dependent on other variables; it is not a model of human success); e) successful people in general, the name tends to nullify the possibility of discussion on the degree of success from the perspective of thinking (however, the weight of the social network in individual success is only one of the additional variables; with the mention that understanding the role of social networks can be regarded as part of proper thinking).

To some extent, the definition of thinking tends to be the prerogative of philosophy, which offers at least two variants:

a) ***The approach based on outlining an appropriate context of significance.*** In this variant, the success of thinking is dependent on history, being influenced by the preferences of different eras. The problem is that this alternative tends to relativize the understanding of thinking and rationality.

b) ***The observance of the logic rules*** (the most important proposition of philosophy) provides a relevant reference, the fact of being logical being an ideal of thinking.

Is this ideal of continuing to follow the rules of logic enough? By myself, it would seem not. From a secondary perspective, it would seem that it is a too high ideal; however, this does not make him incompatible with his ideal status. The fact that logic is formal, missing out on its suitability for many aspects of reality, could point to another limit of logic (in its attempt to be a necessary and sufficient ideal of thought). Approaches based on a good grip on reality have generated some suggestions about the insufficiency of logic as an ideal of thought.

Religion defines a dimension of the thought ideal, or at least contaminates it, the necessity of faith and the assumption of the cognitive limits it proposes (within the horizon of religious confessions) providing a line of argument. In relation to the case study undertaken and to the evolution of the Romanian society and mentality in the last decades, the analysis of these explanatory variants has additional relevance.

Reporting to science. If we increase the level of specificity and relate to certain data of science, then we can consider that, in the study *The Absence of Critical Thinking Skills and its Effects. Case Study: Vaccine Hesitation* (Rotilă, 2022), on the relationship between critical thinking and vaccination, we provided an example of an analysis way.

Previous ideas suggest that talking about an ideal of thinking may prove inappropriate, as we have to assume a definition based on several variables.

3.4 What does critical thinking aims?

In an attempt to increase the chances of a proper understanding of critical thinking skills role, we address some of the results that we believe it proposes. Trying to identify the criteria of ideal success, we consider that several proposals are possible, each of them coming with specific problems of implementation and identification of relevant indicators for evaluating success.

In a simplistic approach, we can consider that the objective of critical thinking is thinking, in the strong sense of the term. Because attempts to indicate correct procedural solutions are not enough, many of the examples used by critical thinking are negative approaches, indicating what is wrong with everyday thinking. Moreover, critical thinking must also identify the moments when we are irrational (sometimes irremediably).

Identifying the objectives of critical thinking encounters several problems, the most important being the evaluation of adherence to critical thinking from the perspective of results (given that the latter do not always depend only on our cognitive behaviors) and conflict of interest with some state institutions and some social contexts. . This last option raises the following problem (to which we don't try to offer a solution here): how much critical thinking a society can support or what is the ideal dose of critical thinking, consistent with the normal functioning of the society.

Here are some of the ideas we believe could be critical thinking goals:

An increase of realism (at individual and social level). This goal raises the first question: How much realism is needed? Should cognitive tools be sufficient to enable people to cope with everyday reality, leaving them free to think about what they want/can do about the `second region` (Pinker, 2021, p. 358) of the world? Or the ideal should be aimed at a uniformity of the `two areas` from the point of view of reality? We cannot provide a simple answer to these questions. In addition, the simple answer to them should not take into account the possible mutual influence of the

two categories of cognitive behaviors. However, by forcing the simplification of a complex reality, we risk an inadequate reduction of the multiple variables (with a potential causal role) that exist.

Increasing discernment. Although it seems reasonable, this is a vague wording, difficult to quantify. Discernment can be verified in context; everyday contexts are strongly influenced by values.

Increasing the rationality coefficient. The rationality coefficient was proposed by Stanovich (2016) in the Comprehensive Assessment of Rational Thinking (CART) approach, keeping it here as a possible indicator.

Increasing the level of instrumental rationality. Instrumental rationality refers to how well a person's actions maximize the satisfaction of his or her desires, given his or her beliefs (Stanovich, 2001).

Increasing reflective and decision-making competence. Decision-making competence refers to the ability to make better decisions, as defined by decision-making principles posited by models of rational choice (Bruine de Bruin et. al., 2020). A proposal that seems to cover both areas of cognitive behavior.

The diversity of the above examples shows that the problem is far from being solved. If it is not clear enough to us what it should be, it seems increasingly clear that the goal cannot be unlimited rationality. The problem, however, is how much limitation we must admit.

4. The situation of critical thinking in Romania

In order to shed some light on the way of institutional reporting in Romania to critical thinking, we believe that at least the following directions of analysis are possible: a). evaluation of legislation; b). the analysis of the books published on this topic by Romanian authors; c) indexing existing translations (noting that they are not sufficient to indicate a change); e) other signs. In this article we will summarize our investigation only in the first category of evaluation.

4.1 A brief analysis of the legal framework

From a general (and radical) perspective, we could consider that the education system in Romania is not fully synchronized with the specific orientations of the western systems regarding the preoccupation for the specific competences of critical thinking. It is not clear, however, whether this is either an exaggeration or an inadequate approach of the problem.

The National Law of Education (Law no. 1/2011) does not mention the skills of critical thinking among those essential to the individual training. We can even see that the expression *critical thinking* is missing from the

content of the law, the closest form being the one of *critical reflection*, found in a reference to professional skills (not general) in the *Annex LIST of terms and expressions definitions used in the law*. Thought from the perspective of the individual, the purposes of education expressed in terms of skills (art. 4 of the law) do not include the training of critical thinking skills or concern for epistemic skills.

In this context, we can ask ourselves whether it's necessary to mention the skills of critical thinking in the law of education in order to develop a systematic concern of the educational system towards them. The answer of the first instance is that although the mention of critical thinking skills does not guarantee a reasonable level of training for all pupils and students, it could still be a relevant support.

A quick analysis of the entire Romanian legislation indicates that the expression *critical thinking* can be identified extremely rarely, most often in relation to the desire to adapt different specializations to the general context. If in the western space critical thinking seems to occupy a significant place from the perspective of the interest given to training, in Romania the steps are only at the beginning. An example of action is the analysis carried out by Mihail (2022), who evaluated several types of actions that could contribute when introducing critical thinking skills in training activities in Romania. In an overall assessment, we can consider that the changes generated by E.U. legislation seem to influence the general framework of approaches aimed at enhancing critical thinking skills.

4.2. Inadequate ideals?

As we suggested in the introductory part, the increase of critical thinking skills seems to be dependent on the ideal of training graduates' practical skills, the variables most commonly used to assess them being *successful on the labor market* or *successful in business*. We can first observe that the discussion is a social ideal, structured according to the model of democracies based on the market economy, the relevant success being one of an economic nature. The deconstruction of this ideal highlights two problems: a tendency to reduce the evaluation of the adequacy of thinking to economic successes and an excessive responsibility of the person, determined by the presumption of an excessive rationality of the economic environment.

If we assume that everyone agrees with the limits of the ability to assess the adequacy of thinking through economic variables, then the question of the criteria for assessing the success of critical thinking skills should be raised.

4.3 Cultural possibilities and limits

From a historical perspective, most of the cognitive solutions identified to counterbalance limits such as those mentioned above are of a cultural nature, they taking the form of various taboos, recommendations, expressions, etc. If we add the cognitive perspective, culture is not only a social form of 'home', a mediator of the relationship with the world and others, but also a reservoir of cognitive solutions that influence the duration and quality of life of the individual.

Cultures are not equal in terms of the cognitive support they provide to citizens. Two examples of variables must be considered from the perspective of differentiations: *the adaptation of cognitive solutions to the environment* (cultural loans can bring inadequacies) and the *ability to form cognitive communities* (dependent on the tradition of social networks, social capital, etc.).

The finding of cultural differences that influence cognitive relationships brings into question the evaluation of cultural limits existence in the way of developing critical thinking skills. From this perspective we can ask ourselves if there is a 'cultural place' of critical thinking (a value) in the Romanian mentality. Perhaps it's more relevant to ask ourselves first whether it exists in Western thought, while identifying its characteristics (Căstăian, 2021)

We must also evaluate the coherence of critical thinking with social values because, in the absence of values that enhance the possibility, the probability of success of critical thinking being diminished. One of the values that seems to be consistent with critical thinking skills is *individualism*, understood here as the ability to individually identify the most appropriate solutions. In an extremely general approach, critical thinking seems to be enhanced by focusing on individualism, the importance of individual decision and the responsibilities associated with it. In other words, gregariousness seems to decrease its probability.

To the extent that there is a fundamental mismatch between Western culture and Romanian culture, which may affect the relevance, possibility and impact of critical thinking skills, attempts to take over the Western model, are making relevant resuming the theory of *forms without concept*. Born in another period marked by the attempt to modernize the Romanian society, this theory has the advantage of identifying the incompatibility of the new institutions (borrowed) with the cultural background. In this sense, we cannot exclude the risk of importing models of critical thinking that don't fit with the mentality and values of this society. The problem could subsist even in the variant of the objective's adequacy to the scientific

knowledge. We point out that the extent to which this theory provides a relevant framework for analysis isn't clear enough in the context of the current magnitude of globalization.

We believe that an important perspective is offered by culturally incorporated models of rationality (in a broad sense): the level of rationality of the survival strategies specific to each culture matters, they being an important source of collective rationality. From this perspective, it is obvious that we can't reduce the increase of individual rationality to individual educational approaches, as we also need culturally incorporated critical thinking tools.

The problem is somewhat similar in the case of values: increasing the penetrability of critical thinking is dependent on its axiological configurations. Solving the problem is not easy and, moreover, we don't think it supports simplistic approaches. One obstacle is the tension between interventions to increase individual rationality, which brings with it an increase in autonomy, and the interest of the community for a level of individual dependence (which brings with it an increase in integration). The second obstacle is the possible conflicts between community survival strategies and those highlighted by the rationality of those members of the community who have a cognitive status modified by interventions specific to critical thinking. Rationality is not the only criterion for judging a survival strategy, as it can often be outdone by its purpose in donating personal and community identity.

One might object that *being rational* means understanding the identity costs of some of the Community's survival strategies and acting in that interest. The objection is partly well-founded: it seems fair to expect intelligent people to understand what is in the community's interest and to act accordingly. However, if things had happened like this, then the whole discussion about progress would have lost its meaning, canceling also the relevance of the interventions specific to critical thinking. The goal of increasing the level of critical thinking is conceived in the horizon of progress, of a desire for change that also includes survival strategies.

5. The logic

To the extent that *Logic* can be seen as part of critical thinking (we believe it is an important part of it), in the Romanian cultural space we already have a practice of training critical thinking skills. In this paradigm, the limits faced by the discipline called *Logic* can be thought as limits to this dimension of critical thinking. Additionally, our anecdotal findings highlighted the risk of a too rigid approach (in the didactic sense) of this

discipline, resulting a low level of popularity and maintaining an artificial distance from reality.

The common place of criticism seems to be the emphasis on indicating the `limits of logic`, derived from its formalism. The differences between logic and reality could participate in the faces of the distance between the intellectual and reality. Somehow logic seems to contribute to the construction of this parallel world populated by different idealisms of the intellectual. The contribution of intellectuals to social change also carries with it the cost of some forms of inadequacy.

A more adequate explanation of the logic efficiency limits is the difference between *valid arguments*, which have a correct form but we know nothing about the truth of the premises, and *solid arguments*, in their case knowing that the premises are true (Pinker, 2021). In a sense, this path is crossed by critical thinking, it being also concerned about the truth of the premises.

Logic can be considered an integral part of critical thinking education. In order to keep us on the line of increasing the accessibility of knowledge, it would require a significant change in the way we teach, increasing the use of examples from everyday life being probably the main recommendation. The discussion is not `another logic`, but only the improvement of logic teaching as a generalized approach. Examples of good practice for what is happening in different schools and faculties could provide a benchmark.

Reformulating, critical thinking cannot exclude logic, being forced to be at least in its continuation where it fails to incorporate it. Equally, we cannot consider that the education of critical thinking is exhausted by logic, even in the most accessible form of the latter.

Pinker (2021; p.140) also supports the need to complement logic with other cognitive approaches, appealing to the functioning of *neuromorphic networks* on the *deep learning* variant and its resemblance to some of the functioning of our mind. To the extent that this classification of human cognitive methods is correct, we can consider that approaches focused on the exclusivity/sufficiency of logic are wrong. We observe here one of the ways in which the understanding of critical thinking depends on the understanding of rationality, in the general sense of the term.

6. Some limits of the appeal to rationality

One of the optimists on the level of human rationality, Steven Pinker (2021), states that in fact we are not as bad at rationality as behavioral economics research suggests: most problems would actually be generated by

far too much importance given to the data obtained under the specific conditions of laboratory experiments, our behaviors in reality being in fact much more appropriate. The issue deserves a careful approach. Equally, however, we must note that Pinker's optimism about humanity in general is blatantly contradicted by the war in Ukraine and other such events (which, in terms of correct predictions, places Pinker with Yuval Noah Harari and Francis Fukuyama). A more appropriate approach from the perspective of respecting scientific standards is the one of Gigerenzer (Gigerenzer et al., 1999), the adequacy also aiming at how to relate to the concept of *limited rationality*.

Trying to discuss some of the limitations that may stand in the way of interventions based on increasing critical thinking skills, we consider that a relevant approach is rationality limited.

6.1 Limited rationality

The main set of limits to interventions based on increasing critical thinking skills to increase rationality is around the concept of *limited rationality*. One of the important theses of limited rationality is that human rationality takes place in the conditions of what we consider to be limits, this being its natural way of existence. The use of the concept *limited rationality* is mainly determined by the desire to create a (realistic) counterweight to the tendency to idealize rationality. We believe that the idealization of rationality should not be seen as an error of humanity, its existence having some motivations.

A good understanding of limited rationality is provided by the call made by one of the promoters of this current of analysis, Simon Herbert (1955): we must consider the simplifications that a certain organism could intentionally introduce in the context of the model applicable to the situation, in order to bring the model (reality) to the level of its processing capacity. Taking the idea of the *matching direction*, used by John Searle (2004) to understand intentionality, in the matter of rationality we believe that we should consider both directions of matching: adaptation (through rationality) to the characteristics of the world, but which must go through adaptation to the concrete possibilities of processing human-specific information.

Discussions on the costs of information processing also led us to the possibility of an absolute limit to the volume of information to be processed for a decision, there being areas where the costs of processing exceed the benefits offered.

Given the fact that we need to discuss limited rationality in order to counterbalance the idealization tendencies of human rationality, the simplest

understanding can be provided by the daily decision-making process: the decision takes place `here and now`, based on information and existing processing resources, both of which are limited. In a sense, *practical rationality* is an efficient process of navigating these limitations. Efficiency is largely due to the heuristics we use, i.e.: the fast (but brief) patterns of thinking. The problem is that exactly appealing to these shortcuts of reasoning is often the source of our errors.

In relation to reality, we are dominated by two tendencies: the *reduction of reality to our cognitive possibilities* and the `letting go` of reality (admiration, wonder, abstention). This last variant seems to be in the area of cognitive modesty.

Compared to the status of *applied epistemology* (Battersby, 2006), critical thinking involves both the ability to discover one's own limits and the ability to identify relevant contexts to be used. One of the concepts that helps us understand that part of the rationality limitation is dependent on the environment is the one of *uncertainty*. Uncertain decisions adequately illustrate the relevance of using heuristic approaches.

6.2 Ecological rationality

First of all, ecological rationality suggests that in the analysis of human rationality we must change, at least sometimes, the context of analysis. Ecological rationality means judging the rationality of decisions in relation to the specific environment in which the person must identify their own survival strategies.

Ecological rationality is part of the approach called limited rationality. From a general perspective, we can consider that there are two ways to understand limited rationality:

- **Idealistic:** based on identifying the limits of human rationality related to a model (the ideal model of unlimited rationality). The most well-known research direction is the identification of biases. The dominant explanatory model seems to be slow thinking and fast thinking (Kahneman, 2011). The dominant solution: nudges. (Katsikopoulos, 2011); (Thaler & Sunstein, 2009).

- **Realistic:** based on identifying people's real possibilities, thought from the perspective of relating to their environment. The most well-known research direction: ecological rationality. The dominant explanatory model: identification of specific limits. The dominant solution: boost. (Grüne-Yanoff & Hertwig, 2016).

6.3 Heuristics and biases

Probably the best example for a different approach to rationality than the traditional one (the latter seeming to be limited to logic and, especially based on it, tending to boundlessness) gives us two directions derived from the program of limited rationality: heuristics and biases.

Heuristics and biases must be addressed together because of the ambivalent status of heuristics: on one hand they are the natural solution to a certain category of limitations of human rationality and on the other hand they are the source of many errors, most often these errors being called biases. A correct understanding of the relationship between heuristics and biases can be summarized as follows: inappropriate use of heuristics can generate biases; some biases are generated by heuristic inadequacies. Although it is not clear whether all heuristics can generate biases and we already know that not all biases are generated by heuristics, the common area between the two is large enough to be worth treating together.

6.3.1 Heuristics

The most tempting argument in favor of limited rationality is the idea that heuristics emerge along the evolutionary path as solutions to the limits of rationality. Although the argument has a high degree of attractiveness, we must mention that, insofar as it is justified to appear on the evolutionary path, the existence of heuristics is consistent with a number of other explanatory hypotheses, the most important being the cognitive conditioning of the environment and the principle of 'mental energy' economics.

At this point, a brief explanation is needed for the principle of 'mental energy' economics. We use the presentation of the terms 'mental energy' in quotation marks to understand that it is only a metaphor meant to suggest the set of resources that condition the existence of mental processes. After reaching an average level of 'mental energy', organisms tend to favor information processing processes that have a low consumption of resources to the detriment of those with high consumption. In the case of people, the stabilization is done somewhere in the average area specific to the community (and the era), participating in its realization and being conditioned by it. The phenomena that indicate this possibility aim at the importance on each community and / or epoch it gives to the knowledge and the thought in general, reflected most often by the place that occupies the specialized people in thinking within the society. The reference to the

maximum level is probably the present, this orientation being launched with modernity.

Another tempting hypothesis is that heuristics are a way of highlighting how human intuitions work. In a synthetic form, we can consider that heuristics are forms of reasoning based on a small number of clues, the economy of `mental energy` being determined by the reduction of the number of mentally processed variables. With this definition in mind, we can understand that the small number of clues may be a consequence of the choice or may be the expression of an objective cognitive limit (a limit of existing information; this limit may be one of the faces of rationality limits). When intervening, the choice of clues can be considered part of rationality, transposing the fact that existing clues do not have the same cognitive importance. The choice of clues can be based on prior knowledge (individual or community) or on an effective way of estimating the specific cognitive weight of each clue. Regardless of which of these variants are used, it is clear that heuristics based on the choice of the most important indices are located in the central flow of rationality.

6.3.2 Biases

How can we understand what a bias is? The simplest approach seems to be provided by indicating the place that bias occupies in the errors of rationality. Taking the classification proposed by Mustață and Bogzeanu (2017) in a modified form (because we consider it problematic regarding the category of cognitive errors), biases are one of the three categories of errors, along with perceptual errors and reasoning errors.

Understanding biases requires a context appropriate to their role. Negative learning seems to provide an appropriate interpretation.

There is a risk that the identification of biases may be based on an inadequate understanding of the human being (from the perspective of his cognitive possibilities). We can gain an intuition about the problem as we try to identify the cognitive ideal suggested by the reverse reading of biases: how should the ideal knowledge look like? Beyond the possible philosophical speculations on the contribution of errors to the meaning of humanity (they participate in generating the contour of a part of chance) we suspect that we could discover some ideological touches that participate in substantiating some of the biases. One of the possible approaches to the problem of the exaggerated recourse to biases is the one suggested by Gigerenzer (2018) through `the bias bias`.

Gigerenzer (2018) emphasizes that, in order to meet the condition of being considered biases, errors must be systematic. Failure to comply with

this condition generates a much higher number of biases than actually exist, which causes the image to be projected by people who are frequently and irrefutably irrational. The most important consequence is the interventions specific to neo-liberal paternalism, highlighted in the *nudgets* strategy. We could thus observe that the direction of research focused on identifying biases implicitly leads to a diminution of human freedom of decision.

The existence of *bias bias* could also be justified by the explanatory hypothesis of the influence of the cultural context on the way of understanding human rationality. The tendency to find more irrationality than actually exists is consistent with the postmodernist perspective, contributing to the denial of the proposed model of modernity.

6.3.3 Limits of the 'broken leg'

Due to the limitations of processing power, human intelligence relies heavily on clues. The orientation towards the discovery of clues is a double-edged sword: it generates the capacity of cognitive shortcuts but also the possibility of giving too much cognitive importance to what appear to be clues. This side effect tends to become increasingly evident in the context of various forms of extension of the processing power of the mind. The side effect also takes a second, weirder face: the inability to constantly use simple decision-making algorithms due to the tendency to consider that one of the variables has the character of a decisive clue/has a higher cognitive weight.

6.4. Uncertainty

The appeal to rationality in the context of admitting limited rationality should involve, among other things, the recognition of uncertainty and the development of specific cognitive behaviors. Uncertainty can be subjective, determined by the cognitive limits of the human, or objective, determined by the limits of the extent to which the environment can be known.

From the perspective of the cognitive limits generated by the environment, the problem is not only related to the cognitive permeability of the environment, but also to the risks specific to that environment. From the point of view of individuals' interests, there is a significant difference between an uncertain and dangerous environment and an uncertain one but without major risks, while from a logical (true, narrow) perspective the two environments generate an identical cognitive problem. While in an environment of risky uncertainty the bias of unjustified trust in one's own cognitive abilities attracts significant costs, the same cognitive behavior in an uncertain environment without major risks requires some additional

information before its axiological classification. For example, self-confidence could weigh positively on the individual if this error does not have significant negative consequences, as it may contribute to other dimensions of that person's existence (for example, individual happiness may depend on this ability).

The expression *critical thinking* induces (correctly) the idea of some limits of thinking, which must be identified each time. However, this significance has a low level of coherence with the marketing of critical thinking.

6.5 Critical thinking marketing

Critical thinking also faces the risk of marketing, which aims in particular to present it as having a much greater impact than in reality. These types of approaches can have side effects such as unjustified self-confidence or, once the problem is observed, widespread distrust in all the skills provided by critical thinking.

At the same time, in a critical approach on critical thinking we could consider that critical thinking is a form of marketing philosophy, an attempt to demonstrate the purpose of a particular area of philosophy in creating skills useful to the economy and daily life of the individual. It is consistent with the world of rapid access to essences, providing a pragmatic synthesis of a part of philosophical thought. In a sense we could call it 'philosophy for the market', meaning a quick (sometimes perhaps too easy) form of instrumentalizing philosophy in accordance with the interests of the market economy. It remains to be seen whether the results of philosophy can be verified according to the criteria of the market economy or we have to look for quantifiers in other dimensions of social existence.

6.6 Missing the specificity of the social environment

The set of approaches based on the growth of critical thinking tends to consider the environment in which the individual conducts his existence as constant. However, they miss the multiple variants of social media formatting, to which individuals have to adapt.

Regarding the relationship between critical thinking and the environment, we should look at whether there is a relationship between the level of rationality of the social environment and what is necessary for the individual to survive in that environment and find out if the ideal critical thinking skills are consistent with survival in any social environment. We should also find out whether adaptation also targets specific forms of modulation of critical thinking skills, including a variation in their level of

adequacy to the principles of rationality. As a hypothesis we can consider that each social environment responds according to its own criteria of rationality/functioning to the behaviors of individuals. The example of rational strategy recommended by the game theory in the case of the *prisoner's dilemma* (understood here as an attempt to generalize a rational solution), namely *Tit for Tat*, i.e.: cooperation on the first move followed by the answer with the same currency, is a problem from the perspective of specific rationality of different social environments, coming into conflict with their values.

6.7 Objective thinking vs. motivated thinking

Motivated thinking versus *objective thinking* is another possible direction of investigation, it may be starting with a presentation of the differences between motivated thinking and objective thinking, using relevant examples.

Objective thinking is just an ideal, science trying to get the closest to it, but not being able to reach it. The reason could lie in the birth of thought, in the beginning it being a *for...* Motivated thinking has an ambiguous status because it is somehow related to the motivation for the emergence of thinking.

Removing motivated thinking from the area of guilt (a large part of it contributes to the development of thinking) but also highlighting the problems it generates (history probably starting with the sophists) are among the possible solutions, designed to provide some criteria for differentiation.

The term *expressive rationality*, proposed by Kahan (2017), indicates that species of motivated thinking that aims to obtain appreciation within the group (not the desire to gain a more accurate understanding of reality). Through expressive rationality, people express opinions that publicly state their preferences.

6.8 Training risks

Unnecessary training is a significant risk from a thinking perspective because it can distort. The fact that it is difficult to anticipate the usefulness of the information and skills that a person will need must be read in more ways: a). some of the skills provided may be necessary or unnecessary in the future; b). the competencies we do not provide are equally important in this equation. Also, it is difficult to assess the adaptive mechanisms that may be canceled during the training process.

6.9 Behavioral economics

Let's suppose that critical thinking aims to increase the person's thinking/cognitive skills. In order to be able to assess the presence or absence of some of the competencies, we need a comparison criterion. The most relevant criterion seems to be the use of thinking to choose and achieve goals. Because the choice of goals sometimes involves discussions about the contribution of other different factors of thought (e.g.: emotions, the values of the community in which we were born, ideology, etc.), it seems useful to stop at achieving goals.

This description of thinking is quite close to that of rationality. If we consider that at least in this plan we can put the sign of equality between *thinking* (the ideal of critical thinking) and *rationality* then it becomes relevant to approach a specialized field in the field of rational choices: behavioral economics. Part of the understanding of rationality is provided by behavioral economics. An important observation is the paradigm shift that behavioral economics has undergone, moving from *rational choice theory* to *perspective theory*. This change is relevant to the relationship between unlimited rationality and limited rationality.

6.10 Ideological interests

From a current perspective, the presumption of human irrationality arising in the context of increasing confidence in various `cognitive technologies` serves the interest of the holders of these technologies. in the face of this orientation) The model is not based on a definitive denial of human rationality, since those who discover / know that we are irrational arise, they somehow become the holders of "true rationality". The denial of the wisdom of the masses gradually removes the crowd from the area of power, giving way to elites and holders of cognitive technologies. For example, the *nudgets* solution, as a corrective intervention against the irrationality of the masses, can be understood as being associated with a category of political preferences (the right having a higher probability than the left).

We cannot say with certainty whether the narrative is constituted or not intentionally because the possible existence of such intentions does not fall within the area of scientific evidence. Entering the political area carries with it the risk of ideological bias, each of us tending to interpret things from the perspective of personal beliefs.

Rationality has been and remains the essential source of political legitimacy. To say that people (some people) are smart or stupid is to

question the legitimacy of their political decisions. Therefore, research on the area of rationality or their results has a high risk of contamination or ideological interpretation. (See also Căstăian, 2016).

7. Evaluation criteria

When we propose a change in public policy, such as that represented by the increase of critical thinking skills, we need to establish specific indicators to highlight the presence or absence of targeted changes. In the case of critical thinking, the issue of establishing what we can verify when evaluating the evolution of a person's critical thinking arises. In principle, we could refer to all his behaviors. However, this could be too general a reference. We can consider that there are some elements capable of constituting a relevant reference: arguments, beliefs, beliefs, decisions, level of success, level of credulity. There are even some references to success, such as *thinking for oneself* or the *ability to identify evidence*. We might even consider that critical thinking reflects a level of self-awareness. All these references are relevant. However, they can slip into an area of irrelevance if viewed in absolute terms, missing the context and the intervention of other variables.

7.1 Two issues adjacent to the verification criteria

7.1.1 Assessing adherence to critical thinking in terms of results

A relevant level of analysis is the ratio between the fundamental objectives of the person and the means used. At what level do we consider that critical thinking intervenes: in that of objectives or that of means? In most cases the goals are actually values. Which means that the claim to set goals through critical thinking actually involves setting the values we adhere to in this way. This is an unexpected leap, an expectation that people can hardly meet. People appear in communities that have already pre-selected certain axiological systems, tending to assume them as personal. Values contribute to personal identity; they can be assumed based on emotional relationships (most often transpose and generate affect); values also support irrational adherences. Moreover, in a large number of cases by our expectation of someone to think critically we understand to reach conclusions similar to ours. We must not neglect this risk of using critical thinking as a tool of pressure or ideology.

7.1.2 Conflict of interest with some state institutions and some social disputes

War is the limiting example of a social context in which the interest for critical thinking as a whole is extremely low, the beliefs placed on other grounded prevailing. Objectively, the problem is generated by the fact that the interests of society can sometimes be radically different from those of the individual, they can go to certain forms of censorship of thought. If we think that some wars may not be based on the general interest, but only by a scrapped one, then the problem becomes even more visible.

8. Is critical thinking also applicable to artificial intelligence?

As we have seen, the understanding of heuristics is conditioned by access to the importance of clues. The ability of people to identify and use clues seems to give them a competitive advantage over artificial intelligence, which can be illustrated, for example, by the well-known *problem of the broken leg* (Meehl, 1954, p. 25): people can realize the importance of information that a person has broken their leg when trying to predict whether they will go to the dance, while an algorithm/artificial intelligence (statistical analysis, in the version presented by P. Meehl) can't assess the importance of this decisive clue (clinical type). The situation is generated by the fact that the indices do not have equal weight, the difference in weights being difficult to identify. The problem must be looked at both ends, and there is a risk that people will see more broken legs than they actually are. This is one of many examples that suggest that rationality specific to artificial intelligence deserves to be included in the general analysis of rationality.

8.1 Do we also have a problem with the rationality of artificial intelligence?

In an abrupt form (meant to draw attention to the problem) we might ask ourselves: "How bad can artificial intelligence (AI) be?". There are several possible answers to this question, one of them regarding the possibility of overestimating it: there is a risk of granting too much AI credit, derived from commercial marketing (Bender et al. 2021). In other words, those who create or use AI have a significant interest in presenting it much more successfully than it actually is, with the authors pointing out the risk of confusing the answers given by a neural network specializing in language processing, which provides plausible answers based on statistical processing, with the appearance of conscious answers. Hutson (2021) considers that AI lacks common sense for the time being, missing the way the world is made

up and functioning. Probably the best-known example to illustrate the situation of people stupid by technology is that of inappropriate use of GPS.

Knowing the limits of AI is becoming more and more a specific value of critical thinking. Confidence in AI tends to be based on areas similar to peer trust in importance, but without benefiting from the cognitive mechanisms specific to the latter. It is a danger that seems to affect especially the new generations, the previous ones being somehow protected by the limited abilities to use the new technologies (by the recourse to traditional cognitive resources). It affects human knowledge in multiple ways, including by closing in on the cognitive bubbles created by the suggestions of different AI.

9. Conclusions

Risks and precautions. The claim that education for critical thinking alone can generate an adequate grasp of reality could be exaggerated, requiring a complex set of epistemic interventions. The size of the marketing component can bring with it expectations that are difficult to fill with real content, risking to turn the expression of critical thinking into a passing fad.

Top-down changes. Given the brief analysis of the legislation carried out in a previous section, the tradition of legal articles presses for the advancement of *the lege ferenda*: the introduction of critical thinking skills in the National Education Law, along with the express indication of epistemic skills. Changing the legislation seems to be necessary in relation to the tradition of social interventions in Romanian society: from top to bottom, they have dominated the last two centuries. Obviously, this direction of intervention carries with it the risk of bottomless forms.

Bottom-up changes. It is not clear whether bottom-up modification is possible. There are some favorable signs, most of them related to the impact of globalization.

Logics. Given the mentions in the section dedicated to logic, our proposal aims at a form of integration of logic in a new educational context, based on two directions of action:

- Identifying a solution to connect logic to reality, but not to affect its formal structure.
- Integrating logic into a complex set of interventions designed to support thinking, organized under the umbrella of critical thinking.

Identifying the approaches with the highest level of coherence with the specifics of the Romanian mentality is a necessary step. This action, which involves conducting dedicated research, assumes the need for a

degree of compatibility between certain cognitive skills and social values, respectively redefining some of the social values in accordance with the objectives of critical thinking, thus increasing the level of coherence.

The creation of reference works in the field of critical thinking is also necessary, the translation of those already existing in the western space can be a beginning. They can take the form of both manuals and dedicated applications, the latter having the advantage of a much wider addressability.

Via negativa. The *via negativa* approach involves the use of recommendations, which have the chance to become *memes*, focused on avoiding mistakes. We can indicate the example of two categories of procedural errors that must be avoided: a) interpretation (automatic a) of the correlation as causality; b) causal reductionism: focusing on a single cause from the interweaving of causes that participate in determining a historical event.

Cognitive economics. Critical thinking should also involve a minimum of preparation for cognitive economics. The ever-increasing volume of information we face brings with it an objective inability to process it. Inevitably, our decisions cannot be based on an analysis of all available information. *Knowing what to give up*, the ability to prioritize decisions according to their importance, etc., are useful cognitive economy strategies in new contexts.

One of the possible solutions was discussed in the heuristics section, which aims to use clues. Another solution seems to be to use the information processing power generated by smart tools. Even if their failures are more visible, as a whole we must note the significant contribution that their evolution has to the *cognitive economy*. This strategy involves the use of that sense of critical thinking that involves identifying the limits of the human mind and setting up tools to amplify its possibilities. At issue is the discovery of appropriate extensions of the mind, i.e.: those cognitive tools that are likely to have a much higher level of "cognitive ergonomics".

Transparency of beliefs and convictions, based on the development of useful tools for clarifying/raising awareness of one's own beliefs, this positioning can influence behaviors towards information and decisions made. These actions represent a form of support for an older recommendation circulating in the space of philosophy, *Know Yourself!* focused in this case on identifying your own possibilities and cognitive limits.

Statistical education is a common recommendation, the contribution of critical thinking focusing, once again, on the negative solution: highlighting errors in order to learn from them.

A complementary variant (sometimes presented as an alternative) seems to find more and more supporters: transposing statistical problems into forms more accessible to human cognitive intuitions / habits, such as the use of natural frequencies (Gigerenzer, 2011) (Hoffrage et al., 2015) and tools for understanding risks (Gigerenzer & Edwards, 2003). The approach based on the use of natural frequencies can also be understood in the horizon of Searle's (2004) theory on the two directions of adaptation, mind to world and world to mind, in question being a form of world adaptation (transposition of data about it) to the possibilities of the mind. Compared to the reference level of statistics, this solution seems to be a proposal for cognitive prosthesis, being meant to compensate for a deficit. Because it is not clear to what extent such solutions are related to critical thinking, the problem requires a separate analysis, carried out from an anthropological perspective (do such tools take us out of the human strong area?) or ontological (do we miss the essence of the human with such adaptations by moving to a secondary realm of existence?).

A useful solution is to introduce elements of game theory and connect them to real world situations, through dedicated exercises. These have the role of putting pupils/students in the situation of real social dilemmas in order to highlight their possible problems and solutions.

To teach pupils and students that there is chance and that certain things must be thought of in terms of probability is a form of giving up the exclusivity of linear models in education. We believe that such reorientations are already happening in many places and in different ways. Here we try to suggest what could be a rule of dealing with certain areas of reality. Even if there is a risk of a certain dilution of responsibility due to the call for explanations based on chance, increasing the grip on reality is a gain that can compensate for other possible losses.

In some cases, the observance of statistical rules such as the *reporting at the base rate* is oriented towards the interpretation of information as clues, generated by the habit of simple and fast heuristics. Noting that the alternative of indices is more rational when the base rate is not known (or when knowing the base rate requires large resources).

The explanation of causation, the limits of its use and the risks arising from its misuse must also be included in specific approaches to critical thinking.

A pragmatic/enactive approach to university education. In terms of pragmatism of thinking, i.e.: providing practical tools in practice, universities, designed as institutions whose purpose is to form mainly thinking, traditionally use two directions of action: a) training of professional thinking, using to applied cognitive models (taken based on practical results) and to the set of items and conditions specific to scientific papers; b) the formation of a general model of thinking through logic (but used only in the case of some of the specializations). The traditional model lacks, therefore, the specific training of everyday practical thinking, which brings with it the possibility to use it in different professional environments.

In principle, we could consider that a good part of critical thinking is oriented towards covering this need. Given that, in the case of certain specializations, we are witnessing the introduction of training in the field of critical thinking skills, we could consider that we are on the right track, being necessary only to emphasize and generalize this direction of intervention. There is still a lack of awareness of the close relationship between the target environment and the type of specific cognitive reporting, namely the ability to identify the influence that the environment has on thinking.

From the sphere of traditional practical solutions, the following approaches can be retained: graduation certificates (organized by degrees or levels), the recognition of completing a formative path and the scores of critical thinking.

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