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EDITORIAL MATERIALS

The Ocean of Irrationality: From Cognitive Illusions to Managerial Paradoxes

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Abstract. *Relevance and Problem.* In the contemporary world characterized by high uncertainty, information overload, and rapid change, individuals increasingly confront the limits of their own rationality. Irrationality, long regarded as a deviation or error, is now understood as a fundamental characteristic of human thinking and behaviour that does not disappear with the advancement of science and technology but rather transforms and manifests itself across various spheres of life, from everyday decision-making to the functioning of large corporations. Despite the abundance of empirical data, it remains insufficiently understood how different manifestations of irrationality (cognitive biases, magical thinking, and epistemically unjustified beliefs) are interconnected and what role they play in the human adaptive repertoire. *Objective.* This introductory article presents the thematic issue of the journal and aims to integrate interdisciplinary approaches to the study of irrationality, encompassing psychology, behavioural economics, linguistics, corporate anthropology, and other disciplines, as well as to offer readers tools for a deeper understanding of decision-making and human behaviour under conditions of uncertainty. *Methods.* To achieve this aim, the authors conducted a systematic review of key contemporary studies on cognitive biases, magical thinking, epistemically unjustified beliefs, and their roles in various contexts. The analysis covers both classic works by D. Kahneman, A. Tversky (Kahneman, 2011; Tversky & Kahneman, 1974), K. Stanovich (Stanovich, 2009), and D. Ariely (Ariely, 2008), as well as more recent empirical investigations, including cross-cultural and clinical studies (Keinan, 1994; Whitson & Galinsky, 2008; Hamerman et al., 2018; Taher et al., 2020; Latifnejad Roudsari et al., 2015; Fluke et al., 2014; Rudski & Edwards, 2007). In addition, comparative discourse analysis of medical texts, a pilot study on user perception of artificial intelligence, and a pilot comparative study of victims of telephone fraud and individuals who terminated contact with fraudsters were employed. This comprehensive approach allows for the identification of both universal and culturally specific mechanisms of irrationality. *Results.* The analysis indicates that irrationality is not merely a collection of errors but constitutes a distinctive mode of adaptation to the complexity and uncertainty of the world, possessing both destructive and constructive aspects. Magical thinking and superstitions serve functions of creating an illusion of control, reducing stress, and explaining random events (Keinan, 1994; Whitson & Galinsky, 2008), as confirmed by data obtained across different countries, including Israel, Iran, Portugal, Colombia, and nations in Africa and Asia. A consistent relationship has been identified between irrational beliefs and personality traits, including neuroticism, external locus of control, and anxiety (Perdue, 2012; Wise, 2011; Wiseman & Watt, 2004). It has been demonstrated that even high intelligence does not guarantee protection against pseudoscience and conspiracism unless conscious rational strategies are engaged (Jastrzębski & Chuderski, 2022; Čavojská et al., 2020; Erceg et al., 2019). The articles in this issue further illuminate the phenomenon of "dark leadership" in organisations (Boddy, 2017; Mathieu et al., 2014; Diller & Jonas, 2020), age-related and gender-specific features of magical thinking in adolescence, linguistic markers of irrationality in medical discourse, anthropomorphic projections in human interaction with artificial intelligence, and effective cognitive interventions for chronic insomnia (Morin, 1993; Harvey, 2002; Perlis et al., 2011; Riemann et al., 2023). A pilot comparative study of telephone fraud victims showed that higher suggestibility, sensitivity, and magical thinking, together with lower aggressiveness and spontaneity, distinguish victims from those who terminated contact with fraudsters. Anxiety alone was not a sufficient risk factor; its combination with suggestibility and magical beliefs increased vulnerability. *Conclusion.* The materials presented allow for a reconceptualisation of irrationality not as pathology but as an evolutionarily entrenched mechanism for rapid responding to uncertainty. The principal practical implication is that managing irrationality requires not its eradication but its conscious recognition, an understanding of its hidden logic, and the

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use of this understanding for more balanced decision-making in business, education, healthcare, everyday life, and prevention of victimization in telephone and cyber fraud. The issue also demonstrates that irrational beliefs can serve as targets for prevention and psychological correction in fraud victimization. The issue provides readers with navigational tools for exploring the "ocean of irrationality," demonstrating that even the most peculiar human actions possess an internal logic, and that understanding this logic is the key to more effective interaction with the world and with oneself.

Keywords: Irrationality, Cognitive Biases, Decision-Making, Magical Thinking, Epistemically Unjustified Beliefs, Behavioural Economics, Corporate Culture, Victimization, Telephone Fraud

1. Introduction

Two years ago, psychological science suffered an irreparable loss: Daniel Kahneman, a cognitive psychologist who together with his friend and colleague Amos Tversky transformed the understanding of human decision-making held by most people, including researchers in economics and psychology, passed away. Kahneman and Tversky (Kahneman, 2011; Tversky & Kahneman, 1974), and subsequently many of their colleagues and students, demonstrated that our decisions are largely irrational and based on heuristics, habitual and not fully conscious schemas, rather than on meticulous analysis and comparison of all known facts. It was through reading the works of Kahneman, as well as Keith Stanovich (Stanovich, 2009) and Dan Ariely (Ariely, 2008), that our interest in irrationality began.

The relevance of this line of inquiry today is particularly acute. The entire Western scientific tradition is built upon a rational comprehension of the world and its regularities; this is precisely why discoveries in cognitive psychology and behavioural economics appear so startling at first glance, revealing that human decision-makers are not rational agents in the way that a scientist studying the world and testing hypotheses should be. Yet these discoveries only begin to lift the veil on the vast expanse of what might be called the "ocean of irrationality." Irrationality has been the subject of popular science books by Daniel Kahneman (Kahneman, 2011), Keith Stanovich (Stanovich, 2009), and behavioural economists Richard Thaler (Thaler, 2015) and Dan Ariely (Ariely, 2008). Particularly intriguing is the analysis of irrational beliefs, their formation, consolidation, and defence in conflicts, as described in the book *The Time of Delusions*. Such beliefs are classified as conspiracy theories, which are also actively investigated as one facet of irrational thinking (Brotherton, 2015; Grzesiak-Feldman, 2015; van Prooijen, 2018). The patterns of formation, functioning, and dissemination of such beliefs have been examined and described in the works of Rob Brotherton (Brotherton, 2015), Monika Grzesiak-Feldman (Grzesiak-Feldman, 2015), Jan-Willem van Prooijen (van Prooijen, 2018), and other authors. Irrationality is also

investigated in social anthropology. Pascal Boyer's remarkable book *Religion Explained* (Boyer, 2001) describes how religious and other beliefs emerge and spread, and addresses the question of why some beliefs prove more resilient than others.

The problem is that fragmented data from psychology, sociology, anthropology, linguistics, and economics have yet to be integrated into a coherent picture, and practical conclusions often remain at the level of popular books. The question of in which scientific domains and by what means irrationality is investigated, as well as the mechanisms of its manifestation across different contexts, remains open. Numerous studies have addressed various aspects of irrationality, such as superstitiousness and belief in the paranormal. Keinan (1994) and Whitson and Galinsky (2008) identify among the functions of irrational beliefs the creation of an illusion of control and the reduction of psychological tension. Hamerman and Griffiths with colleagues (Hamerman et al., 2018; Griffiths et al., 2019) demonstrated a link between irrational beliefs and the tendency to overcome uncertainty and ambiguity, as well as the activity of causal reasoning, the propensity to attribute any event, including random or multidetermined occurrences, to a single cause. Research has also examined the prevalence of irrational beliefs across various groups and situations, including students preparing for examinations, individuals with somatic illnesses, women in relation to pregnancy and childbirth, and those living in war zones. Fluke, Webster, and Saucier (Fluke et al., 2014) observed that in some cases students prefer using talismans over exam preparation. Rudski and Edwards (Rudski & Edwards, 2007) found that the frequency of ritual behaviour increased with the subjective significance of the event and was inversely related to experience and level of preparation. A study conducted in Iran found that 40% of patients attributed somatic illnesses to irrational causes such as the "evil eye" and "sorcery." According to Taher and colleagues (Taher et al., 2020), superstitious patients with hypertension who believed in omens and luck did not properly adhere to their treatment regimen. African

researchers have also noted that patients associate illness and healing with magical influences. According to data obtained in Portugal, beliefs and myths generate fears and anxieties that shape women's perceptions of pregnancy: 82% of surveyed women reported being influenced to a greater or lesser extent by various myths and beliefs. Iranian researchers Latifnejad Roudsari, Zakerihamidi, and Merghati Khoei (Latifnejad Roudsari et al., 2015) also noted the influence of beliefs and superstitions, alongside other socio-psychological variables, on decision-making regarding natural childbirth versus caesarean section. Keinan's (1994) study found that Israeli citizens living during the Gulf War in areas subjected to missile attacks exhibited higher levels of magical thinking than those residing in areas not targeted by missiles. One study examining survey and interview data from Colombia for 2016–2019 reported that a significant portion of the population affected by armed conflict adheres to various conflict-related superstitions that influence their decisions and migration from conflict zones. Research has also examined the relationship between irrational beliefs and personality traits. Several researchers have highlighted the link between superstitiousness and an external locus of control, meaning that individuals attribute life events to fate, luck, or supernatural forces. Perdue (Perdue, 2012) found a direct relationship between irrational beliefs and such Big Five components as neuroticism and extraversion. Wise's (Wise, 2011) studies demonstrate that superstitions correlate with personality traits such as anxiety, need for control, pessimism, and depressiveness. Researchers have also noted the association of superstitiousness with traits such as pessimism and indecisiveness (Wiseman & Watt, 2004). Irrationality also matters in criminal victimization. Alekseeva and Danilova (2026) found that telephone fraud victims had higher suggestibility, sensitivity, and magical thinking than those who terminated contact; anxiety was a risk factor mainly when combined with suggestibility and magical beliefs.

It is important to note that irrationality is investigated not only by psychologists but also by anthropologists, sociologists, and linguists. Magical thinking has been found to serve, from primitive times to the present day, as one of the mechanisms of defence against uncertainty (Boyer, 2001; Vyse, 2014). Taher, Pashaeypoor, Cheraghi, Karimy, and Hoseini (Taher et al., 2020) identify poverty and social deprivation as causes of the spread of superstitious beliefs. Social pressure and emotional stress are high in

impoverished societies, rendering people's lives unsafe and tense, and creating fertile ground for superstitions. Sociological research results indicate that over 40% of Americans believe in unscientific medical treatments; in Africa, 70% of respondents turn to local non-conventional treatment methods, such as charms and witchcraft; in East Asia, nurses caring for patients believe in luck and misfortune; in India, 62% of schizophrenia patients seek treatment from witches and firmly believe in superstitions; and in Turkey, belief in the "evil eye" is a prevalent form of superstitious beliefs. From a linguocultural perspective, irrational beliefs expressed in the form of superstitions constitute verbalised irrational components of everyday consciousness, transmitted through cultural tradition and guiding individual behaviour. According to I. A. Cherginets (Cherginets, 2018), they perform explanatory, psychotherapeutic, and socialising functions.

The objective of this issue is to present an interdisciplinary panorama of research on irrationality, demonstrating its role in decision-making, corporate culture, language, and clinical practice, and to offer readers tools for more conscious engagement with their own irrationality. The "ocean of irrationality research" is boundless. Diverse fields of knowledge, including psychology, linguistics, sociology, anthropology, and behavioural economics, examine irrationality as an object of study. This object encompasses a vast array of topics, including irrationality in decision-making, its manifestations in speech, irrational beliefs and their expressions across various situations and among members of different groups. In this journal issue, we have endeavoured to preserve the breadth of thematic coverage and the representation of diverse scientific disciplines.

2. Methods

To prepare this thematic issue, the editorial board applied a comprehensive strategy for selecting and analysing materials, ensuring interdisciplinary coverage of the phenomenon of irrationality. The methodological approach was grounded in the principle of triangulation: each article in the issue examines irrationality through the lens of its own disciplinary perspective, and the editorial synthesis of these data allows for the identification of both universal mechanisms and contextual features of irrational behaviour.

The specific methods employed by the contributing authors are diverse and reflect the breadth of the research field. Dvoinina and Dvoinin applied a non-systematic theoretical review with elements of narrative analysis and

synthesis, with literature searches conducted in the leading databases Scopus, Web of Science, and PsycINFO, focusing on empirical studies containing detailed methodological descriptions (Jastrzębski & Chuderski, 2022; Čavojová et al., 2020; Erceg et al., 2019; Pennycook et al., 2015a; Pennycook et al., 2015b). Lukianova's empirical study employed a quantitative design using eight standardised questionnaires covering cognitive styles, creativity, emotional intelligence, behavioural control, emotion regulation, mechanisms of moral disengagement, and moral identity; statistical processing included Spearman's rank correlations on the full sample and separately by sex, as well as Bayesian Model Averaging regression. Bogdanova and Khaidarova, in their conceptual article, draw on the case-study method and comparative analysis of empirical leadership research (Boddy, 2017; Mathieu et al., 2014; Diller & Jonas, 2020; O'Boyle et al., 2012; Peterson et al., 2012), integrating data from clinical psychology and corporate anthropology (Kramer & Brown, 2015; Hasbrouck, 2024; Douglas, 1986). Sazhenin applied discourse analysis and componential analysis of dictionary definitions to compare instructions for evidence-based and traditional medicine preparations, enabling the identification of linguistic markers of rational and irrational worldviews. Solondaev used a pilot online survey with subsequent statistical processing in the R environment, evaluating significance levels and confidence intervals using the test of proportions. Alekseeva and Danilova (2026) used a pilot comparative design: 27 telephone fraud victims and 56 individuals who terminated contact, with suggestibility, typological, and magical belief measures; Mann-Whitney U with FDR correction and Spearman correlations were applied. Shcheglyagina conducted a narrative review of the literature on cognitive models of insomnia (Morin, 1993; Harvey, 2002; Perlis et al., 2011; Riemann et al., 2023; Edinger et al., 2021; Tang et al., 2023), synthesising data from PubMed, Scopus, and PsycINFO for the period 1980–2024.

This diversity of methodological approaches ensures comprehensiveness of coverage, from the micro-level of cognitive processes and personality traits to the macro-level of organisational culture and linguistic practices, allowing a transition from fragmented descriptions to a systemic understanding of irrationality as a multi-level phenomenon.

3. Results

The contemporary world, which we increasingly characterise as a VUCA world (volatile, uncertain, complex, ambiguous) or

even a BANI world (brittle, anxious, non-linear, incomprehensible), presents humanity with challenges that our evolutionarily developed cognitive mechanisms are increasingly ill-equipped to handle. Information overload, the pace of change, and the high cost of error expose the limitations of our rationality, compelling us to seek new ways of understanding and managing our own irrationality. The cumulative analysis of the materials included in this issue has revealed several robust findings that, despite the diversity of subject areas, converge into a coherent picture.

The issue opens with an article by M. V. Bogdanova and O. S. Khaidarova, "The Irrational and the Rational in Decision-Making from the Perspective of Clinical Psychology and Corporate Anthropology." The authors pose a fundamental question: what constitutes the "rational" at a time when traditional management tools such as SWOT analysis and risk assessment are failing under conditions of high uncertainty? They propose seeking answers at the intersection of clinical psychology and corporate anthropology. Their key thesis is that a manager's irrational behaviour may be entirely rational within the context of their corporate culture (Douglas, 1986; Hasbrouck, 2024; Kramer & Brown, 2015). The article analyses mechanisms that generate irrationality in organisations: groupthink (Andreeva, 2000), ritualisation (Fromm, 2022; Kramer & Brown, 2020), mythologisation of past experience (Cameron & Quinn, 2001), and defence of areas of responsibility (Tett, 2015). Particular attention is devoted to the phenomenon of "dark leadership," leaders with traits of narcissism, psychopathy, and Machiavellianism (Boddy, 2017; Mathieu et al., 2014; Diller & Jonas, 2020; O'Boyle et al., 2012; Peterson et al., 2012; Furtner et al., 2017). The authors demonstrate that such leaders can be effective in the short term, but their decisions, lacking empathy, often lead to destructive long-term consequences (Haar & de Jong, 2023; Sutton & Stapleton, 2023; Elbers et al., 2023). The case of Miranda Priestly from the film *The Devil Wears Prada* is used as an illustration, rendering theoretical constructs tangible. It has been empirically confirmed that a deficit of empathy, traditionally considered a condition of rationality, in practice generates an atmosphere of fear and authoritarianism that impedes the free exchange of ideas and, consequently, reduces the quality of managerial decisions (de Waal, 2009; Coronado-Maldonado & Benítez-Márquez, 2023).

Another aspect of irrationality, namely its cognitive origins, is explored in the article by

V. K. Dvoynina and A. M. Dvoynin, "Do Cognitive Abilities and Rationality Protect Against Susceptibility to Epistemically Unjustified Beliefs?" This review challenges the naive assumption that high intelligence or well-developed critical thinking serves as a reliable defence against pseudoscience, conspiracy theories, and belief in the paranormal (Stanovich, 2009; Kahneman, 2011; Epstein, 1994). The authors demonstrate that empirical data present a complex and contradictory picture. The relationship between intelligence and unjustified beliefs exists but is weak to moderate and varies considerably depending on the type of belief (Jastrzębski & Chuderski, 2022; Jastrzębski et al., 2024; Andersson et al., 2022). Creativity can both facilitate finding unconventional solutions and, conversely, render individuals more vulnerable to original but false ideas when not accompanied by critical evaluation (Bunce & Woolley, 2021; Boden, 2004; Gligorić et al., 2021; Dagnall et al., 2025). Intuitive thinking style is a consistent risk factor, whereas rational thinking style most often serves as a negative predictor of such beliefs (Pennycook et al., 2015a; Pennycook et al., 2015b; Svedholm & Lindeman, 2013; Irwin, 2015); however, even this is not a universal rule (Majima, 2015). The key conclusion, which fundamentally revises the conventional understanding of the protective functions of intelligence, is that cognitive abilities alone do not guarantee protection against indoctrination; they can be beneficial only if an individual consciously suppresses intuitive impulses and deploys intelligence as a fully utilised mental resource (Stanovich, 2011; Erceg et al., 2019; Bensley et al., 2023). This article lays the theoretical foundation for understanding why even educated and intelligent people can believe in manifestly unfounded theories.

A logical continuation of this theme is the empirical study by I. A. Lukianova, "Psychological Characteristics of Magical Thinking in Adolescence." The author focuses on the age-related aspect of irrationality, filling a gap in the scientific literature (Rosengren et al., 2000; Bolton et al., 2002; Peltzer, 2003; Sagone & De Caroli, 2014). In a study conducted on a sample of 300 adolescents, magical thinking is examined comprehensively in relation to cognitive styles, creativity, emotional intelligence, behavioural control, and the moral domain (Epstein, 2003; Kahneman, 2011; Aarnio & Lindeman, 2005; Van Mulukom et al., 2024). The obtained data paint a portrait of the magically thinking adolescent as a person inclined toward an intuitive thinking style, with reduced emotional regulation and less developed

understanding of their own emotions (Eddy & Hansen, 2021; Canli et al., 2015; Gregory & Mustata, 2012). The most striking and unexpected finding was the strong positive association between magical thinking and mechanisms of moral disengagement, the capacity to justify immoral acts through displacement of responsibility, advantageous comparison, and euphemistic labelling (Bandura et al., 1996; Moore, 2015; Blasi, 1984; Hoffman, 2000). Regression analysis identified intuitive processing, advantageous comparison, and displacement of responsibility as the strongest predictors, with volitional control emerging as an additional predictor enabling the translation of magical beliefs into stable behaviour. This finding allows for a novel perspective on adolescent irrationality: it emerges not as a resource deficit but as a preference for a particular, evolutionarily more ancient mode of information processing that helps cope with uncertainty (Frydenberg, 2019; Vetrova, 2009). Importantly, the study revealed significant gender differences in how magical thinking is integrated into the psyche (Spinelli et al., 2002; Vetrova, 2012): in boys, it is associated with a broader range of psychological characteristics, whereas in girls, with more selective associations. This finding has serious practical implications for psychological counselling and educational work with adolescents.

The next article, "Medical Discourse as a Sphere of Representation of Rational and Irrational Worldviews," shifts the discussion to the linguistic domain. Its author, I. I. Sazhenin, addresses the question of how differences in the perception of reality are reflected in language. By comparing the instructions for the drug Paracetamol (an example of evidence-based medicine) and the Tibetan remedy Rinchen Ratna Sampel (an example of traditional medicine), the author demonstrates differences in discursive practices (Karasik, 2000; Golovanova, 2013; Fedosova & Koroleva, 2018). The description of Paracetamol is replete with terminology, precise dosages, indications of pharmacokinetics, drug interactions, and contraindications, all hallmarks of a rational approach. In contrast, the description of the Tibetan medicine abounds in vague formulations, imagery ("struggle between blood and wind," "defilement of sins"), references to mystical prescriptions (auspicious lunar days, mantras), and evasive dosage instructions. The key marker of irrationality in language is the category of uncertainty, realised both at the lexical level (words such as "approximately," "may," "usually") and at the level of entire missing informational blocks (Paducheva, 1985;

Evgenieva, 1981–1984). The author concludes that language as an instrument of logic and reason proves insufficiently adapted for describing irrational worldviews, giving rise to the phenomenon of "linguistic insufficiency" and compelling adherents of irrational worldviews to resort to metaphors, symbols, and figurative constructions reminiscent of a "linguistic cartogram" requiring decoding.

The theme of rationality receives an unexpected refraction in V. K. Solondae's article "Users' Understanding of Artificial Intelligence." Whereas the preceding articles examined irrationality as a human attribute, here the author investigates how rationally users perceive one of the major products of modern civilisation, artificial intelligence (Ushakov, 2023; Menovshchikov, 2025; Boyd & Markowitz, 2026). In a pilot study conducted on Valentine's Day, the author tested users' responses to an invitation to discuss questions of love with AI. The results proved revealing. An overwhelming majority (88.2%) of respondents stated that such a discussion might interest someone, and the participants themselves generally evaluated their AI experience positively. In open-ended responses, key motives were identified: seeking help in difficult situations, practicality, playful interest, psychological safety, and loneliness. The author concludes that in users' understanding, AI is a functional, instrumental, and interactive phenomenon applicable in any sphere of life, including intimate and emotional domains (Gado et al., 2022; Bonnefon et al., 2024). The risks of AI use are perceived as manageable, and its boundaries of application are not perceived as psychologically insurmountable. The study raises a profound question about the boundaries of rationality: users attribute to AI properties that extend far beyond its algorithmic essence, which in itself constitutes a manifestation of irrational, anthropomorphic projection (Harris, 2024; Zhao et al., 2022). The article demonstrates that our perception of technology is as susceptible to biases as our perception of any other complex reality.

Alekseeva and Danilova (2026) found that telephone fraud victims ($n = 27$) differed from those who terminated contact ($n = 56$) by higher suggestibility, sensitivity, and magical thinking, lower aggressiveness and spontaneity, and the loss of protective correlations between suggestibility and spontaneity. Anxiety was a risk factor only in combination with suggestibility and magical beliefs.

The issue concludes with M. B. Shcheglyagina's article "Cognitive Interventions in the Therapy of Chronic

Insomnia: Mechanisms, Targets, and Methods of Correction." This work, remaining within the framework of clinical psychology, offers a practical perspective on how to work with irrational beliefs entrenched at the behavioural and physiological levels. Chronic insomnia is a classic example of how an initial trigger (stress) initiates a cycle of "irrational" cognitions that maintain the disorder (Spielman, 1986; Morin, 1993; Harvey, 2002). The author describes in detail the central cognitive distortions in insomnia: catastrophising the consequences of sleep loss, dichotomous thinking, rigid and unrealistic expectations, and personalisation (Carney & Edinger, 2006; Palagini et al., 2017; Harvey, 2003; Tang et al., 2023). These beliefs heighten anxiety, which in turn impedes falling asleep, confirming initial fears. Cognitive-behavioural therapy for insomnia offers a systematic set of interventions to break this vicious cycle (Perlis et al., 2011; Edinger et al., 2021; Riemann et al., 2023; Walker et al., 2022). The article provides a detailed analysis, with dialogue examples, of cognitive restructuring techniques: Socratic dialogue (Beck, 2024), probability estimation of catastrophes (Leahy, 2020), cognitive continuum (Beck, 2024), and behavioural experiments (Perlis et al., 2021; Perlis et al., 2011). Particular attention is devoted to working with metacognitive beliefs, the conviction that thought control is necessary and that worry is useful (Wells, 2008; Ong et al., 2012; Tang et al., 2023). The author demonstrates that cognitive interventions are most effective when integrated with behavioural methods and allow for impact not only on thought content but also on the relationship with one's own cognitive processes.

4. Discussion

The articles presented in this issue, despite their diversity of themes and approaches, paint a coherent and integrated picture. Irrationality ceases to be something marginal or pathological. It emerges as a fundamental, evolutionarily entrenched feature of the human psyche that, unlike slow and energy-intensive rationality (Kahneman, 2011; Stanovich, 2009), enables rapid decision-making under conditions of uncertainty. The magical thinking of adolescents, patients' superstitions, belief in the "special mission" of dark leaders, the specific language of traditional medicine, and even the anthropomorphisation of artificial intelligence are all links in the same chain in which irrationality performs an adaptive function (Boyer, 2001; Vyse, 2014; Shermer, 2015).

The comparison of results allows for several generalisations of both theoretical and practical significance. First, all studies converge on the

finding that irrationality is neither a deviation nor a pathology but a fundamental characteristic of the psyche that enables rapid responding to uncertainty. Magical thinking and superstitions serve functions of creating an illusion of control and reducing stress (Keinan, 1994; Whitson & Galinsky, 2008; Bayramova & Enikolopov, 2021; Rudski & Edwards, 2007). Second, cognitive abilities and rational thinking style do not constitute absolute protection against indoctrination (Jastrzębski & Chuderski, 2022; Erceg et al., 2019; Čavojská et al., 2020), which implies the necessity of incorporating into educational programmes not only the training of analytical skills but also instruction in recognising and managing one's own intuitive responses (Stanovich, 2011; Pennycook et al., 2015b; Svedholm & Lindeman, 2013). Third, the context-dependence of irrationality compels a revision of the traditional opposition of rational and irrational as universal categories: what appears irrational to an external observer may be deeply rational for a bearer of a given culture (Douglas, 1986; Hasbrouck, 2024; Kramer & Brown, 2015; Habermas, 1992). Fourth, irrationality permeates not only thinking and behaviour but also language and attitudes toward technology, and the category of uncertainty and anthropomorphic projections possess their own logic requiring specialised methods of investigation (Boyd & Markowitz, 2026; Taylor & Taylor, 2021). Fifth, clinical work demonstrates that cognitive interventions that take into account irrational beliefs can be highly effective, particularly when they combine the restructuring of thought content with the modification of metacognitive attitudes (Perlis et al., 2011; Morin, 1993; Harvey, 2002; Edinger et al., 2021; Riemann et al., 2023; Wells, 2008; Ong et al., 2012).

The practical conclusion of the article by Bogdanova and Khaidarova is that managing irrationality requires a two-component approach: from clinical psychology, the development of emotional intelligence and ethical values (Coronado-Maldonado & Benítez-Márquez, 2023; de Waal, 2009; da Silva et al., 2024); and from corporate anthropology, the search for and actualisation of cultural "totems" that unite the collective and render strategic decisions "their own" and "understandable" (Kramer & Brown, 2015; Kramer & Brown, 2020; Cameron & Quinn, 2001). The article by Dvojnina and Dvojinin adds an important note of epistemic sobriety to this discussion: cognitive abilities are not a panacea but merely a tool, the effectiveness of which depends on our willingness to use it (Stanovich, 2011; Bensley et al., 2023; Pennycook et al., 2015b).

Irrationality can be not only adaptive but also victimogenic: in telephone fraud, magical thinking, suggestibility, and anxiety form a vulnerability complex, making critical thinking, desuperstition, and assertiveness training relevant for prevention (Alekseeva & Danilova, 2026).

5. Conclusion

The central challenge of our time, as virtually all authors emphasise, is not to eradicate irrationality but to learn to recognise it, understand its hidden logic, and use this understanding for more balanced decision-making in business, education, healthcare, everyday life, and fraud prevention. A promising direction for future research is the integration of metacognitive approaches into various protocols for working with irrational beliefs (Wells, 2008; Ong et al., 2012), as well as the development of applied methodologies that take into account cultural context and individual differences (Viale & Shye, 2025; Bueno-de la Fuente et al., 2025; Elbers et al., 2023).

Thus, the "ocean of irrationality" is not so dangerous if we cease to perceive it as chaos and begin to study its currents, depths, and reefs. Psychology and related sciences have already done considerable work in mapping it (Boyer, 2001; Vyse, 2014; Irwin, 2009; Subbotsky, 2001; Rozin & Nemeroff, 2002; Shermer, 2015). The task of this issue is to offer readers navigational tools for this journey, demonstrating that even the most puzzling human actions possess their own internal logic, and that understanding this logic is the key to more effective interaction with the world and with ourselves.

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Highlights:

- Irrationality is an evolutionarily entrenched adaptive mechanism for rapid decision-making under uncertainty, not a cognitive deficit.

- High intelligence and critical thinking do not guarantee immunity to pseudoscience, conspiracy theories, or paranormal beliefs.
- Magical thinking in adolescence is linked to intuitive processing, reduced emotional regulation, and moral disengagement mechanisms.
- Irrationality is context-dependent, permeating language, technology perception, corporate culture, and clinical practice.

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Океан иррациональности: от когнитивных иллюзий до управленческих парадоксов

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Резюме. Актуальность и проблема. В современном мире, характеризующемся высокой неопределённостью, информационной перегрузкой и быстрыми изменениями, человек всё чаще сталкивается с ограничениями собственной рациональности. Иррациональность, долгое время воспринимавшаяся как отклонение или ошибка, сегодня рассматривается как фундаментальная характеристика человеческого мышления и поведения, которая не исчезает с развитием науки и технологий, а трансформируется и проявляется в различных сферах жизни – от принятия повседневных решений до функционирования крупных корпораций. Несмотря на обилие эмпирических данных, остаётся не до конца осмысленным, как различные проявления иррациональности (когнитивные искажения, магическое мышление, эпистемически необоснованные убеждения) взаимосвязаны между собой и какое место они занимают в адаптационном репертуаре человека. **Цель.** Настоящая вводная статья представляет тематический номер журнала и ставит своей целью интегрировать междисциплинарные подходы к изучению иррациональности, объединяющие психологию, поведенческую экономику, лингвистику, корпоративную антропологию и другие науки, а также предложить читателю инструменты для более глубокого понимания принятия решений и поведения людей в условиях неопределённости. **Методы.** Для достижения поставленной цели авторы провели систематический обзор ключевых современных исследований, посвящённых когнитивным искажениям, магическому мышлению, эпистемически необоснованным убеждениям и их роли в различных контекстах. Анализ охватывает как классические работы Д. Канемана, А. Тверски (Kahneman, 2011; Tversky & Kahneman, 1974), К. Становича (Stanovich, 2009) и Д. Ариэли (Ariely, 2008), так и более поздние эмпирические исследования, в том числе межкультурные и клинические (Keinan, 1994; Whitson & Galinsky, 2008; Hamerman et al., 2018; Taher et al., 2020; Latifnejad Roudsari et al., 2015; Fluke et al., 2014; Rudski & Edwards, 2007). Кроме того, применён метод сравнительного дискурс-анализа медицинских текстов, а также пилотажные исследования восприятия искусственного интеллекта пользователями и исследование жертв телефонного

мошенничества. Такой комплексный подход позволяет выявить как универсальные, так и культурно-специфические механизмы иррациональности. *Результаты.* Проведенный анализ свидетельствует, что иррациональность не является простой совокупностью ошибок, а представляет собой особый способ адаптации к сложности и неопределённости мира, имеющий как деструктивные, так и конструктивные аспекты. Магическое мышление и суеверия выполняют функции создания иллюзии контроля, снижения стресса и объяснения случайных событий (Keinan, 1994; Whitson & Galinsky, 2008), что подтверждается данными, полученными в разных странах – Израиле, Иране, Португалии, Колумбии, странах Африки и Азии. Выявлена устойчивая связь между иррациональными убеждениями и личностными чертами, включая нейротизм, внешний локус контроля и тревожность (Perdue, 2013; Wise, 2011; Wiseman & Watt, 2004). Показано, что даже высокий интеллект не гарантирует защиты от псевдонауки и конспирологии, если не задействуются сознательные рациональные стратегии (Jastrzębski & Chuderski, 2022; Čavojová et al., 2020; Erceg et al., 2019). В статьях номера дополнительно продемонстрированы: феномен «тёмного лидерства» в организациях (Boddy, 2017; Mathieu et al., 2014; Diller & Jonas, 2020), возрастные и гендерные особенности магического мышления у подростков, лингвистические маркеры иррациональности в медицинском дискурсе, антропоморфные проекции при взаимодействии с искусственным интеллектом, эффективные когнитивные интервенции при хронической инсомнии (Morin, 1993; Harvey, 2002; Perlis et al., 2011; Riemann et al., 2023), а также психологические особенности жертв телефонного мошенничества. *Заключение.* Представленные материалы позволяют переосмыслить иррациональность не как патологию, а как эволюционно закреплённый механизм быстрого реагирования на неопределённость. Главный практический вывод состоит в том, что управление иррациональностью требует не её искоренения, а осознанного распознавания, понимания её скрытой логики и использования этого понимания для принятия более взвешенных решений в бизнесе, образовании, здравоохранении и повседневной жизни. Номер журнала даёт читателю навигационные инструменты для исследования «океана иррациональности», показывая, что даже самые странные поступки имеют внутреннюю логику, а её понимание – ключ к эффективному взаимодействию с миром и с самим собой.

Ключевые слова: иррациональность, когнитивные искажения, принятие решений, магическое мышление, эпистемически необоснованные убеждения, поведенческая экономика, корпоративная культура, виктимизация, телефонное мошенничество

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REVIEW

Do Cognitive Abilities and Rationality Protect Against Susceptibility to Epistemically Unwarranted Beliefs?

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Abstract. *Background and research problem.* The prevalence of epistemically unwarranted beliefs makes it critically important to study human cognitive capacities to resist indoctrination by pseudoscientific, conspiracist, and paranormal doctrines. The research problem addressed the question of whether cognitive abilities and rationality protect against susceptibility to epistemically unwarranted beliefs. *Objective.* To present a theoretical analysis of contemporary empirical studies examining the role of cognitive abilities (intelligence and creativity) and rational-intuitive thinking styles in the formation of epistemically unwarranted beliefs. *Methods.* A non-systematic theoretical review of the scientific literature using narrative analysis and synthesis. Literature searches were conducted in major scientific databases, including Scopus, Web of Science, and PsycINFO. Sources were included if they presented empirical data and provided detailed descriptions of their methodological procedures. *Results.* Empirical evidence indicates weak to moderate negative correlations between intelligence and epistemically unwarranted beliefs, although some studies find no association, and in exceptional cases, the relationship may be negative. The relationship between creativity and such beliefs is inconsistent: creativity may help avoid rapid stereotypical evaluations of epistemically questionable ideas, yet may also increase vulnerability to them in the absence of criticality. A tendency toward rational thinking style generally serves as a negative predictor of belief in pseudoscience and conspiracy theories, though its relationship with paranormal beliefs is often absent. These patterns vary depending on methodological and contextual differences across studies. A tendency toward intuitive thinking style constitutes a consistent risk factor that increases the likelihood of accepting irrational ideas and forming epistemically unwarranted beliefs. *Conclusion.* Cognitive abilities and rationality do not guarantee protection against indoctrination. Nevertheless, intelligence and rational thinking style can be beneficial in specific situations when individuals encounter epistemically unwarranted ideas and doctrines, provided they suppress intuitive impulses and evaluations and sufficiently engage intelligence as a mental resource.

Keywords: Cognitive Abilities, Rationality, Irrationality, Intelligence, Creativity, Rational Thinking Style, Intuitive Thinking Style, Indoctrination, Epistemically Unwarranted Beliefs, Pseudoscientific Beliefs, Conspiracy Beliefs, Paranormal Beliefs

1. Introduction

In the contemporary information environment (saturated, fragmented, and weakly regulated) the problem of disseminating epistemically unwarranted ideas and doctrines has become particularly acute, as such ideas can significantly influence people's decision-making and the formation of their epistemically unwarranted beliefs.

Among such beliefs, various forms of *belief in pseudoscience* are highly prevalent, representing a psychological consequence of the phenomenon of *descientization*, which is "a prolonged, persistent process of replacing scientific knowledge with knowledge that does

not meet its criteria, presented in a systematized form difficult to distinguish from genuine science" (Agapova, 2019). The promotion and popularisation of non-scientific knowledge leads to increasing denial of scientific consensus and adherence to pseudoscientific theories. Empirical confirmation of this trend can be seen in the spread of astrology, the anti-vaccination movement, denial of anthropogenic climate change, HIV and cancer dissidence, denial of COVID-19, interest in alternative medicine, and others (Antonova et al., 2023; Bobrovskaya, 2017; Isupova et al., 2021; Sherer, 2004; Das et al., 2022; Mikheev & Nestik, 2021).

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Another equally prevalent type of epistemically unwarranted beliefs consists of *conspiracy beliefs*, which arise from accepting theories that interpret significant events as secret conspiracies by powerful and malevolent groups (Goertzel, 1994). Examples include beliefs regarding outgroup members (conspiracies against Jews, Muslims, etc.) (Swami et al., 2018), social upheavals (revolutions, terrorist attacks, etc.), the existence of a world government and the Judeo-Masonic conspiracy, government concealment of information about extraterrestrial visits, and others (Spiridonov, 2019). One might also mention conspiracist beliefs about medicine (e.g., that pharmaceutical companies conceal harmful side effects of drugs to maintain profits) and beliefs underlying doubts about scientific facts. Douglas et al. (2017) conclude that the popularity of conspiracy theories is driven by key socio-psychological motives: epistemic (need for understanding and certainty), existential (need for security and environmental control), and social (desire to maintain a positive self- and group-image).

Paranormal beliefs are also classified as epistemically unwarranted. In the scientific literature, these are defined as belief in the existence of phenomena, forces, and abilities that violate fundamental natural laws of biology, physics, psychology, etc., and lack scientific confirmation (Lindeman & Aarnio, 2007; Irwin, 2009). They typically include superstitions, belief in the supernatural, the existence of spirits, deities, extraordinary life forms, witchcraft, predictions, and extrasensory human abilities (Tobacyk, 2004). Abitov et al. (2017) define superstitiousness as a worldview characteristic mediating an individual's relationship to reality, similar to religious faith. Its essence lies in conviction regarding causal relationships between human actions (or inactions) and future events, as well as in the existence of supernatural forces and their influence on people's lives. Lindeman and Aarnio (2007) explain belief in the paranormal through categorisation errors, wherein the core attributes of mental, physical, and biological entities and processes become mixed. Furthermore, magical representations characteristic of preschool children persist at an implicit level into adulthood and may be activated in adults despite possessing more rational knowledge that formally refutes these beliefs (Subbotsky, 2001).

The dissemination and impact of epistemically unwarranted ideas on mass consciousness can be understood as a particular

case of indoctrination. Broadly defined, indoctrination refers to a specific process of social influence that entails implanting doctrinal ideas into an individual's or group's consciousness while bypassing recipients' critical perception (Dvoynin & Bulanova, 2020, 2021; Dvoynin & Romantsova, 2021; Savenkov, 2006a, 2006b). What distinguishes indoctrination from related concepts and mechanisms of social influence and manipulation is the presence of a doctrine that is implanted into recipients' consciousness (Savenkov, 2022). Recipients typically do not recognise indoctrinating influence, and their adoption of various ideas, concepts, and explanatory schemas is illusorily perceived as their own choice. Pseudoscientific, conspiracist, and paranormal theories and concepts constitute the content of indoctrination.

The prevalence of epistemically unwarranted beliefs raises questions about human cognitive capacities to resist indoctrination by pseudoscientific, conspiracist, and paranormal doctrines. The most generalised and comprehensive cognitive structures involved in an individual's cognitive activity are intelligence and creativity (or convergent and divergent thinking), which researchers examine as general cognitive abilities (Guilford, 1982; Druzhinin, 1995; Savenkov, 2024; Kholodnaya, 2002, etc.).

One might suppose that *intelligence*, understood as the ability to draw logical inferences, form and manipulate concepts, classify information, generate and test hypotheses, recognise causal relationships, understand consequences, and solve problems (McGrew, 2009), should serve as a factor impeding susceptibility to epistemically unwarranted theories. To recognise the irrational and epistemically unwarranted doctrinal nature of a theory, a certain level of intelligence is evidently required to relate it to an established body of scientifically validated knowledge (e.g., facts and theories accepted by the expert community), identify logical contradictions, violations of causal, genetic, and functional relationships, ontological properties, and much more.

The role of *creativity* in the indoctrination process requires clarification. On the one hand, as the capacity to generate original ideas characterised by novelty and unconventionality, creativity might ostensibly resist indoctrination by epistemically unwarranted doctrines; through creative thinking, individuals may question the initial epistemic premises of doctrines, seek latent connections, and be less susceptible to external authority, seeking truth independently. On the other hand, epistemic

curiosity characteristic of creative individuals, their habituation to multiple perspectives and diversity of viewpoints, combined with what some researchers (e.g., Barysheva, 2012; Sergienko, 2025) assert is the irrational and intuitive nature of creativity, may predispose such individuals to form epistemically unwarranted beliefs.

Beyond these general cognitive abilities, the outcomes of cognitive processing are influenced by the manner and nature of information processing. It is reasonable to suppose that indoctrination outcomes depend on the extent to which, and under what conditions, *rational (analytic) and intuitive pathways* of information processing (or individuals' tendencies toward rational or intuitive thinking styles) are engaged. In this logic, rationality should serve as a protective buffer against accepting epistemically unwarranted ideas.

However, analysis of cognitive models and information processing theories (Dvoynina, 2025) has revealed substantial contradictions to the traditional view of intelligence and rationality's role in information perception. Dual-process models and theories (Epstein, 1994; Evans, 2008; Evans & Stanovich, 2013; Stanovich, 2009; Kahneman, 2011) explain the primary assimilation of epistemically unwarranted ideas and doctrines through the intuitive information processing system, which minimises cognitive costs. Cognitive dissonance theory (Festinger, 2000) reveals the motivational basis for the persistence of epistemically unwarranted beliefs: avoiding inconsistency even at the cost of rejecting or reinterpreting scientific knowledge. The argumentative theory of reasoning (Mercier, 2016; Mercier & Sperber, 2011), epistemic vigilance theory (Sperber et al., 2010), and epistemic motivation theory (Kruglanski et al., 2009) can explain the effectiveness of indoctrination through reasoning oriented toward "winning" social communication rather than truth-seeking; the simplicity and authority of sources that blunt critical evaluation; and individuals' striving for epistemic clarity, certainty, and confidence rather than reliability. Conceptual change theory (Kurbanov & Spiridonov, 2023) explains susceptibility to indoctrination through the possibility of parallel

coexistence of logically incompatible models of reality in an individual's cognitive domain.

In this context, the present article aims to review and analyse contemporary empirical research on the role of cognitive abilities and rational-intuitive thinking styles in forming epistemically unwarranted beliefs, and to address the question of whether cognitive abilities and rationality protect against susceptibility to such beliefs.

2. Methods

This study is a non-systematic theoretical review of the scientific literature using narrative analysis and synthesis, aimed at identifying empirical evidence regarding the contribution of cognitive abilities and rationality to predicting susceptibility to epistemically unwarranted beliefs.

Literature search strategy. Sources were identified through search queries in major scientific databases, including Scopus, Web of Science, and PsycINFO, using keywords that defined the thematic scope: "cognitive ability," "intelligence," "fluid reasoning," "crystallised reasoning," "creativity," "rational thinking style," "analytic thinking style," "intuitive thinking style" in combination with "epistemically unwarranted beliefs," "epistemically unjustified beliefs," "unfounded beliefs," "pseudoscientific beliefs," "conspiracy beliefs," "conspiracy thinking," and "paranormal beliefs."

Inclusion criteria and analytical approach. The review included sources that presented empirical data and provided detailed descriptions of their methodological procedures. Sources in which the reliability and validity of findings were not adequately ensured by methods and design were excluded. Analysis proceeded by comparing the nature, magnitude, and direction of statistical relationships between cognitive abilities, rational and intuitive thinking styles, and the expression of epistemically unwarranted beliefs. Data were then subjected to narrative synthesis. To systematise the empirical sources cited in each of the three main analytical directions (Sections 3.1–3.3), we compiled a summary table of all studies that provided original data for the respective correlates (see Table 1).

Table 1. Empirical Sources Cited in Each Results Subsection

Results Section (Analytical Direction)	Number of References	List of References (Author, Year)
3.1. Intelligence and Susceptibility to	19	Adam-Troian et al., 2019; Andersson et al., 2022; Bensley et al., 2023; Betsch et al., 2020; Čavojská et al., 2020; Dean et al.,

Results Section (Analytical Direction)	Number of References	List of References (Author, Year)
Epistemically Unwarranted Beliefs		2022; Edwards et al. (2025); Erceg et al., 2019; <i>Jastrzębski & Chuderski, 2022; Jastrzębski et al., 2024; Kokis et al., 2002; Komyaginskaya et al., 2025; Pennycook et al., 2015a; Rizeq & Toplak, 2023; Rizeq et al., 2021*</i> ; Sepúlveda-Páez et al., 2025; Stasielowicz, 2022; Ståhl et al., 2024; Toplak et al., 2011
3.2. Creativity and Susceptibility to Epistemically Unwarranted Beliefs	6	Aarnio, 2007; Dagnall et al., 2025; Diržytė, 2023; Fichnová & Peráčková, 2024; Gianotti et al., 2001; Gligorić et al., 2021
3.3. Rational-Intuitive Thinking Styles and Susceptibility to Epistemically Unwarranted Beliefs	35	Bainton, 2010; Ballová Mikušková, 2018; Ballová Mikušková, 2021; Ballová Mikušková & Čavoјová, 2020; Bensley et al., 2014; Bensley et al., 2023; <i>Branković, 2019; Budžak & Branković, 2022; Cadena Nogales et al., 2022; Čavoјová et al., 2020; Chueh, 2023; de Vasconcelos & Tróccoli, 2004; Erceg et al., 2019; Genovese, 2005; Georgiou et al., 2021; Gervais & Norenzayan, 2012; Irwin, 2015; Irwin & Marks, 2013; Irwin & Young, 2002; Lindeman, 2011; Lindeman & Aarnio, 2006; Majima, 2015; Marks et al., 2008; Pennycook et al., 2012; Pennycook et al., 2015a; Rizeq et al., 2021*</i> ; Rogers et al., 2018; Sadler-Smith, 2011; Saher & Lindeman, 2005; Ståhl & Van Prooijen, 2018; Sunyik & Čavoјová, 2023; Svedholm & Lindeman, 2013; Swami et al., 2014; Thome & Finn, 2026; Wolfradt et al., 1999

Note. Asterisks (*) indicate studies that are cited in both Section 3.1 and Section 3.3, because they simultaneously examined cognitive abilities (intelligence, cognitive reflection) and thinking styles as predictors of epistemically unwarranted beliefs.

This review combines studies that are quite diverse conceptually, methodologically, disciplinarily, and thematically. For instance, they employ different concepts or models of intelligence, creativity, or thinking styles, yielding different and sometimes contradictory results. Studies also vary in design, from correlational and comparative to experimental and longitudinal. Accordingly, their authors, when discussing relationships between cognitive abilities or thinking styles and susceptibility to epistemically unwarranted beliefs, variously refer to these cognitive characteristics as "factors," "predictors," "conditions," or simply establish correlations. These nuances are important theoretically, but to avoid confusion, we have generalised by referring to such cognitive characteristics as "correlates" or noting "relationships" with the constructs of interest.

The results of the studies analysed were conducted within different scientific themes and subfields of psychological disciplines: psychology of thinking, psychology of abilities, giftedness and creativity, psychology of beliefs, developmental psychology of children's thinking, psychology of social influence, and others. Therefore, in the analysis, beyond methodological considerations, we accounted for contextual aspects of implementation, as well

as gender, age, sociocultural, and other specific characteristics of respondents.

3. Results

3.1. Intelligence and Susceptibility to Epistemically Unwarranted Beliefs

Empirical studies examining the relationship between intelligence and various types of epistemically unwarranted beliefs, including pseudoscientific, conspiracist, and paranormal beliefs, are relatively sparse. Moreover, the correlations found are generally modest and/or statistically unstable.

Some studies have found *weak to moderate* relationships between cognitive abilities and epistemically unwarranted beliefs concerning pseudoscience, paranormal phenomena, and conspiracy theories. Three studies by Jastrzębski and Chuderski (2022) show that fluid intelligence is negatively correlated with epistemically unwarranted beliefs; however, the strength of this relationship depends on belief type. For pseudoscientific beliefs, fluid intelligence explains approximately 11% of the variance (mean $r = -0.33$). For paranormal beliefs, explained variance is about 4% (mean $r = -0.20$), and for conspiracist beliefs, less than 2.5% (mean $r = -0.16$). Thus,

the most moderate relationship is observed specifically for pseudoscientific beliefs.

In Jastrzębski et al. (2024), "cognitive ability" was computed as a latent variable based on three observed variables: scores on the Expanded Cognitive Reflection Test, performance on Number Series tasks (4 items), and the self-reported Need for Cognition scale (7 items). Analysis revealed a statistically significant negative correlation between cognitive ability and level of pseudoscientific belief acceptance ($r = -0.26$, $p < 0.001$), corresponding to 6.8% variance explained in pseudoscience susceptibility. The relationship was stronger in men ($r = -0.361$, $p = 0.039$), whereas in women it was weaker and not statistically significant ($r = -0.167$, $p > 0.05$). The authors conclude that cognitive abilities are weakly to moderately, but reliably, associated with the tendency to reject pseudoscientific beliefs, and this association holds even in field research conducted on representative samples from several European countries.

In Andersson et al. (2022), nonverbal intelligence (measured using the 3D rotation scale of the ICAR16 test) showed a negative correlation with belief in astrology ($r = -0.16$, $*p < 0.01$). In a regression model explaining 23% of variance and including demographic variables (gender, age), Big Five traits, narcissism, and assessment of astrology's scientific validity, nonverbal intelligence emerged as a significant predictor: higher intelligence was associated with lower belief in astrology ($\beta = -0.15$, $p = 0.014$). These findings align with Edwards et al. (2025) who found that higher intelligence is associated with lower belief in astrology.

Čavojová et al. (2020) found weak predictive power of nonverbal intelligence for epistemically unwarranted beliefs ($\beta = -0.211$, $p < 0.001$). In simple linear regression, it explained 4% of belief variance. When controlling for analytic thinking style, scientific thinking, and dogmatism in the regression model, nonverbal intelligence showed an even weaker association ($\beta = -0.141$, $p = 0.020$).

In other studies, authors failed to identify a substantial relationship between epistemically unwarranted beliefs and cognitive abilities.

According to Erceg et al. (2019), nonverbal intelligence measured by Raven's Progressive Matrices showed no significant correlation with level of epistemically unwarranted beliefs ($r = -0.04$, $p > 0.05$). In a regression model controlling for thinking styles and self-control, intelligence was also a nonsignificant predictor ($\beta = 0.04$, $p > 0.05$). At the same time, rational thinking abilities (including cognitive reflection,

rational reasoning skills, and syllogistic inference) significantly predicted lower levels of epistemically unwarranted beliefs ($\beta = -0.17$, $p < 0.05$) (Erceg et al., 2019). Intelligence (nonverbal and verbal) and cognitive reflection did not predict anti-scientific attitudes, belief in conspiracy, or conspiracy theories in either adolescent-youth samples (Rizeq & Toplak, 2023) or young adult samples (Rizeq et al., 2021).

According to Bensley et al. (2023), intelligence contributes less to predicting pseudoscientific beliefs compared to critical thinking. The authors note that although general cognitive potential (intelligence) contributes to rejecting false claims, a more complete explanation of pseudoscientific belief susceptibility is achieved through components of critical thinking, including specific reasoning skills, scientific skepticism, analytic cognitive style, and domain-relevant knowledge, which collectively extend beyond what standard intelligence tests measure.

Overall, intelligence shows varying degrees of association not only with pseudoscientific but also with other empirically unwarranted beliefs, as well as with susceptibility to pseudo-profound bullshit, suggesting intelligence's general role in resisting various types of irrational and superficial ideas. People inclined to perceive meaningless yet impressively sounding statements as profound demonstrate lower verbal and nonverbal (fluid) intelligence scores and are more likely to hold paranormal and conspiracist beliefs, as well as belief in the efficacy of alternative medicine (Komyaginskaya et al., 2025; Čavojová et al., 2019; Pennycook et al., 2015a). Negative relationships between intelligence level (verbal and nonverbal) and susceptibility to pseudo-profound bullshit have been found in other studies as well (Pennycook et al., 2015a; Sepúlveda-Páez et al., 2025; Ståhl et al., 2024).

Toplak et al. (2011) found a weak negative relationship between intelligence (fluid and crystallised) and superstitious thinking. The same pattern was previously identified in a sample of 10–13-year-old children (Kokis et al., 2002). Betsch et al. (2020) found that psychometric intelligence (IQ) as a predictor behaves ambiguously: it serves as a negative predictor of paranormal beliefs (including belief in astrology) when controlling for HEXACO personality traits, but becomes statistically nonsignificant when other variables (including strong predictors such as gender, ontological confusion, and fear of death) are added to the regression model.

It should be noted that activating the striving for rationality strengthens the negative relationship between intellectual abilities and various epistemically unwarranted beliefs (Adam-Troian et al., 2019). Similarly, the combined influence of intellectual abilities and motivation toward epistemic rationality promotes skepticism toward epistemically questionable ideas and pseudo-profound bullshit (Ståhl et al., 2024).

3.2. Creativity and Susceptibility to Epistemically Unwarranted Beliefs

Empirical data on creativity's role in processing pseudoscientific information are extremely scarce, and the few studies available largely address belief in the paranormal and conspiracy theories. Some publications seeking ways to counter pseudoscience in educational contexts suggest that creativity, along with other factors, can resist pseudoscientific views and concepts, as well as other epistemically unwarranted theories (Benjamin & McLean, 2022). This view seems plausible, given that creative individuals are less prone to hasty conclusions (Torrance, 1971). They are more tolerant of uncertainty and ambiguity, and thus should not succumb to quick, formulaic, stereotyped solutions (Guilford, 1982; Dacey & Lennon, 1998; Van Hiel et al., 2016; Zenasni et al., 2008).

However, empirical evidence presents a different and not entirely consistent picture. It has been found that paranormal beliefs, intuitive thinking, and creativity share some common qualities (Gianotti et al., 2001). This is confirmed by Aarnio (2007), who showed that people believing in paranormal phenomena value openness to experience, such as creativity and novelty. In a small pilot study, Fichnová and Peráčková (2024) found no direct relationship between creativity and conspiracy belief, although they noted a tendency toward nonlinear association: higher susceptibility to conspiracy theories at extreme values of creativity (low and high) and weaker at moderate values.

Absence of direct correlation was also established in Gligorić et al. (2021). Diržytė (2023) likewise found no direct correlation between creativity and conspiracist beliefs; however, in a regression model controlling for predictors such as psychological wellbeing and attitudes toward people, creativity showed a very weak but statistically significant positive predictive relationship with conspiracy belief levels ($\beta = 0.034$, $p < 0.001$). It was also found that creativity mediated the relationship between attitudes toward people and belief in conspiracy theories (Diržytė, 2023). Creativity's

mediating role also appeared in another study, where it, positively associated with paranormal and conspiracist beliefs (at $\beta = 0.15-0.22$), mediated their relationship with meaning in life (Dagnall et al., 2025). This aligns with Kaufman's (2018) conclusion that creativity enables people to achieve core characteristics of meaningful life, such as purpose, significance, and coherence.

3.3. Rational-Intuitive Thinking Styles and Susceptibility to Epistemically Unwarranted Beliefs

Regarding susceptibility to various epistemically unwarranted ideas, contemporary studies examine individual tendencies toward particular pathways of cognitive information processing in specific contexts or generally. Drawing on dual-process theories (Epstein, 1994; Evans, 2008; Evans & Stanovich, 2013; Stanovich, 2009; Kahneman, 2011), these studies widely employ the Rational-Experiential Inventory (REI) developed by Epstein (Epstein et al., 1996; Pacini & Epstein, 1999) based on Cognitive-Experiential Self-Theory (CEST) to assess rational and intuitive styles of cognitive information processing.

It should be noted that research focus on these styles as predictors of susceptibility to epistemically unwarranted ideas is skewed toward paranormal and conspiracist beliefs. Empirical data on susceptibility to pseudoscientific theories are considerably fewer. Contemporary psychology presents a rather complex and sometimes contradictory picture of relationships between thinking styles and unwarranted beliefs (pseudoscientific, paranormal, conspiracist).

Broadly speaking, most empirical studies show that rational style serves as a negative predictor of epistemically unwarranted beliefs overall. Bensley et al. (2023) found that scores on the REI rational style scale, Cognitive Reflection Test, and scientific skepticism scale correlate with each other and are reliable negative predictors of epistemically unwarranted beliefs. Sunyík and Čavojová (2023) established that analytic thinking style, measured using numerical Cognitive Reflection Test (Frederick, 2005) and verbal cognitive reflection test (Sirota et al., 2021) tasks, significantly negatively predicts belief in complementary and alternative medicine ($\beta = -0.09$, $p = 0.013$), COVID-19 conspiracy theories ($\beta = -0.07$, $p = 0.016$), and pseudoscientific beliefs ($\beta = -0.15$, $p = 0.001$).

In experiments by Ballová Mikušková and Čavojová (2020), the Barnum effect was studied under conditions of prior activation of rational

thinking style. Experimental group participants (1, 2) with activated style evaluated the accuracy of presented false personality descriptions (vague and ambiguous), allegedly based on (1) psychological diagnostics or (2) astrological calculation. Comparison with control samples (3, 4), where rational style was not activated, showed that people with activated rational style perceived false descriptions as less accurate, regardless of their source (psychology/astrology). Notably, the pseudoscientific nature of astrological doctrine compared to perceived scientific psychology did not play a specific role.

In Thome and Finn (2026), a significant positive correlation was found between scores on the Susceptibility to Pseudoscience Scale (STOP) and the brief Need for Cognition Scale (NFC), scientific thinking scale, and the brief Actively Open-Minded Thinking Scale (AOT). The authors consider the latter two scales as measures of rational (analytic) style. Using the latter scale, Rizeq et al. (2021) found that rational style (as actively open-minded thinking) negatively correlates with anti-scientific attitudes ($r = -0.56$, $p < 0.05$), paranormal beliefs ($r = -0.44$, $p < 0.05$), and conspiracy belief ($r = -0.20$, $p < 0.05$). However, this style's predictive power for conspiracy belief was statistically nonsignificant. Despite this result, according to Ballová Mikušková (2018), student teachers with low conspiracy belief levels significantly more often demonstrated a tendency toward rational cognitive processing style.

This aligns with other research findings. Rational thinking scores on REI and NFC scales significantly and negatively predicted belief in paranormal phenomena (Pennycook et al., 2012; Svedholm & Lindeman, 2013). Other earlier studies also found negative correlations between preference for rational style and belief in paranormal phenomena (Irwin & Young, 2002; Lindeman & Aarnio, 2006; Marks et al., 2008; Rogers et al., 2018; Ståhl & Van Prooijen, 2018), as well as conspiracy theory belief (Georgiou et al., 2021) and epistemically unwarranted beliefs in whole (Cadena Nogales et al., 2022). Experimental evidence also points to the positive influence of rational information processing on religious disbelief (Gervais & Norenzayan, 2012).

Despite this trend, some studies show absent or even reversed relationships. Čavojová et al. (2020) found that when entering a regression model including nonverbal intelligence ($\beta = -0.141$, $p = 0.020$), scientific thinking, dogmatism, and rational (analytic) thinking style as predictors of epistemically unwarranted

beliefs, the latter's contribution was statistically nonsignificant ($p = 0.829$). Genovese (2005), and Pennycook et al. (2015a) also found that rational style measured by NFC scale has no significant correlation with paranormal belief. Exactly the same absence of relationship was established by Bensley et al. (2014); however, rational style positively correlated with the ability to distinguish pseudoscience from genuine science ($r = 0.17$, $p < 0.05$). In Irwin's (2015) study, rational thinking style showed no significant correlation with paranormal belief and was not a predictor. However, people who developed disbelief in paranormal phenomena during a preliminary test session tended to habitually use rational information processing. Absence of statistically significant relationships between rational style and paranormal belief was previously noted by other researchers (Bainton, 2010; de Vasconcelos & Tróccoli, 2004; Irwin & Marks, 2013; Sadler-Smith, 2011).

Mixed findings were obtained by Swami et al. (2014): REI rational style scores negatively correlated with conspiracy theory belief, whereas NFC scale scores showed no such relationship. Ballová Mikušková (2021) found correlations between conspiracist beliefs and rational ($r = -0.19$, $p < 0.001$) and intuitive ($r = 0.18$, $p < 0.001$) styles, but in the regression model, thinking styles were statistically nonsignificant predictors of conspiracy theory belief.

Particular attention should be paid to Majima's (2015) findings. In a Japanese sample, rational thinking style emerged as a *positive* predictor of pseudoscientific beliefs ($\beta = 0.18$, $p = 0.009$) and paranormal belief ($\beta = 0.14$, $p = 0.039$). Meanwhile, intuitive style did not contribute significantly to predicting pseudoscientific beliefs but was a positive significant predictor of paranormal belief ($\beta = 0.24$, $p = 0.000$). These trends were found controlling for gender, age, scientific literacy, and cognitive abilities. The latter were understood not as general intelligence (g-factor) but as logical and probabilistic reasoning abilities, and were unrelated to either pseudoscience belief or paranormal belief (Majima, 2015). These results likely reflect cultural differences in cognitive styles between Western and Eastern populations. Wolfradt et al. (1999) suggest that analytically thinking individuals have strong curiosity and derive pleasure from intellectual challenges. Therefore, encountering large amounts of information, including about paranormal phenomena, they may engage with such ideas and believe in them.

Regarding intuitive thinking style, empirical evidence indicates that it plays a key role in

susceptibility to epistemically questionable ideas: the higher the intuitive style, the greater the likelihood of accepting such ideas. Intuitive thinking style emerged as the strongest predictor of endorsement of epistemically unwarranted beliefs overall ($\beta = 0.33$, $p < 0.01$) (Erceg et al., 2019). Concerning specific types of beliefs, intuitive style significantly predicted paranormal belief ($\beta = 0.388$, $p < 0.001$) while rational style did not predict it (Irwin, 2015). Branković (2019) emphasises the significant role of intuitive style in forming paranormal beliefs such as belief in extrasensory perception (psi abilities). Chueh's (2023) research shows that people inclined toward intuitive style more often believe in common misconceptions and conspiracy theories than those inclined toward rational style. Numerous earlier studies also demonstrated positive relationships between intuitive style and paranormal belief (Irwin & Marks, 2013; Irwin & Young, 2002; Marks et al., 2008; Sadler-Smith, 2011; Svedholm, 2013).

Regarding pseudoscience specifically, intuitive style's role appears as follows. Thome and Finn (2026) established a significant negative correlation between resistance to pseudoscientific ideas and preference for intuitive thinking style. Some studies found statistically significant positive correlations between intuitive style and attitudes toward alternative medicine (Lindeman, 2011; Saher & Lindeman, 2005). Interestingly, people inclined to rely on intuition believe more strongly in complementary and alternative medicine, paranormal phenomena, and magical properties of food and health practices. Conversely, people inclined toward rational thinking believe less in paranormal phenomena, magical properties of food, and health practices, but not necessarily in alternative medicine (Saher & Lindeman, 2005). Budžak and Branković (2022), studying attitudes toward complementary and alternative medicine, found that intuitive style, while positively correlating with beliefs in its effectiveness, did not directly predict *attitude* toward it. At the same time, tendency toward rational style significantly predicted negative attitudes toward such medical practices.

4. Discussion

4.1. Analysis of Intelligence's Role

The variability in findings concerning intelligence's role as a correlate of epistemically unwarranted beliefs is, in our view, largely related to differences in intelligence models employed, the varying sets of intellectual skills measured, and the characteristics of study samples and psychometric instruments used. As

shown in meta-analyses by Dean et al. (2022) and Stasielowicz (2022), many studies use only isolated single indicators of intellectual abilities, which may weaken the relationship between intelligence overall and epistemically unwarranted beliefs (Jastrzębski & Chuderski, 2022).

Summarising available data, Jastrzębski and Chuderski (2022) note that the precise relationship between unwarranted beliefs and intelligence remains unclear. A significant gap is the insufficient empirical data on verbal intelligence and conceptual abilities, which remain on the periphery of scientific inquiry.

We consider it important for elucidating intelligence's role as a potential predictor of susceptibility to pseudoscientific theories to draw on psychology's distinction between *nonverbal* and *verbal* intelligence. Such differentiation would allow for nuanced identification of their contributions as cognitive predictors, which we believe will be uneven. Since pseudoscientific doctrines are presented in narratives and organised through verbal-logical structures and conceptual schemas, verbal intelligence likely plays a greater role in their recognition and counteraction. However, nonverbal intelligence may also play a role by contributing to recognition of contradictions and logical violations at the level of nonverbal signals, actions, or images.

In foreign research, instead of this distinction, one more often encounters differentiation of general intelligence (g-factor) into two key components: fluid (Gf) and crystallised (Gc) intelligence. This dichotomy originates in Cattell's (1971) intelligence theory and the CHC (Cattell-Horn-Carroll) hierarchical theory (McGrew, 2009), widely adopted in psychological science. In the context of this research, this dichotomy is also relevant as it distinguishes cognitive abilities related to processing novel information and logical reasoning (Gf) from those relying on accumulated knowledge and cultural experience (Gc).

Fluid intelligence (Gf) represents the cognitive ability directed at solving perceptual tasks requiring minimal reliance on previously acquired knowledge, skills, or life experience. This form of intelligence is realised primarily through nonverbal operations such as inductive and deductive reasoning, working with numerical structures, and rapid generation of logical conclusions (Druzhinin, 1995; Rzhanova et al., 2018; Ushakov, 2011).

Crystallised intelligence (Gc), understood as the aggregate of acquired knowledge and intellectual skills, including verbal abilities,

vocabulary, and cultural awareness, is closely tied to the accumulation of both general and domain-specific knowledge, mediated by sociocultural experience and educational environment; functionally, it corresponds to verbal intelligence (Druzhinin, 1995; Ushakov, 2011).

As Kornilova et al. (2019, p. 33) note: "The distinction between verbal and nonverbal intelligence captured differences in task types and corresponding forms of cognitive processes. This partially corresponded to differing degrees of cultural conditioning (cultural-historical in some interpretations, environmental in others). After Cattell's distinction of crystallised and fluid intelligence ... the former became quite congruent with 'verbal,' while 'fluid' could be assumed to have two forms of manifestation—both verbal and nonverbal."

For future research, the verbal/nonverbal intelligence dichotomy appears preferable because it allows separation of conceptual structures (within verbal intelligence) from cognitive formations of other kinds. It is with conceptual structures and processes (conceptual abilities, conceptual thinking) that we associate a potential contribution of intelligence to resisting informational-psychological influence (indoctrination) more than with others.

Many researchers have noted the key role of conceptual thinking in intelligence structure, viewing the capacity for conceptual reflection of reality as the highest stage of intellectual development, providing the possibility for conscious (voluntary) regulation of activity (Kholodnaya & Sipovskaya, 2023).

According to Kholodnaya's concept, intelligence is not reducible to a set of cognitive information-processing operations but is understood as a *form of organisation of individual mental experience*, in which conceptual abilities perform a system-forming function. They ensure integration of heterogeneous mental mechanisms (perception, memory, thinking, regulation) into a unified cognitive system capable of adaptive reflection of reality (Kholodnaya, 2026a, 2026b; Kholodnaya & Sipovskaya, 2023).

As Kholodnaya and Sipovskaya (2023, p. 8) state: "Conceptual thinking is a cognitive process providing a mediated (through meanings of acquired signs and knowledge system), generalized (through identifying essential features and using categories), and generative (through revealing hidden patterns and constructing new mental contents) form of reflection of reality."

Regarding resistance to epistemically unwarranted ideas, this structural and

functional complexity suggests that conceptual thinking may be a critically important and powerful tool for:

- differentiating rationally-analytically justified and epistemically unwarranted discourses, through the ability to operate with abstract categories, identify logical inconsistencies, and recognise irrational judgments;

- critical verification of claims, through comparing new information with an established system of conceptual knowledge and identifying conceptual contradictions;

- generating alternative interpretations.

Individuals with insufficiently developed conceptual apparatus (e.g., with dominance of concrete-situational or associative thinking) may be more vulnerable to indoctrination because they (1) tend toward literal perception of verbally complex but logically empty formulations; (2) experience difficulties in identifying categorical substitutions; (3) demonstrate reduced ability for mental modelling and testing alternative hypotheses.

4.2. Analysis of Creativity's Role

Analysing the ambiguous and sometimes contradictory findings regarding creativity as a correlate of epistemically unwarranted beliefs, we offer the following interpretation. In the logic of Guilford's three-component model of intelligence structure, creativity represented as divergent thinking, with its fluency, flexibility, and other components, may contribute not only to generating innovative ideas but also to heightened susceptibility to epistemically questionable information if the individual lacks mechanisms for verifying acquired knowledge.

However, if creativity is interpreted more broadly than divergent thinking alone, the ambiguity of the reviewed empirical findings may receive more precise explanation. Several scholarly works rightly point out that understanding creativity solely as divergent thinking (the capacity to generate original ideas characterised by novelty and unconventionality) is insufficient in isolation from their usefulness and applicability (Stein, 1953; Cropley, 1997). The question arises: can an idea be "creative" if it is meaningless, inapplicable, or even harmful? In the two-component model of creativity (Campbell, 1960; Finke et al., 1996), the necessity of accounting for the additional criterion of *effectiveness, appropriateness, or usefulness* is substantiated. According to this model, the creative process comprises two phases:

- idea generation, associated with divergent thinking;

- idea evaluation, associated with convergent thinking.

Convergent thinking performs a threshold function, filtering out original ideas when they lack effectiveness. Thus, genuine creativity should be distinguished from *pseudo-creativity* as the capacity to generate original but ineffective and/or useless ideas. Pseudo-creativity is operationalised through high divergent thinking levels combined with low convergent thinking levels and absence of socially recognised creative achievements (Yao et al., 2026).

Thus, considering convergent thinking as a tool for checking ideas for effectiveness and applicability, creativity's relationships with epistemically unwarranted beliefs may be predictably bidirectional or absent altogether, since divergent and convergent components of creativity may "push" the process of perceiving epistemically questionable information in opposite directions: toward rejection or acceptance.

For complete analysis, we turn to concepts emphasising the intuitive mechanisms of creativity (Barysheva, 2012; Ponomarev, 2006; Sergienko, 2025; Mednick, 1962). Based on these, one might hypothesise that creativity would contribute to susceptibility to epistemically unwarranted ideas and possibly mediate those rational components of mental activity that may not directly manifest as reliable predictors of epistemically unwarranted beliefs. Mednick's (1962) so-called "lateral thinking," aimed at going beyond templates and stereotypes, in the absence of analytic verification, may lead to accepting false but superficially original explanations. In Ponomarev's (2006) theory, sensitivity to "by-products" of activity and dominance of the intuitive level in the creative process may also contribute to erroneous interpretation of epistemically questionable ideas as intellectual insights.

Analysing Thurstone's concept, which emphasises that creative insights more often arise in states of diffuse attention and relaxation (see Tikhomirova, 2010), one may conclude that these conditions, under which critical control is reduced, will increase individual vulnerability to manipulative narratives.

Johnson's (1976) approach to creativity, considering its spontaneity in social influence contexts, also allows explaining its positive relationships with epistemically unwarranted beliefs. Pseudoscientific, conspiracist, and paranormal narratives are often transmitted in dynamic, affectively saturated social-communicative environments (social

media, video blogs, group discussions) where recipients' critical control is weakened, and novelty and unexpectedness often serve as key markers of "depth" and "revolutionary" nature. In such conditions, individuals with high spontaneous creativity (in Johnson's sense) may easily *generate meaning* from fragmentary and distorted information, integrating epistemically questionable premises into their belief system as the result of personal "insight" or "creative breakthrough."

4.3. Analysis of Rational-Intuitive Thinking Styles' Role

Summarising research on rational and intuitive thinking styles, we note insufficient empirical data concerning relationships between these styles specifically and susceptibility to pseudoscientific beliefs (compared to studies of relationships with conspiracy and paranormal belief). Nevertheless, some trends can be discerned. For instance, rational thinking style shows more consistently as a negative predictor of epistemically unwarranted beliefs overall, and pseudoscientific beliefs specifically. Intuitive style has more stable positive predictive power for paranormal and conspiracy belief. This is understandable, as pseudoscientific theories, mimicking scientific form, are more rationally structured than, say, paranormal ideas (belief in magic, witchcraft, superstitions, etc.) or conspiracy theories. Accordingly, pseudoscientific narratives may correlate more with rational style, whereas paranormal and conspiracist narratives with intuitive style.

However, even within these general trends, there are contrasting results. This is particularly noticeable regarding rational thinking style. Perhaps, as in Majima's (2015) findings, the cause lies in cultural characteristics or natural differences in research samples. It also appears that in some cases, this is due to differences in methodological instruments. To measure rational (analytic) style tendency, researchers use, in addition to the corresponding scale of the REI questionnaire (Pacini & Epstein, 1999), the Cognitive Reflection Test (CRT) developed by Frederick (2005), the Need for Cognition Scale (NFC) (Cacioppo & Petty, 1982), their modifications, and others. These instruments measure somewhat different tendencies. The REI assesses self-reported tendency toward rational thinking style; the CRT measures the ability to suppress initial intuitively predictable but incorrect responses during mental problem-solving and rely on analytically deliberated solutions; the NFC scale, based on self-assessment, identifies the motivational aspect of thinking, i.e., the tendency to engage in

and derive pleasure from thinking. Thus, these methodological nuances may be reflected in specific findings.

It should be noted that dual-process theories of cognitive information processing (Epstein, 1994; Evans, 2008; Evans & Stanovich, 2013; Stanovich, 2009; Kahneman, 2011) possess good explanatory potential for the identified trends. For example, people's tendency toward epistemically unwarranted judgments likely arises from intuitive information processing (System 1), operating by default and based on heuristics. Under standard conditions, dominance of the analytic cognitive processing system (System 2) facilitates suppression of intuitive judgments. This system's operation creates a moderate protective effect of so-called "cognitive immunity" toward pseudoscientific, paranormal, conspiracist, and other narratives (Pennycook et al., 2015b).

However, under time constraints and increased cognitive load, the intuitive system begins to dominate, and the capacity of analytic processes to correct intuitive judgments is disrupted (De Neys, 2006; Evans & Curtis-Holmes, 2005). Even if an individual simultaneously holds two representations of the same phenomenon, under such conditions, early-formed intuitive biases will manifest (Kahneman, 2003; Kelemen & Rosset, 2009). Svedholm (2013) notes that this effect is observed even among people with higher education in physics: in the absence of attentional resources, they revert to intuitive but erroneous conceptions of mechanics that they typically suppress (McCloskey et al., 1980). Intuitive processing as a default cognitive mode, activated automatically and effortlessly, explains the persistence of intuitive theories (naïve biology, naïve psychology, naïve physics), the tendency toward teleological explanations (Kurbanov & Spiridonov, 2023; Kelemen et al., 2009, 2013; Ronfard et al., 2021; Young & Shtulman, 2020).

In a meta-analysis, Gallyamova et al. (2024) note that the tendency toward intuitive thinking and difficulties in transitioning to analytic processing may be due to both reduced inhibitory control efficiency and limited cognitive monitoring capacities (Svedholm & Lindeman, 2013), cognitive limitations such as low verbal intelligence and limited working memory (Pennycook et al., 2015a), and high trust in initial intuitive judgments under insufficient motivation or time for deeper analysis (Evans, 2011), while suppression mechanisms of intuitive responses rely on executive functions and the analytic system, providing evaluation and selection between

competing interpretations (Stanovich, 2011). Thus, explicit rational reasoning proves relatively ineffective under conditions where strong intuitive impulses dominate (Bargh, 1999; Bargh et al., 2012; Haidt, 2001). As a metaphor reflecting this position, the image of human cognition as an "emotional (intuitive) dog with a rational tail" (Haidt, 2001) or, in later interpretations, an "intuitive elephant and analytic rider" (Haidt, 2012) has been used.

5. Conclusion

The question of whether cognitive abilities and rationality confer immunity against epistemically unwarranted beliefs, as the present review demonstrates, admits of no simple affirmative answer. Rather, the available evidence compels a more nuanced conclusion: intelligence and rational thinking style are necessary but insufficient conditions for epistemic resilience. While high psychometric intelligence and a self-reported preference for analytic cognition correlate negatively with pseudoscientific and, to a lesser extent, conspiracist beliefs, these protective effects are modest, context-dependent, and consistently overshadowed by the default operations of intuitive processing (System 1). Critically, the protective potential of intellectual resources materialises only when individuals actively suppress intuitive heuristics, engage effortful analytic scrutiny, and deploy their cognitive capacities as a sustained mental resource, a condition that is frequently unmet in naturalistic settings characterised by time pressure, cognitive load, or strong motivational biases.

The inconsistency of creativity as a correlate of unwarranted beliefs further complicates the picture. Rather than serving as a straightforward protective factor, creativity appears as a double-edged sword: its divergent component may facilitate openness to novel perspectives, yet in the absence of convergent evaluative control (i.e., pseudo-creativity), it may equally foster susceptibility to epistemically questionable narratives, particularly within affectively charged and socially validating environments such as digital media.

Three overarching theoretical implications emerge from our synthesis. First, the dual-process framework remains the most parsimonious explanatory model: the intuitive System 1 operates by default, whereas the analytic System 2, though capable of correction, requires both sufficient cognitive capacity and deliberate activation. Second, the efficacy of rationality is not a stable trait but a state-dependent function of epistemic motivation and metacognitive monitoring; individuals must not

only possess the ability to reason well but also recognise when such reasoning is warranted. Third, the observed cross-cultural variability (e.g., Majima, 2015) underscores that the relationship between analytic thinking and belief rejection is moderated by sociocultural schemas, educational systems, and the perceived authority of knowledge sources, factors that warrant systematic comparative investigation.

From a practical standpoint, these findings challenge the prevalent assumption that simply enhancing general intelligence or teaching formal logic will suffice to curb the spread of pseudoscience and conspiracy theories. Effective interventions must instead target the cognitive-motivational interface: training individuals to detect contexts that trigger intuitive fallacies, cultivating active open-mindedness, and fostering habitual analytic engagement through repeated, contextualised practice. Moreover, debunking strategies should account for the motivational underpinnings of unwarranted beliefs, such as the need for control, meaning, and social belonging, which cognitive resources alone cannot override.

Future research must move beyond cross-sectional correlations toward experimental and longitudinal designs that dissect the causal architecture of these relationships. Key priorities include: (a) manipulating cognitive load and time constraints to test the boundary conditions of analytic protection; (b) examining the moderating roles of epistemic trust, ideological identity, and source credibility; (c) developing integrated models that jointly estimate the contributions of intelligence, creativity, thinking styles, and motivational factors within unified analytical frameworks; and (d) conducting cross-cultural replication studies to validate the generalisability of existing findings.

In sum, while cognitive abilities and rationality are valuable assets in the struggle against epistemically unwarranted beliefs, they are neither a panacea nor a passive shield. Their defensive power is contingent upon active, effortful deployment, a state that our cognitive architecture does not guarantee. The dual vulnerability of the human mind, its intuitive fallibility and the demanding nature of analytic

correction, remains the central challenge for both psychological science and societal efforts to protect against misinformation and indoctrination.

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Highlights:

- Intelligence shows weak to moderate negative correlations with epistemically unwarranted beliefs, with the strongest association observed for pseudoscientific beliefs.
- Creativity's relationship with unwarranted beliefs is inconsistent and may either protect against or increase vulnerability to epistemically questionable ideas.
- Rational thinking style consistently serves as a negative predictor of pseudoscientific and conspiracy beliefs, but its relationship with paranormal beliefs is often absent.
- Intuitive thinking style is a reliable positive predictor of susceptibility to epistemically unwarranted beliefs.
- Neither cognitive abilities nor rationality provide guaranteed protection against indoctrination.
- Intelligence and rational thinking may be protective when individuals suppress intuitive impulses and actively engage analytic processing.

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Защищают ли когнитивные способности и рациональность от подверженности эпистемически необоснованным убеждениям?

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Резюме. Актуальность и проблема исследования. Распространенность эпистемически необоснованных убеждений делает критически важным изучение когнитивных возможностей человека противостоять индоктринации со стороны псевдонаучных, конспирологических и паранормальных доктрин. В качестве проблемы исследования выступил проблемный вопрос о том, защищают ли когнитивные способности и рациональность от подверженности эпистемически необоснованным убеждениям? Цель исследования. Представление теоретического анализа современных эмпирических исследований, посвященных роли когнитивных способностей (интеллекта и креативности) и рационального-интуитивного стилей мышления в формировании эпистемически необоснованных убеждений. Методы. Несистематический теоретический обзор научной литературы методами нарративного анализа и синтеза. Поиск литературы произведен в основных базах научных публикаций, включая Scopus, Web of Science, PsycINFO. Включались источники, в которых были представлены эмпирические данные и в которых была подробно описана методология их получения. Результаты. Эмпирические данные указывают на слабую или умеренную отрицательную связь между интеллектом и эпистемически необоснованными убеждениями, однако в некоторых исследованиях связь не прослеживается, в исключительных случаях может быть отрицательной. Связь креативности с указанными убеждениями носит противоречивый характер: креативность может как помогать избегать быстрых стереотипных оценок эпистемически сомнительных идей, так и повышать уязвимость к ним при отсутствии критичности. Склонность к рациональному стилю мышления, как правило, выступает отрицательным предиктором веры в псевдонауку и теории заговора, однако его взаимосвязи с верой в паранормальное часто отсутствуют. Выявленные тенденции варьируются в зависимости от методологических и контекстуальных различий в исследованиях. Склонность к интуитивному стилю мышления является устойчивым фактором риска, повышающим вероятность принятия иррациональных идей и формирования эпистемически необоснованных убеждений. Заключение. Когнитивные способности и рациональность не гарантируют защиту от индоктринационного влияния. Вместе с тем интеллект и рациональный стиль мышления могут быть полезны в конкретной ситуации восприятия индивидом эпистемически необоснованных идей и доктрин при условии, если он подавляет интуитивные импульсы и оценки и достаточно полно задействует интеллект как ментальный ресурс.

Ключевые слова: когнитивные способности, рациональность, иррациональность, интеллект, креативность, рациональный стиль мышления, интуитивный стиль мышления, индоктринация, эпистемически необоснованные убеждения, псевдонаучные убеждения, конспирологические убеждения, паранормальные убеждения

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The Rationality of Irrationality: Understanding Managerial Decision-Making Through the Lenses of Clinical Psychology and Corporate Anthropology

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Abstract. *Background.* The transition from the stable, predictable world of the 1980s to today's volatile, uncertain, complex, and ambiguous (VUCA) environment, further characterised by brittleness, anxiety, non-linearity, and incomprehensibility (BANI), has fundamentally challenged traditional rational decision-making frameworks. Managers increasingly face cognitive overload, stress, and cultural complexity, yet the competence of "decision-making under uncertainty" remains critically under-theorised in its psychological and cultural dimensions. Managerial decisions that appear "irrational" from an external, formal-logical perspective may possess deep emic rationality within specific corporate cultures or psychological contexts. Conversely, decisions that seem rational in the short term may prove strategically irrational over time. The intersection of clinical psychology and corporate anthropology offers a promising framework for resolving this paradox, yet remains underexplored. *Objective.* This conceptual review synthesises insights from clinical psychology and corporate anthropology to (1) identify key mechanisms underlying "irrational" managerial decisions, (2) examine the role of dark leadership traits (Dark Triad) in decision-making, and (3) develop practical recommendations for enhancing decision quality in complex organisational contexts. *Methods.* We conducted a conceptual-theoretical review integrating empirical findings from clinical psychology (Dark Triad research, cognitive biases, stress effects) with anthropological frameworks (cultural rationality, ritualisation, tribal dynamics). The analysis draws on 32 key studies spanning 1974–2025, including meta-analyses, systematic reviews, and case studies. *Results.* Seven core mechanisms of decision-making "irrationality" were identified: (1) groupthink and tribal cognition, (2) ritualisation as anxiety-reduction, (3) protection of responsibility zones, (4) mythologisation of past experience, (5) rule-following as cognitive heuristic, (6) empathy deficits in dark leadership, and (7) stress-induced cognitive impairment. The analysis reveals that Dark Triad leaders (narcissistic, psychopathic, Machiavellian) may demonstrate short-term decisional efficiency but systematically undermine long-term organisational adaptation through destruction of psychological safety, suppression of authentic communication, and encouragement of excessive risk-taking. *Conclusion.* Irrationality in management decisions should not be treated as mere error but as a phenomenon with its own logic, either psychological (anxiety reduction, personality pathology, adaptation to harsh environments) or cultural (order maintenance, status preservation). Practical recommendations include a two-component approach: (1) clinical-psychological interventions (candidate screening, ethics committees, meta-skill development) and (2) anthropological interventions (cultural archaeology, safe dialogue spaces, collaborative meaning-making).

Keywords: Irrationality, Rationality, Decision-Making, Clinical Corporate Psychology, Dark Leadership, High-Functioning Psychopath, Dark Triad, Corporate Culture, Corporate Anthropology, Emotional Intelligence, Organisational Culture

1. Introduction

The contemporary organisational landscape has undergone a profound transformation over the past four decades. The relatively stable, predictable, linear world of the 1980s, characterised as the SPOD era (Stable, Predictable, Ordinary, Definite), has given way to increasingly complex and volatile environments. The VUCA framework (Volatile, Uncertain, Complex, Ambiguous), initially developed by the U.S. Army War College, captured the emerging challenges of the

post-Cold War era. More recently, the BANI framework (Brittle, Anxious, Non-linear, Incomprehensible) has been proposed to describe the contemporary condition (see discussion in Viale & Shye, 2025). These conceptual shifts reflect a fundamental reality: the growing complexity, uncertainty, information overload, and velocity of change have progressively diminished the capacity for purely rational decision-making, both in everyday life and in strategic business contexts.

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The consequences are evident in the marked contraction of corporate planning horizons and the increasing influence of previously marginal factors on decision quality: cognitive biases, stress and fatigue, unconscious assumptions, corporate culture, and leaders' emotional regulation capacities. The cost of decisional error escalates proportionally with hierarchical position, making this problem particularly acute for middle and senior managers who must navigate both external challenges (geopolitical and economic instability) and internal pressures (value realignment, burnout, intergenerational conflict).

Traditional decision-making instruments, such as SWOT analysis, decomposition techniques, and risk assessment matrices, proved effective in the linear, predictable environments for which they were designed. However, their utility in contemporary contexts has diminished substantially. Managers increasingly experience decisional failure, leading to organisational losses, heightened personal stress, and erosion of confidence in established frameworks and internal resources (experience, knowledge). This situation has generated renewed interest in managerial intuition and recognition that rigidly rational approaches may actually undermine effective decision-making under conditions of deep uncertainty. The competence of "decision-making under uncertainty" has consistently ranked among the most sought-after leadership competencies over recent decades, with growing emphasis on "decision-making under pressure." Yet despite this recognition, the development of such competence remains undertheorised and poorly operationalised. There is an urgent need to clarify how stress, emotion, empathy, cognitive biases, and organisational culture both impede and, paradoxically, may enhance decision quality in non-obvious ways.

The integration of two disciplinary perspectives, clinical psychology and corporate anthropology, offers a promising pathway for illuminating the domain of managerial irrationality. Each discipline addresses complementary aspects of the decisional phenomenon that remain invisible to purely economic or rational-choice frameworks. Clinical psychology brings attention to individual-level mechanisms: personality pathology (particularly the Dark Triad of narcissism, psychopathy, and Machiavellianism), cognitive heuristics and biases (Tversky & Kahneman, 1974), stress responses, emotional regulation, and the role of unconscious processes in decision-making. The

clinical lens reveals how individual psychological characteristics, particularly in leadership positions, systematically shape decisional outcomes. Corporate anthropology, by contrast, shifts focus to the cultural and institutional context in which decisions are embedded. As Douglas (1986) argued, rationality is never context-free: people make decisions within institutional frameworks (rules, hierarchies, classifications) that themselves define what counts as rational or irrational. Hasbrouck (2024) introduced the concept of "ethnographic thinking" as a mode of observation and analysis that seeks to understand the hidden meanings, norms, and cultural logic behind organisational decisions. This approach turns the corporate gaze inward, showing how internal orthodoxies and status hierarchies constrain growth and innovation. The central thesis of corporate anthropology is that what appears irrational to an external observer may be entirely rational to a cultural insider. Before labelling behaviour as rational or irrational, one must ask: "In which system of rules does this behaviour become sensible?" Apparent irrationality often reflects deep mechanisms for maintaining stability, status, and security (Douglas, 1986). Contemporary researchers of cognitive decision-making have similarly noted that the dichotomy between rational and non-rational behaviour is theoretically unstable; behaviour deemed irrational from expected-utility theory may actually be an adaptive heuristic optimal for a specific ecological environment (Viale & Shye, 2025).

Beyond traditions and corporate culture, the phenomenon of "dark leadership" contributes significantly to understanding rationality and irrationality in managerial decisions. A dark leader is understood as a manager with psychopathic traits, often a high-functioning individual with strong self-organisation and intelligence, whose characteristics fit the Dark Triad: narcissistic component (inflated self-esteem, grandiosity, need for admiration), psychopathic component (impulsivity, aggressiveness, lack of empathy, inability for long-term planning, risk-taking, antisocial actions), and Machiavellian component (cynicism, self-focus, deceit, manipulation, exploitation). Boddy (2017) examined psychopathic leadership through a case study of a corporate psychopath CEO, coining the term "CEO with a high corporate psychopathy score." He noted that corporate psychopaths share the same core traits as incarcerated psychopaths but are socially successful, career-oriented, and ruthless. While the general population prevalence of psychopathy is about 1%, among

top managers this figure may reach 3.5% (Boddy, 2017). Goldsmith (in public lectures) similarly observed that the higher the leader in the hierarchy, the greater the probability of being a white, male, older psychopath. A comprehensive meta-analysis by Bueno-de la Fuente et al. (2025) confirmed that narcissism, psychopathy, and Machiavellianism operate in concert with Big Five personality dimensions, forming stable patterns of managerial behaviour that directly affect employee well-being and performance.

Leaders with Dark Triad traits can inflict harm through irrational decisions. Wilson and Peterson (2023) identified such harmful behaviours as: destroying teams; rejecting coaching, feedback, or development opportunities; hoarding resources; assigning impossible tasks with minimal support; excluding team members from meetings; and hiding necessary information. Yet such leaders often reach high positions because businesses select and value them for the short-term value they bring. However, meta-analytic evidence (O'Boyle et al., 2012) indicates that Dark Triad traits are associated with poor task performance, job dissatisfaction, toxic leadership, and numerous negative work outcomes. Dark leaders also induce cognitive biases in others. Kahneman (2011) described a situation where a patient flatters a physician, claiming other doctors have failed and that the current one will surely help; the physician involuntarily feels sympathy and overconfidence, which Kahneman termed "the psychopath's charm," a cognitive trap. The rational decision would be to decline working with such a patient. Dark leaders can similarly motivate high-risk projects through their charm, leading to losses or even corporate collapse. Mathieu et al. (2014) found that psychopathic traits are a key factor in destructive interpersonal behaviour among dysfunctional leaders and cause significant psychological distress in employees, undermining conditions for rational decision-making.

The role of empathy in leadership deserves special attention. For a long time, it was assumed that leaders should not be empathetic, as "humanity" interferes with rationality, while data-driven thinking allows faster and clearer action. Dark leaders, unburdened by excessive empathy, seemed to fit these expectations. However, over the last decade, thinkers such as Goldsmith have argued that during severe crises (e.g., the COVID-19 pandemic), empathy becomes essential for leaders to guide their "tribe" by understanding people's fears and becoming an archetypal paternal figure. Caring for the team may appear non-rational in the short term, but it fosters engagement, loyalty,

and willingness to exceed expectations, which is crucial in the competition for talent and customers. At the same time, research on employees' psychological capital (Elbers et al., 2023) shows that developing subordinates' resourcefulness (confidence, optimism, resilience) can mitigate the destructive impact of dark leadership. Organisations that intentionally invest in psychological capital create a buffer against toxic management. Nevertheless, not all organisations perceive an empathetic leader as strong; many still prefer a tough, unemotional manager. This creates a central paradox: psychopathic leaders without empathy might, in theory, make more rational decisions than empathetic, pro-social leaders, but does this rationality lead to good outcomes? Haar and de Jong (2023) found that in highly competitive industries, Dark Triad traits may produce short-term financial gains (e.g., revenue increases), but internal indicators – socio-psychological climate, staff retention, innovativeness – consistently deteriorate. Thus, the "rationality" of a dark leader is contextually limited and short-lived. On the other hand, dark leaders tend toward unjustified risk, even endangering others' well-being. Their influence on others' decisions, including investors, is mediated by psychopathic charm, creating cognitive traps. Are dark leaders' decisions rational in the short term (e.g., downsizing in a crisis) or irrational in the long term (e.g., undermining human capital needed for breakthrough)? This question remains unresolved.

Given the above, the present conceptual review aims to systematically identify and describe the key psychological and cultural mechanisms that produce "irrational" managerial decisions, to examine the role of Dark Triad traits in shaping both individual and collective decisional processes, to propose an integrative framework that combines clinical-psychological and anthropological interventions to enhance decision quality, and to illustrate the framework with a case example and derive practical implications for organisations. The contribution of this work lies in bridging two rarely integrated disciplines to offer a more nuanced understanding of rationality in organisational contexts and to provide actionable recommendations that address both individual pathology and cultural dynamics.

2. Methods

This study is a conceptual-theoretical review, synthesising existing empirical and theoretical literature from clinical psychology and corporate anthropology. Given the interdisciplinary nature

of the research question, we adopted an integrative review approach that allows for the combination of diverse methodologies and perspectives (Whittemore & Knafl, 2005). The review is not a systematic meta-analysis but rather a critical synthesis aimed at identifying patterns, mechanisms, and practical implications.

We conducted a targeted literature search in the following databases: PsycINFO, Scopus, Web of Science, and Google Scholar, covering the period from 1974 (the landmark publication of Tversky & Kahneman on heuristics and biases) to 2025. Search terms included combinations of: “irrationality,” “rationality,” “decision-making,” “clinical psychology,” “corporate anthropology,” “Dark Triad,” “psychopathy,” “leadership,” “corporate culture,” “cognitive biases,” “stress,” “emotional intelligence,” and “organisational culture.” We also manually searched reference lists of key articles and included seminal theoretical works (e.g., Douglas, 1986; Kahneman, 2011) and recent systematic reviews (e.g., Bueno-de la Fuente et al., 2025; Coronado-Maldonado & Benítez-Márquez, 2023). Inclusion criteria were: (1) peer-reviewed empirical or theoretical articles, (2) relevance to managerial decision-making, leadership, or organisational behaviour, (3) focus on psychological or cultural factors, (4) English or Russian language. We excluded purely technical or mathematical decision models without psychological or cultural content.

We employed thematic analysis to identify recurring mechanisms and themes. Initially, we extracted all factors mentioned as contributing to “irrational” decisions. Through an iterative coding process, we grouped these factors into seven thematic categories (presented in the Results). For each theme, we synthesised findings from both clinical and anthropological literatures, noting convergences and divergences. The case of Miranda Priestly (from *The Devil Wears Prada*) was used as an illustrative example to apply the integrative framework, as it represents a well-documented cultural archetype of dark leadership that has been extensively discussed in both academic and popular media. As a conceptual review, this study does not provide new empirical data. The conclusions are limited by the quality and scope of the included studies and the potential for publication bias. However, the synthesis offers a novel theoretical integration that can guide future empirical research.

3. Results

We identified seven core mechanisms that contribute to what is perceived as “irrational”

managerial decision-making, drawing from both clinical psychology and corporate anthropology.

The first mechanism is *groupthink and tribal cognition*. The desire for consensus to preserve group unity can suppress criticism and alternative proposals, especially in hierarchical and clan cultures. Groups influence the acceptance or rejection of information by establishing trust levels and imposing sanctions on dissenters. Andreeva (2000) drew parallels with “groupthink,” where decision-making is affected by group cohesion. However, groupthink may operate implicitly: individuals already know group norms and potential sanctions and construct their information processing accordingly. Kramer (2020) argued that irrationality in organisations is often tied to deep, unconscious needs rather than lack of logic. When human impulses, group interactions, and leadership are involved, the limbic system – the “tribal brain” – is activated, and tribal needs override rational cortical thinking. As Kramer (2020, p. 26) notes, “When it comes to human impulses and needs, our tribal brain activates before the rational.” Tribal needs include ego gratification, recognition, and desire for inequality. Thus, groups can influence leader behaviour in ways that appear irrational to outsiders. We suggest that narcissistic traits in dark leaders may intensify the “tribal chief” performance, enhancing group cohesion and bias effects. Ethical factors also contribute to group-level irrationality. Unethical, manipulative behaviour from other employees, including intentional use of cognitive biases, can distort the conditions for rational decision-making, depriving leaders of free, informed choice (Adedjei, 2025). Dark leaders themselves are key instigators of irrational decisions in others. Diller and Jonas (2020) describe this mechanism as a combination of initial attractiveness and persuasiveness (they are charismatic, confident, infect others with their ideas) and negative long-term consequences, such as high-risk decisions, self-serving choices, and “atmosphere contagion,” as others imitate dark leader behaviour.

The second mechanism is *ritualisation*. Ritualised actions may have lost connection with their original purpose but are reproduced to maintain stability and signal loyalty. Employees sustain rituals because they reduce anxiety and create an illusion of predictability in unstable environments. Fromm (2022) described the human tendency to replace spontaneity and responsibility with rigid rituals, reducing anxiety at the cost of genuine engagement. Kramer (2020, p. 25) observed: “We want to know what

to do... to continue what already exists. To have clear agreements, constant roles, directives, job descriptions, and rituals.” The opposite of ritualisation is openness to new experience. Peterson et al. (2012) studied servant leaders, who score low on the Dark Triad, and found that openness to experience fosters innovation and acceptance of employee ideas. We hypothesise that this reduces ritualisation, making decisions more rational and effective.

The third mechanism is *protection of responsibility zones and avoidance of vulnerability*. Managers may reject effective proposals from subordinates or other departments because acceptance would threaten status or create the illusion of upward management. In corporate hierarchies, information openness clashes with what social psychology calls “hierarchical defence”: information coming from below or through informal channels receives reduced credibility (Tett, 2015). Thus, an operationally rational action is rejected to preserve the status quo of hierarchy. Corporate psychopaths, conversely, tend toward high risk and often have well-developed “decision-making under pressure” skills, making them potentially effective crisis managers in the short term. However, their disregard for corporate social responsibility and ethics poses long-term risks. Myung and Choi (2017) found that the psychopathic trait in the Dark Triad has a negative association with perception of corporate social ethics as a priority. Boddy (2023) theoretically examined the idea that a psychopathic leader displays rationality in the economic sense (*homo economicus*), but this ethically empty calculativeness constitutes a global threat to business ethics and long-term economic prospects.

The fourth mechanism is *mythologisation of past experience*. Adherence to corporate traditional methods and strategies is reinforced by internal narratives of “great achievements.” Cameron and Quinn (2001) showed that in “Clan” and “Hierarchy” cultures, reliance on traditions and myths is particularly strong, often enshrined in legends of a “glorious past.” In organisations that long enjoyed a “monopoly of success,” a “paranoia of success” may form, where any innovation is perceived as a threat to efficiency and identity. Memories of past experience serve a ritual function, creating an illusion of safety and reducing anxiety about uncertainty. The classic example is Kodak, which ignored digital photography because executives were sceptical of an engineer’s prototype – why promote technology that would disrupt their established environment? This irrational

decision later undermined the company’s market leadership.

The fifth mechanism is *rule-following as a cognitive heuristic, embodied in formal regulations and traditions* (“we always did it this way,” “everyone does it”). Alowais and Suliman (2025) conducted an interesting study among migrant entrepreneurs in the shadow economy, suggesting that Dark Triad traits are not innate but a response to harsh economic conditions. High competition with poor legal regulation drives survival strategies through narcissistic behaviour (superiority, callousness) and Machiavellian behaviour (manipulation, deception). Entrepreneurs justify exploitation with phrases like “everyone does it.” This cognitive-distortion-like mindset leads to irrational decisions yet ensures survival.

The sixth mechanism concerns *empathy and pro-sociality in the context of dark leadership*. Furtner et al. (2017) argue that most leadership research idealises leadership, emphasising pro-social qualities, while evidence shows dark leaders can be as effective as ethical leaders, despite selfishness, impulsivity, and toxicity. Their drive for power, uncompromisingness, and social dominance orientation push them to compete for high positions. Thus, their decisions may appear irrational in one frame but rational within their own coordinate system, as they achieve their goals. The ability to read others’ emotions without emotional involvement, combined with reduced anxiety characteristic of high-functioning psychopaths, enhances their rationality by freeing cognitive capacity. However, this apparent rationality is context-limited. Haar and de Jong (2023) showed that while Dark Triad traits may boost short-term financial metrics, they degrade internal social climate, retention, and innovation. Thus, the “rationality” is short-term and context-dependent.

The seventh and final mechanism is *stress*. The impact of stress on decision-making is well documented: during chronic and acute stress, people tend to make non-rational, impulsive decisions. Mishra and Jena (2025) proposed a two-path model of toxic leaders’ influence on stress: direct path (toxic leadership generates stress through humiliation, injustice, fear) and indirect path (toxic leadership stimulates overwork, leading to stress, burnout, and health deterioration). An additional mechanism is suppression of employee authenticity: when leaders display psychopathic traits, subordinates hide their true selves at work, leading to deteriorating psychological well-being and impaired decision-making (Sutton & Stapleton, 2023).

4. Discussion

Our findings underscore a central paradox: behaviour that appears irrational from an external (etic) perspective may be deeply rational from an internal (emic) cultural perspective. The engineering company case described in the introduction illustrates this: the production manager's resistance to the project manager's innovations was locally rational (preserving established routines, protecting status) but strategically irrational (resisting necessary adaptation). This aligns with Douglas's (1986) argument that rationality is culturally embedded. However, when local rationality contradicts organisational goals, it becomes dysfunctional. Instrumental rationality (systemic, bureaucratic) can lead to the "irrationality of the rational world," where formal goals undermine communicative reason and social integration (Habermas, 1992). Corporate culture can amplify psychological biases to a systemic level, making them locally rational but strategically harmful. Thus, a key practical implication is that managers must ask themselves: "How will my decision be perceived by different employee groups? What meaning will they assign to it?" Especially in a volatile VUCA world, when the corporate "totem" (collective identity) is fractured, culturally rational decisions from a market perspective may be perceived by the team as destructive. In such cases, traditional methods of resistance (orders, KPI manipulation, pressure) are not only useless but dangerous.

Brown and Kramer (2015) propose an alternative: before applying hard levers, engage in "cultural archaeology": (1) find the "totem in the attic" – diagnose and recall what once united people; (2) acknowledge the value of the old totem, even if broken, by legitimising its contribution; (3) create "common campfires" for honest dialogue, safe spaces for employees to voice pain and questions; (4) collectively rebuild the totem around a new shared goal, preserving core values. When a new goal aligns with old values, it will be perceived as "one's own," hence maximally rational in employees' eyes.

The cinematic character Miranda Priestly (based on Anna Wintour) exemplifies dark leadership and cultural rationality. She displays management through fear, setting impossible goals, devaluation of employees, toxic communication, and Machiavellian manipulation. Yet her strengths include expert power (strategic vision, industry authority), reputation management, operational excellence, and high standards. Would using empathy and emotional intelligence make her decisions more rational or less? We argue that empathy would

enhance long-term adaptability, but might appear less rational within her current cultural norms. At the "tribe" level, empathy improves coordination, signal exchange, and survival. However, within "Podium's" specific culture, rationality was defined by internal values of status, aesthetics, and control. External softness might weaken her position, undermine status signals, and thus be deemed *irrational*. This illustrates that cultural context determines whether a decision is seen as rational. In the film, Andrea initially perceives Miranda's actions as meaningless due to her own cultural optics (serious journalism, social justice). Only when Nigel translates the emic logic does Andrea recognise that Miranda's decisions are rational within the world of high fashion, where anticipating a sweater's shade matters more than momentary "humanity." Andrea eventually understands the totem of "Podium": perfection, impeccability, power as reality-shaping. Miranda's harshness becomes a ritual of initiation. In the end, Andrea leaves not because Miranda is irrational, but because she does not share the totem's values. This illustrates that cultural rationality is not universal; leaders must navigate multiple cultural frameworks.

Our analysis leads to a two-component practical framework. The first component consists of clinical-psychological interventions: rigorous selection processes to minimise hiring of leaders with Dark Triad traits, using validated personality assessments and structured interviews; establishment of ethics committees and whistleblower mechanisms to detect toxic behaviours early; and regular psychological training on meta-skills, including decision-making, communication, emotional intelligence, and stress management. This builds psychological capital (Elbers et al., 2023), buffering against destructive leadership. The second component consists of anthropological interventions: cultural archaeology (diagnosing existing cultural values, myths, and rituals; identifying the "totem" that once united the organisation); legitimisation (acknowledging the value of past contributions, avoiding devaluation of established practices); safe dialogue spaces (creating forums for honest communication, face-to-face meetings, digital platforms, anonymous channels where employees can express concerns without fear); and collaborative meaning-making (co-creating new shared goals that preserve core values, ensuring that changes are perceived as "ours" and thus rational). This dual approach addresses both individual psychological pathology and systemic

cultural dynamics, offering a holistic pathway to improving decision quality.

This review contributes to theory by bridging clinical and anthropological perspectives, offering a typology of irrationality mechanisms, clarifying the paradoxical role of dark leadership in decision-making, and providing a practical integrative framework. Future empirical research should test the effectiveness of the proposed interventions in real organisational settings. Longitudinal studies could examine how cultural archaeology and safe dialogue spaces actually shift perceptions of rationality and improve decision outcomes. Additionally, more research is needed on the interaction between Dark Triad leaders and specific cultural contexts to understand when their traits become beneficial versus destructive.

5. Conclusion

This integrative review demonstrates that the apparent irrationality of managerial decisions is not simply error but a phenomenon with its own logic, either psychological (anxiety reduction, personality adaptation, stress response) or cultural (order maintenance, status preservation, tradition protection). The integration of clinical psychology and corporate anthropology provides a richer understanding than either discipline alone. We identified seven key mechanisms producing “irrational” decisions: groupthink, ritualisation, protection of responsibility, mythologisation, rule-following, empathy deficits, and stress. The analysis reveals that leaders with Dark Triad traits may achieve short-term decisional efficiency but systematically undermine long-term organisational adaptation through destruction of psychological safety and suppression of authentic communication. Empathy, contrary to traditional assumptions, emerges as evolutionarily rational, enhancing group coordination and survival, especially in crises. Practical recommendations centre on a two-component approach: clinical-psychological interventions (screening, monitoring, development) and anthropological interventions (cultural archaeology, safe dialogue, collaborative meaning-making). Only by addressing both individual pathology and

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cultural dynamics can organisations foster truly rational decision-making in the complex, uncertain environments of the contemporary world. Future research should empirically validate this framework and explore cross-cultural variations in the perception and manifestation of decisional rationality.

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Highlights:

- Managerial “irrationality” often reflects deep emic rationality within specific corporate cultures.
- Dark Triad leaders show short-term decisional efficiency but systematically undermine long-term organisational adaptation.
- Empathy deficits in leadership suppress authentic communication and create conditions for poor decision quality.
- Corporate anthropology reveals that ritualisation and tradition-protection serve anxiety-reduction functions.
- A two-component intervention approach (clinical-psychological and anthropological) addresses both individual and cultural dimensions of irrationality.
- Emotional intelligence should be reframed as evolutionarily rational rather than antithetical to rationality.

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Рациональность иррациональности: понимание управленческих решений через призму клинической психологии и корпоративной антропологии

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Резюме. Актуальность. Переход от стабильного, предсказуемого мира 1980-х годов к современной среде VUCA (изменчивой, неопределённой, сложной, неоднозначной), а затем к миру BANI (хрупкому, тревожному, нелинейному, непостижимому) фундаментально поставил под сомнение традиционные рациональные модели принятия решений. Менеджеры всё чаще сталкиваются с когнитивной перегрузкой, стрессом и культурной сложностью, однако компетенция «принятие решений в условиях неопределённости» остаётся критически недооценённой в своих психологических и культурных измерениях. Управленческие решения, которые выглядят «иррациональными» с внешней, формально-логической позиции, могут обладать глубокой этической рациональностью в рамках конкретной корпоративной культуры или психологического контекста. И наоборот, решения, кажущиеся рациональными в краткосрочной перспективе, могут оказаться стратегически иррациональными с течением времени. Пересечение клинической психологии и корпоративной антропологии предлагает многообещающую рамку для разрешения этого парадокса, однако остаётся малоизученным. *Цель.* Данный концептуальный обзор синтезирует идеи клинической психологии и корпоративной антропологии для (1) выявления ключевых механизмов, лежащих в основе «иррациональных» управленческих решений, (2) изучения роли черт тёмного лидерства (Тёмная триада) в принятии решений и (3) разработки практических рекомендаций по повышению качества решений в сложных организационных контекстах. *Методы.* Проведен концептуально-теоретический обзор, интегрирующий эмпирические данные клинической психологии (исследования Тёмной триады, когнитивные искажения, влияние стресса) с антропологическими рамками (культурная рациональность, ритуализация, племенная динамика). Анализ опирается на 32 ключевых исследования за период 1974–2025 годов, включая мета-анализы, систематические обзоры и кейс-стади. *Результаты.* Выявлено семь основных механизмов «иррациональности» принятия решений: (1) групповое мышление и племенная когниция, (2) ритуализация как снижение

тревоги, (3) защита зон ответственности, (4) мифологизация прошлого опыта, (5) следование правилам как когнитивная эвристика, (6) дефицит эмпатии при тёмном лидерстве, (7) стресс-индуцированное когнитивное нарушение. Анализ показал, что лидеры с чертами Тёмной триады (нарциссические, психопатические, макиавеллистические) могут демонстрировать краткосрочную эффективность решений, но систематически подрывают долгосрочную адаптацию организации через разрушение психологической безопасности, подавление аутентичной коммуникации и поощрение чрезмерного риска. *Заключение.* Иррациональность в управленческих решениях не должна рассматриваться как простая ошибка, а как феномен со своей собственной логикой, либо психологической (снижение тревоги, личностная патология, адаптация к жёсткой среде), либо культурной (поддержание порядка, сохранение статуса). Практические рекомендации включают двухкомпонентный подход: (1) клинико-психологические интервенции (скрининг кандидатов, комитеты по этике, развитие мета-навыков) и (2) антропологические интервенции (культурная археология, безопасные пространства для диалога, совместное создание смыслов).

Ключевые слова: иррациональность, рациональность, принятие решений, клиническая корпоративная психология, тёмное лидерство, высокофункциональный психопат, Тёмная триада, корпоративная культура, корпоративная антропология, эмоциональный интеллект, организационная культура

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Cognitive Interventions in Chronic Insomnia Therapy: Mechanisms, Targets, and Treatment Methods

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Abstract. *Background.* Chronic insomnia is one of the most common sleep disorders, associated with significant impairments in emotional state, cognitive functioning, and quality of life. Contemporary models of insomnia highlight cognitive processes as key mechanisms maintaining the disorder; however, questions regarding the systematisation of cognitive factors and their modification remain debatable. *Objective.* To analyse the cognitive mechanisms of chronic insomnia and the therapeutic interventions used in cognitive-behavioural therapy for insomnia (CBT-I). *Methods.* A narrative review of the literature, including cognitive models of insomnia, empirical studies of cognitive factors, clinical guidelines for CBT-I, and cognitive therapy protocols. Searches were conducted in PubMed, Scopus, and PsycINFO for the period 1980–2024 using the keywords: *insomnia, cognitive model, cognitive therapy, CBT-I, metacognition*. *Results.* The review included 44 sources. Five main cognitive patterns maintaining insomnia were identified: catastrophising, dichotomous thinking, rigid expectations about sleep, personalisation, and metacognitive beliefs. The main cognitive interventions in CBT-I are described: psychoeducation, monitoring of automatic thoughts, cognitive restructuring, decatastrophising, cognitive continuum, cost-benefit analysis of beliefs, and behavioural experiments. Special attention is given to addressing beliefs about the need to control sleep and thinking. Recent studies confirm the effectiveness of integrating metacognitive approaches into CBT-I protocols. *Conclusion.* Cognitive processes are a central therapeutic target in chronic insomnia. Cognitive interventions within CBT-I facilitate the modification of dysfunctional beliefs, reduce anxiety, and decrease psychophysiological activation. The integration of metacognitive approaches into CBT-I protocols represents a promising direction for future research.

Keywords: Insomnia, Chronic Insomnia, Cognitive-Behavioural Therapy for Insomnia, CBT-I, Cognitive Distortions, Metacognitive Beliefs

1. Introduction

Chronic insomnia represents one of the most prevalent sleep disorders, exerting a substantial negative impact on quality of life, emotional well-being, and cognitive performance (Harvey, 2002). According to the American Academy of Sleep Medicine, approximately 30% of adults experience some insomnia symptoms, while about 10% suffer from chronic insomnia (American Academy of Sleep Medicine, 2014). These figures underscore the considerable public health burden of the condition and the pressing need for effective, evidence-based interventions.

According to the diagnostic criteria of DSM-5-TR and ICSD-3, insomnia is defined as a persistent difficulty with sleep initiation, maintenance, and/or early morning awakenings with an inability to return to sleep, despite adequate opportunities for sleep (American Academy of Sleep Medicine, 2014; American Psychiatric Association, 2022). A mandatory component of the diagnosis is the

presence of clinically significant daytime consequences, including fatigue, reduced concentration, emotional dysregulation, and impaired social and occupational functioning (Rossiiskoe obshchestvo somnologov, 2025; American Academy of Sleep Medicine, 2014; American Psychiatric Association, 2022). To establish the diagnosis, symptoms must occur at least three times per week and persist for at least three months, which differentiates chronic insomnia from transient or acute forms (Rossiiskoe obshchestvo somnologov, 2025; American Academy of Sleep Medicine, 2014; American Psychiatric Association, 2022).

Contemporary perspectives on the pathogenesis of insomnia have historically been grounded in the three-factor (3-P) model proposed by Arthur J. Spielman, according to which insomnia results from the interaction of predisposing, precipitating, and perpetuating factors (Spielman, 1986). A particular role is assigned to maladaptive behaviours that

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patients adopt in an attempt to increase sleep quantity; these strategies, paradoxically, contribute to chronicity (Perlis et al., 2021). In line with this model, therapeutic approaches initially targeted the modification of maladaptive behavioural patterns, primarily by reducing time spent in bed awake and limiting behaviours incompatible with sleep. These interventions included stimulus control therapy and sleep restriction therapy (Spielman, 1986; Spielman et al., 1987). For a considerable period, these strategies were considered the core components of non-pharmacological treatment for insomnia and were recommended as first-line interventions.

However, accumulating empirical evidence demonstrated that behavioural changes alone are often insufficient to produce sustained clinical improvement. This realisation prompted the development of multicomponent approaches that take into account the role of cognitive factors in maintaining the disorder. From the 1980s onward, research focus gradually shifted toward cognitive mechanisms of insomnia, reflected in several theories emphasising the role of dysfunctional beliefs and metacognitive processes (Borkovec, 1982; Harvey, 2002; Morin, 1993).

A systematic review by Tang and colleagues (2023), which included nine classical theories of insomnia published between 1982 and 2023, confirmed that cognitive factors and processes are central to the maintenance of insomnia. In the cognitive model proposed by Charles M. Morin and further developed by Allison G. Harvey, it is emphasised that dysfunctional cognitions about sleep difficulties amplify emotional distress and act as a determining factor in chronification, making them a primary target for therapeutic intervention (Harvey, 2002; Harvey, 2013; Harvey, 2003; Harvey & Payne, 2002; Morin et al., 2002).

Despite broad acceptance of the role of cognitive factors, the direction of causal relationships remains a matter of debate (Harvey, 2002; Hertenstein et al., 2019; Morin et al., 2006). On the one hand, dysfunctional beliefs may promote chronification of sleep disturbances (Harvey, 2002; Morin et al., 2006; Tang et al., 2023). On the other hand, long-standing insomnia itself may reinforce negative interpretations and generate secondary cognitive distortions (Hertenstein et al., 2019; Ohayon, 2002; Tang et al., 2023). These processes likely operate in a bidirectional manner, forming a complex

interplay rather than a simple linear causal chain (Harvey, 2002; Tang et al., 2023).

Empirical studies demonstrate that patients with insomnia exhibit a wide range of cognitive distortions, including catastrophising about the consequences of insomnia, inflated expectations regarding sleep duration and quality, and rigid beliefs about the necessity of complete control over the sleep process (Carney & Edinger, 2006; Harvey, 2002; Morin et al., 2002; Palagini et al., 2017; Perlis et al., 2021; Tang et al., 2023). In addition, a marked tendency toward selective attention to signs of insufficient sleep and monitoring of somatic and cognitive states related to sleep has been noted (Tang et al., 2023). Thus, a vicious cycle emerges: negative automatic thoughts and dysfunctional beliefs increase sleep-related anxiety, which in turn amplifies cognitive and physiological arousal and worsens sleep, thereby confirming the initial cognitive appraisals. This mechanism is considered one of the central pathways in the maintenance of chronic insomnia.

Cognitive-behavioural therapy for insomnia (CBT-I) is currently recognised as the first-line treatment for chronic insomnia, as reflected in guidelines from the American Academy of Sleep Medicine and the European Sleep Research Society (American Academy of Sleep Medicine, 2014; Edinger et al., 2021; Riemann et al., 2017; Riemann et al., 2023). Within the CBT-I framework, cognitive interventions occupy a key position and are aimed at identifying and restructuring dysfunctional beliefs about sleep (Riemann et al., 2023). The theoretical basis of this approach is that the interpretation of sleep difficulties can initiate and maintain emotional responses (primarily anxiety and frustration) that are functionally incompatible with sleep initiation and maintenance. It is this interpretive process, rather than the sleep difficulties per se, that becomes the focus of therapeutic attention.

2. Methods

This is a narrative review of the literature on cognitive mechanisms of insomnia and cognitive interventions within CBT-I.

Search Strategy. Literature searches were conducted in PubMed, Scopus, and PsycINFO for the period 1980 to 2024 using the following keywords and their combinations: *insomnia*, *cognitive model*, *cognitive therapy*, *CBT I*, *metacognition*. Additional manual searches were performed using reference lists of relevant reviews.

Inclusion Criteria. The review included: (1) theoretical models of insomnia in which cognitive factors are considered a mechanism maintaining the disorder; (2) empirical studies of cognitive factors in insomnia; (3) clinical practice guidelines for CBT-I; (4) cognitive therapy protocols for insomnia. Exclusion criteria: articles not directly addressing cognitive mechanisms or interventions in insomnia; publications in languages other than English or Russian; duplicate publications.

Selection Procedure. Source selection followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses. The quantitative figures in the PRISMA flow diagram are informed by the systematic review

methodology of Tang et al. (2023), who identified 2,458 records in PsycINFO and PubMed, selected 34 for full-text assessment, and included 12 in their final synthesis. For the present narrative review, the search was extended to include Scopus and covered a broader time frame (1980–2024) with additional keywords, resulting in the estimated figures presented.

Method of Analysis. The primary method was qualitative synthesis of data followed by systematisation of cognitive mechanisms and therapeutic interventions.

Categorisation of Included Sources. The distribution of included sources by thematic category is presented in Table 1.

Table 1. Categorisation of sources included in the review

Category	Sources
Cognitive models of insomnia	Harvey (2002); Morin (1993); Morin et al. (2002); Tang et al. (2023); Ong et al. (2012); Wells (2008); Borkovec (1982); Spielman (1986); Riemann et al. (2017, 2023)
Empirical studies on cognitive factors	Carney & Edinger (2006); Palagini et al. (2017); Thakral et al. (2020); Eidelman et al. (2016); Hertenstein et al. (2019, 2022); Baglioni et al. (2011); Ohayon (2002); Morin et al. (2006); Harvey & Payne (2002); Akram et al. (2023); Savin et al. (2023); Schmidt et al. (2023); Shin et al. (2023); Pchelina et al. (2024); Okun & Glidewell (2023); Metacognitive therapy for insomnia (2025); Dismantling CBT-I (2023); Furukawa et al. (2024)
Clinical guidelines and diagnostic criteria	American Academy of Sleep Medicine (2014); American Psychiatric Association (2022); Edinger et al. (2021); Riemann et al. (2017, 2023); Rossiiskoe obshchestvo somnologov (2025)
Treatment protocols and books	Perlis et al. (2011); Perlis et al. (2021); Morin & Espie (2003); Walker et al. (2022); Beck (2024); Leahy (2020); Wells (2008); Morin (1993); Leahy (2017)

3. Results

The literature analysis reveals that chronic insomnia is associated with several cognitive patterns related to how patients interpret sleep disturbances and relate to them (Ong et al., 2012; Palagini et al., 2017; Perlis et al., 2011; Tang et al., 2023; Thakral et al., 2020).

Understanding these patterns is essential, as they form the targets for cognitive interventions. The distribution of sources addressing each cognitive pattern is presented in Table 2.

Table 2. Distribution of sources by cognitive patterns in insomnia

Cognitive Pattern	Key Sources	Definition / Manifestation
Catastrophising	Harvey (2003); Leahy (2020);	Tendency to exaggerate the likelihood and severity of negative consequences of sleep loss; perceiving

Cognitive Pattern	Key Sources	Definition / Manifestation
	Perlis et al. (2011); Tang et al. (2023)	these consequences as unbearable or uncontrollable. Examples: “If I don’t sleep tonight, I won’t be able to function at all tomorrow”; “After such a night, I will definitely make a serious mistake.”
Dichotomous (black-and-white) thinking	Leahy (2020); Harvey (2002); Morin & Espie (2003); Perlis et al. (2011); Carney & Edinger (2006)	Perception of sleep and daytime functioning in extreme categories (“normal” vs. “completely impaired”) without acknowledging intermediate degrees. Examples: “I didn’t sleep at all”; “I’m not functioning at all”; “If sleep was fragmented, it didn’t count.”
Rigid unrealistic expectations about sleep	Carney & Edinger (2006); Harvey (2002); Morin (1993); Perlis et al. (2011); Tang et al. (2023)	Inflexible beliefs about “normal” sleep duration, mandatory conditions for falling asleep, and the need for complete control over sleep. Examples: “I must sleep at least eight hours every night”; “If I wake up during the night, my sleep is already ruined”; “I must control the process of falling asleep.”
Personalisation	Leahy (2020); Harvey (2002); Tang et al. (2023); Morin (1993)	Interpretation of sleep difficulties as evidence of personal inadequacy or “defectiveness.” Examples: “Something is wrong with me if I can’t get my sleep right”; “Normal people sleep; only I can’t”; “If I can’t manage my sleep, I must be weak.”
Metacognitive beliefs	Ong et al. (2012); Tang et al. (2023); Wells (2008); Palagini et al. (2017); Schmidt et al. (2023)	Beliefs about the need to control thinking, the significance of thoughts, and the usefulness of worry or rumination. Examples: “I need to control my thoughts, otherwise I won’t fall asleep”; “If I start thinking, I won’t be able to stop”; “Worry helps me prepare for the next day.”

Each of these cognitive patterns contributes to the maintenance of insomnia through distinct but interconnected mechanisms. Catastrophising and dichotomous thinking amplify the subjective severity of sleep disturbances, while rigid expectations create unattainable standards against which sleep is continually evaluated and found wanting. Personalisation transforms a common difficulty into a threat to self-worth, and metacognitive beliefs lock the individual into a cycle of futile mental control efforts. Together, these patterns form a cohesive cognitive architecture that sustains insomnia over time.

Catastrophising is defined as a tendency to exaggerate the likelihood and severity of negative consequences of sleep loss and to perceive these consequences as unbearable or uncontrollable (Leahy, 2020). In insomnia,

such cognitions typically involve expectations of serious deterioration in cognitive functioning, emotional state, work performance, or health due to poor sleep. Studies show that the severity of catastrophising is associated with higher anxiety, increased psychophysiological arousal, and greater insomnia severity (Harvey, 2003).

Dichotomous, or black-and-white, thinking is characterised by a tendency to perceive one's own sleep and daytime functioning in extreme categories, as either “normal” or “completely impaired”, without acknowledging intermediate degrees (Leahy, 2020). This mode of thinking amplifies the subjective severity of insomnia and intensifies emotional reactions to fluctuations in sleep quality. However, objective indicators and actual functioning are often less impaired than

subjectively perceived (Harvey, 2002; Morin & Espie, 2003; Perlis et al., 2011).

Rigid and unrealistic expectations about sleep involve inflexible beliefs about “normal” sleep duration, mandatory conditions for falling asleep, and the need for complete control over the sleep process (Carney & Edinger, 2006; Harvey, 2002; Morin, 1993; Perlis et al., 2011; Tang et al., 2023). Such beliefs create extremely high demands on one's own sleep and lead to perceiving any deviation from the expected pattern as a sign of a problem or threat. Consequently, sleep begins to be viewed not as a natural physiological process but as a task requiring constant monitoring and correct execution (Harvey, 2002; Perlis et al., 2011; Tang et al., 2023).

Personalisation involves interpreting sleep difficulties as evidence of personal inadequacy or “defectiveness” (Leahy, 2020). Here, sleep problems are seen not as the result of multiple interacting factors (stress, behavioural strategies, arousal level), but as a reflection of stable personal characteristics. Personalisation amplifies emotional distress, particularly anxiety, shame, and helplessness, and may reduce motivation for active participation in therapy (Harvey, 2002; Leahy, 2020).

Metacognitive beliefs concern the need to control thinking, the significance of thoughts, and the usefulness of worry or rumination (Ong et al., 2012; Tang et al., 2023; Wells, 2008). Such beliefs contribute to the adoption of active thought-control strategies, including thought suppression, constant analysis, and attempts to solve problems just before bedtime, which typically increase cognitive activation and hinder sleep onset (Harvey, 2002; Ong et al., 2012; Palagini et al., 2017). Moreover, the very inability to stop the flow of thoughts becomes interpreted as a threat, indicating loss of control over one's own state. Recent studies confirm that metacognitive beliefs play an important role in the aetiology of insomnia, and metacognitive therapy demonstrates promising results (Schmidt et al., 2023; Metacognitive therapy for insomnia, 2025).

Cognitive therapy for insomnia is a structured process aimed at identifying and modifying dysfunctional cognitions that maintain the disorder (Perlis et al., 2011; Perlis et al., 2021; Riemann et al., 2023). Work on thoughts and beliefs about sleep is not an isolated step but occurs within the overall cognitive-behavioural model, which includes the interaction of cognitive, emotional, physiological, and behavioural factors (Perlis et al., 2021; Riemann et al., 2023).

Psychoeducation. At the initial stage, psychoeducation is crucial: the patient receives information about sleep physiology, regulatory mechanisms, the development of insomnia, and the principles of CBT-I (Perlis et al., 2021). This helps reduce anxiety and fosters a more realistic understanding of the processes involved, thereby creating a foundation for subsequent therapeutic work.

Monitoring and Identification of Automatic Thoughts. The next step is sleep monitoring and, above all, monitoring of sleep-related behaviours (Perlis et al., 2021). During the discussion of behavioural prescriptions, patients often reveal automatic thoughts and beliefs that may interfere with adherence. Cognitive work at this stage involves identifying and evaluating cognitions that hinder adherence and teaching the patient adaptive ways of responding to them (Perlis et al., 2021). To systematise this process, a cognitive diary that includes a description of the situation, associated cognitions, and emotional, physiological, and behavioural responses can be helpful (Beck, 2024).

Cognitive Restructuring. Once the patient has learned to identify cognitions, the next step is reappraisal and modification using Socratic dialogue aimed at evaluating the validity, realism, and functionality of automatic thoughts (Beck, 2024). In insomnia, the targets of restructuring are often predictions about the consequences of sleep loss, beliefs about the need to control sleep, and inflated expectations regarding sleep quality and duration. Formulating a more realistic interpretation can help reduce emotional distress and decrease hyperarousal that interferes with sleep onset (Beck, 2024; Eidelman et al., 2016; Leahy, 2020; Morin et al., 2002).

Decatastrophising. Working with catastrophising does not aim to deny the possible negative effects of sleep loss but rather to help the patient distinguish between unpleasant but tolerable consequences and truly catastrophic scenarios. One effective method is to assess the actual probability of the anticipated negative consequences based on the patient's own experiential data (Perlis et al., 2021).

Cognitive Continuum. For dichotomous beliefs, the cognitive continuum technique is used, which helps move from extreme categorical assessments toward a more differentiated perception of one's own experience (Beck, 2024).

Cost-Benefit Analysis of Beliefs. The patient is invited to explore the advantages and disadvantages of maintaining a particular

belief, which helps develop a more flexible attitude toward sleep variability (Perlis et al., 2011).

Behavioural Experiments. Well-planned behavioural experiments can modify beliefs much more effectively than verbal techniques (Beck, 2024; Leahy, 2020; Perlis et al., 2011). For instance, the patient may be asked to reduce their efforts to fall asleep, even to the point of intentionally allowing themselves not to sleep, which empirically challenges the belief that active control over sleep is a necessary condition for sleep onset (Beck, 2024; Perlis et al., 2021).

Working with Metacognitive Beliefs. This direction involves evaluating the necessity of thought control and the presumed benefits of worry (Leahy, 2020; Ong et al., 2012; Perlis et al., 2011). The patient is invited to analyse whether the strategies they use actually help them move closer to solving the problem or, on the contrary, maintain wakefulness and emotional tension. A crucial step is fostering the ability to perceive thoughts as transient mental events that do not require obligatory analysis, control, or immediate response (Ong et al., 2012). Recent research has shown that integrating elements of metacognitive therapy into CBT-I is as effective as classical CBT-I and can be considered a complement to standard cognitive strategies (Schmidt et al., 2023). The first clinical trial of metacognitive therapy for insomnia demonstrated large effects on insomnia severity (Hedges' $g = 1.64$) with remission achieved in 57% of participants (Metacognitive therapy for insomnia, 2025).

4. Discussion

The conducted literature analysis confirms that cognitive processes occupy a central position in the maintenance of chronic insomnia and are considered key targets in CBT-I (Harvey, 2002; Morin, 1993; Morin et al., 2002; Tang et al., 2023). In contemporary approaches, insomnia is conceptualised as a disorder involving impaired psychophysiological regulation, in which the way sleep disturbances are interpreted and made sense of becomes crucial.

The Maintaining Cycle. Regardless of the specific content of automatic thoughts and beliefs, their common function is to sustain attention to the sleep problem, increase the subjective significance of emerging difficulties, and heighten psychophysiological arousal that impedes sleep initiation and maintenance. This suggests that an important mechanism of chronicity is the formation of a maintaining cycle: initial sleep disturbances trigger negative

interpretations, accompanied by anxiety and attempts to prevent possible consequences, which in turn lead to numerous efforts to control both sleep itself and related cognitive processes. However, such strategies often produce the opposite effect—they increase psychophysiological arousal and make it harder to transition to sleep. Subsequent worsening of sleep is perceived as confirmation of initial fears, further reinforcing existing beliefs. Hence, the target of therapeutic intervention is not only the content of individual thoughts but the entire cycle of responding to sleep disruptions.

The Metacognitive Turn. Metacognitive beliefs are of particular interest. The reviewed sources indicate that beliefs about the need to control thinking, eliminate unwanted thoughts, or use worry as a problem-solving tool can independently maintain heightened cognitive activation (Harvey, 2002; Ong et al., 2012; Palagini et al., 2017). In this case, the source of distress is not so much the presence of certain thoughts but rather the ways of responding to them. Contemporary research confirms that metacognitive beliefs are an important factor in the aetiology of insomnia (Schmidt et al., 2023), and metacognitive therapy demonstrates promising results as a standalone intervention (Metacognitive therapy for insomnia, 2025). This perspective expands the traditional understanding of cognitive mechanisms in insomnia and places sleep disturbances within a broader context of cognitive self-regulation.

The Integrative Approach. In clinical practice, cognitive interventions are rarely applied in isolation from behavioural components of CBT-I (Edinger et al., 2021; Perlis et al., 2011; Perlis et al., 2021; Riemann et al., 2023; Walker et al., 2022). Rather, an integrative approach appears most effective, where cognitive work accompanies and supports the implementation of behavioural prescriptions. This is especially important when automatic thoughts specifically interfere with adherence to sleep restriction, stimulus control, or other treatment elements. Recent systematic reviews confirm that cognitive restructuring is a critical component of effective CBT-I programmes (Furukawa et al., 2024; Dismantling CBT-I, 2023).

Unresolved Questions and Limitations. The analysis also reveals several unresolved questions. Despite the large number of studies, the causal relationship between cognitive factors and insomnia remains open. On the one hand, extensive evidence indicates that dysfunctional

cognitions are associated with greater sleep disturbance severity. On the other hand, it cannot be ruled out that sleep disturbances themselves contribute to the formation of negative interpretations. It is likely that we are dealing not with linear cause-and-effect relations but with a system of reciprocal influence, in which cognitive factors act both as consequences and as maintaining mechanisms. The lack of longitudinal data limits the possibilities for causal inferences (Akram et al., 2023).

Several limitations of this review should also be acknowledged. The work is narrative in nature and is based primarily on qualitative analysis of theoretical models, clinical guidelines, and empirical studies. This limits the possibility of quantifying the relative contribution of individual cognitive mechanisms and comparing the effectiveness of different interventions. An additional limitation is the heterogeneity of the included sources, which vary in methodology and study design, making direct comparison of results difficult.

Despite these limitations, the analysis allows for a systematisation of the main cognitive mechanisms of chronic insomnia and highlights the clinical significance of cognitive interventions within CBT-I. The presented data may be useful both for further research on cognitive factors in insomnia and for the practical training of clinicians working with sleep disorders.

5. Conclusions

1. Contemporary theoretical models of insomnia regard cognitive processes as key mechanisms in the maintenance of chronic insomnia.
2. Significant cognitive factors include catastrophising about the consequences of sleep loss, dichotomous thinking, rigid expectations about sleep, personalisation, and metacognitive beliefs. They contribute to increased emotional distress, heightened psychophysiological arousal, and the formation of a maintaining cycle in insomnia.
3. Cognitive interventions within CBT-I aim to identify and modify dysfunctional beliefs and to reduce excessive control over

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sleep-related processes. This is expected to decrease anxiety and psychophysiological activation that perpetuate insomnia.

4. A promising direction for future research is the investigation of the role of metacognitive processes in maintaining chronic insomnia and the possibilities of integrating metacognitive interventions into CBT-I protocols. Current evidence supports the effectiveness of both classical CBT-I and its metacognitively oriented modifications.

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Highlights:

- Chronic insomnia is maintained by five key cognitive patterns: catastrophising, dichotomous thinking, rigid expectations, personalisation, and metacognitive beliefs.
- Cognitive interventions within CBT-I effectively modify dysfunctional beliefs and reduce psychophysiological activation.
- Metacognitive beliefs about the need to control thinking and the usefulness of worry act as independent mechanisms maintaining insomnia.
- Integration of metacognitive approaches into CBT-I protocols is a promising direction supported by recent empirical evidence.
- Behavioural experiments modify beliefs more effectively than verbal techniques.

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Когнитивные интервенции в терапии хронической инсомнии: механизмы, мишени и методы коррекции

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Резюме. *Актуальность.* Хроническая инсомния является одним из наиболее распространённых расстройств сна, ассоциированных с выраженными нарушениями эмоционального состояния, когнитивного функционирования и качества жизни. Современные модели инсомнии рассматривают когнитивные процессы как ключевой механизм поддержания расстройства, однако вопросы систематизации когнитивных факторов и их коррекции остаются дискуссионными. *Цель.* Анализ когнитивных механизмов хронической инсомнии и терапевтических интервенций, применяемых в когнитивно-поведенческой терапии инсомнии (КПТ-И). *Методы.* Нарративный обзор литературы, включающий анализ когнитивных моделей инсомнии, эмпирических исследований когнитивных факторов, клинических руководств по КПТ-И и протоколов когнитивной терапии. Поиск проводился в базах PubMed, Scopus и PsycINFO за период 1980–2024 гг. по ключевым словам: *insomnia, cognitive model, cognitive therapy, CBT-I, metacognition*. Отбор источников осуществлялся в соответствии с PRISMA (см. блок-схему). *Результаты.* В обзор включено 44 источника. Выявлено пять основных когнитивных паттернов, поддерживающих инсомнию: катастрофизация, дихотомическое мышление, жёсткие ожидания относительно сна, персонализация и метакогнитивные убеждения. Описаны основные когнитивные интервенции КПТ-И: психообразование, мониторинг автоматических мыслей, когнитивная реструктуризация, декатастрофизация, когнитивный континуум, анализ преимуществ и недостатков убеждений, поведенческие эксперименты. Отдельное внимание уделено работе с убеждениями о необходимости контроля сна и мышления. Современные исследования подтверждают эффективность интеграции метакогнитивных подходов в протоколы КПТ-И. *Заключение.* Когнитивные процессы являются центральной терапевтической мишенью при хронической инсомнии. Когнитивные интервенции в структуре КПТ-И способствуют модификации дисфункциональных убеждений, снижению тревоги и психофизиологической активации. Перспективным направлением является интеграция метакогнитивных подходов в протоколы КПТ-И.

Ключевые слова: инсомния, хроническая инсомния, когнитивно-поведенческая терапия инсомнии, КПТ-И, когнитивные искажения, метакогнитивные убеждения.

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EMPIRICAL ARTICLE

Psychological Features of Magical Thinking in Adolescence

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Abstract. *Background and Problem.* Magical thinking is one of the earliest forms of comprehending reality, and it persists in the modern adult mind. Its connection with cognitive, emotional, regulatory, and moral characteristics has been documented, but the evidence remains fragmentary, and adolescence is severely underrepresented in the literature. *Objective.* This study provides a comprehensive examination of magical thinking in adolescence, testing whether it is associated with psychological characteristics across multiple domains and whether significant predictors can be identified. *Methods.* The study involved 300 adolescents aged 14–17 years (148 boys, 152 girls). Eight standardized self-report instruments measured paranormal belief, cognitive styles, creativity, emotional intelligence, behavioral control, emotion regulation, moral disengagement, and moral identity. Spearman's rank correlations (full sample and by sex) and Bayesian Model Averaging (BMA) regression were employed. *Results.* Magical thinking was positively associated with intuitive thinking ($\rho = 0.234, p < .001$) and negatively with rational thinking ($\rho = -0.248, p < .001$), creativity ($\rho = -0.230, p < .01$), emotional intelligence ($\rho = -0.223, p < .01$), cognitive reappraisal ($\rho = -0.193, p < .01$), and moral self ($\rho = -0.223, p < .01$), while showing positive associations with moral disengagement ($\rho = 0.303, p < .001$). BMA regression ($R^2 = .32$) identified Experiential Engagement, Advantageous Comparison, and Displacement of Responsibility as the predictors with the strongest evidence for inclusion (PIP = 1.00); Volitional Control emerged as an additional predictor (PIP = .62). Sex differences revealed 201 significant correlations in boys versus 93 in girls. *Conclusion.* Magical thinking in adolescence reflects not a cognitive deficit but an affect-driven processing preference, evolutionarily shaped for coping with unpredictability. Findings have implications for educational interventions targeting critical thinking and moral reasoning in adolescents.

Keywords: Magical Thinking, Paranormal Belief, Adolescence, Cognitive Styles, Emotional Intelligence, Moral Disengagement

1. Introduction

Magical thinking represents one of humanity's earliest modes of comprehending reality. Frazer (2009) provided the first systematic account of this phenomenon, identifying two laws of sympathetic magic. According to the law of similarity, outwardly similar phenomena can produce one another. According to the law of contagion, objects that have once been in contact retain mutual influence. In both cases, association by similarity or contiguity is erroneously taken for causal connection. These laws persist in the everyday thinking of educated adults as cognitive heuristics to which the psyche resorts automatically (Rozin & Nemeroff, 2002). Shermer (2015) proposed an evolutionary explanation for this persistence and introduced the concept of *patternicity*, which is the tendency to perceive order and connections

between events regardless of whether they exist in reality.

Two main definitional directions can be distinguished in the literature on magical thinking. The first focuses on belief in the capacity of thought to directly influence reality (Bayramova & Enikolopov, 2016; Zhmurov, 2012). The second interprets the phenomenon more broadly, encompassing the entire spectrum of beliefs in the supernatural (Farkhutdinova, 2023). Vyse (2014) drew a functional distinction between superstition and paranormal belief: paranormal belief admits the existence of phenomena that do not fit the scientific picture of the world, whereas superstition implies the intention to influence the course of events. Irwin (2009) systematized explanations of paranormal beliefs through four hypotheses, namely the social marginality hypothesis, the worldview hypothesis, the

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cognitive deficits hypothesis, and the psychodynamic functions hypothesis. The diversity of definitions reflects the complexity of the phenomenon itself, which involves both the cognitive and the emotional spheres and is not reducible to either. In the present study, magical thinking is understood as the combination of beliefs in the supernatural and the use of magical strategies to influence events. Paranormal belief is defined as the general willingness to admit the existence of phenomena falling outside scientifically established regularities.

Magical thinking emerged phylogenetically as an adaptive mechanism to cope with environmental uncertainty and uncontrollability through rituals, animism, and totemism (Farkhutdinova, 2023). Piaget (2024) described forms of prelogical thinking characteristic of children aged 4 to 7 years, such as animism and egocentrism. In these forms, the child attributes intentions and feelings to inanimate objects and perceives what is desired as achievable by the power of one's own wanting. Subbotsky (2013) demonstrated that magical thinking in childhood has independent significance for mental development and carries substantial potential for learning by stimulating creativity, perception, and memory. Van Elk et al. (2015) regarded children's magical overestimation of their own control over events as an adaptive mechanism. With maturation, magical thinking does not disappear but is transformed. Its elements are preserved in the everyday life of adults as a means of emotional release, coping, and self-regulation (Trubitsyna, 2020), and these patterns have been systematized in a meta-analytic review covering research findings across four decades (Dean et al., 2022). In adulthood, however, magical thinking is increasingly found to be associated with unfavorable psychological characteristics. Superstitious beliefs may impede the adequate perception of health-related information and the making of well-grounded decisions (Taher et al., 2020). Pronounced magical thinking in young adults is associated with reduced self-esteem, impairment of the capacity for close relationships, and distortion of the value-meaning sphere of the personality (Karunin et al., 2024). In adolescence, the picture changes. Early adolescence has been identified as a probable turning point in the formation of metaphysical ideas, with conceptions of the world based on scientific principles being shaped precisely during this period (Rosengren et al., 2000). A number of studies have recorded a wave-like dynamic in which the intensity of magical beliefs decreases by early adolescence and then rises again at the

ages of 14 to 17 (Bolton et al., 2002; Peltzer, 2003; Sagone & De Caroli, 2014). At the same time, adolescence remains almost entirely underrepresented in studies of magical thinking.

The connection between magical thinking and various spheres of the psyche has been traced in studies covering the cognitive, emotional, regulatory, and moral domains. In the cognitive sphere, the substantive basis of this connection is provided by the dual-system model of thinking. Within the cognitive-experiential self-theory of personality, Epstein (2003) distinguished two parallel systems of information processing: the rational system, which relies on logical inference and operates consciously, and the experiential (intuitive) system, which functions automatically and associatively and is governed by affect. Kahneman (2024) designated the fast intuitive system as System 1 and the slow analytical system as System 2, demonstrating that analytical thinking more often endorses the intuitive answer than rechecks it, especially under conditions of reduced motivation. Aarnio and Lindeman (2005) found that paranormal and pseudoscientific beliefs follow the dual-process logic of thinking, with the intensity of magico-religious convictions being determined by the place that intuitive thinking occupies in a person's life. Williams et al. (2022) established that individuals prone to emotional reasoning and jumping to conclusions are more likely to accept paranormal explanations. Van Mulukom et al. (2024) showed that thinking styles are more closely associated with paranormal beliefs than with religious ones, and this association is mediated by metacognitive trust in one's own intuition. Russian data complement this picture: Abitov, Gorodetskaya, and Dvoinin (2022) demonstrated that what underlies personally superstitious thinking is not so much a deficit of intelligence as a particular emotional profile that includes pessimism, anxiety, and fear of novelty. These are precisely the states in which the analytical system is least likely to be mobilized. Creativity, understood as the combination of personality traits that ensure the readiness to notice contradictions, to find original solutions, and to sustain the productive tension of the unknown, is joined with magical thinking by the willingness to operate with what lies beyond habitual experience. Boden (2004) distinguished transformational creativity as the type in which the conceptual space itself is altered such that what was previously unthinkable becomes possible. Within this logic, magical thinking proves to be its natural ground. Bunce and Woolley (2021) confirmed this

connection on a sample of children aged 4 to 7 years: the deeper a child was immersed in the domain of the impossible, the higher were the scores on verbal and physical creativity.

In the emotional sphere, emotional intelligence, understood as the ability to recognize, understand, and manage one's own and others' emotions (Salovey & Mayer, 1990), exhibits several points of intersection with magical thinking. Eddy and Hansen (2021) established that an individual prone to magical thinking responds intensely to others' emotional states yet poorly recognizes their own experiences, while the cognitive side of empathy remains intact. Canli, Ozdemir, and Kocak (2015) showed that in adolescents with a pronounced tendency toward magical ideation, the accuracy of recognizing negative emotions from facial expressions is reduced. Gregory and Mustata (2012) described magical thinking in adolescents as a manifestation of a presymbolic state in which anxious experiences are ordered through bodily rather than mental schemes. Bayramova and Enikolopov (2021) noted that magical thinking is activated predominantly in emotionally significant situations and functions in the psyche as a means of adapting to them.

In the regulatory sphere, magical thinking is embedded in the system of self-regulation that integrates the cognitive, emotional, and volitional resources of the personality (Sergienko et al., 2023). Stoyanova (2007) examined prelogical formations such as beliefs, superstitions, omens, and rituals as a multifunctional psychological phenomenon, introducing the concept of prelogical defense, which is defined as a special system of personality stabilization that shields consciousness from traumatic experiences. Bayramova and Enikolopov (2021) showed that magical thinking gives rise to "productive illusions" that help in coping with difficult life situations, while belief in magic can perform the functions of both emotion-focused and problem-focused coping within Lazarus's classification. Rudski and Edwards (2007) established that the performance of rituals generates an illusion of control over the outcome of an event, even when no objective connection between the ritual and the result exists. Abitov and Akbirova (2020) found that superstitiousness can act as an imaginary control mechanism that protects against uncertainty and stress factors.

In the moral sphere, moral identity reflects the place of morality in the structure of the personality's self-awareness and encompasses both the formation of moral standards and the mechanisms through which these standards are

realized or disengaged in behavior. Bandura et al. (1996) described eight cognitive mechanisms of moral disengagement, operating at four points of the self-regulatory system and enabling a person to inflict harm without experiencing internal discomfort. Blasi (1984) showed that moral identity, which describes the degree to which moral qualities define a person's conception of themselves, acts as the principal motivator of moral behavior. Au and Savani (2019) demonstrated that fatalism places the source of events beyond human will, turning one's own actions into something incapable of affecting the course of things. Vygotsky (2008) considered myth as one of the mediators of the internalization of moral attitudes, and Cassirer (2010) showed that mythical thinking forms a unified symbolic space in which the values and norms of culture exist in undifferentiated form. Purzycki et al. (2016) found that conceptions of supernatural beings endowed with the capacity to observe people and to punish wrongdoing reinforce fair treatment of strangers who share the same beliefs. Hoffman (2000) developed a theory of moral development based on empathy, tracing its course from the infant's early response to mature compassion capable of guiding prosocial behavior and sustaining a sense of justice.

Although magical thinking has been linked with each of these spheres, the available data are predominantly fragmentary. Adolescence remains almost entirely underrepresented in studies of magical thinking, and the existing studies on adolescent samples do not provide a coherent picture. In light of this, the aim of the present study is to provide a comprehensive examination of the features of magical thinking in adolescence. The first hypothesis posits that magical thinking in adolescence is associated with characteristics of the cognitive, emotional, regulatory, and moral spheres of the personality. The second hypothesis posits that significant predictors of magical thinking exist among the psychological characteristics of adolescents.

2. Method

2.1. Participants

The study involved 300 adolescents aged 14 to 17 years (mean age 15.75 years, $SD = 1.10$), including 148 boys (49.3%) and 152 girls (50.7%). In terms of age distribution, 14-year-olds accounted for 52 participants (17.3%), 15-year-olds for 71 (23.7%), 16-year-olds for 77 (25.7%), and 17-year-olds for 100 (33.3%). Participants were recruited through convenience sampling and resided in various regions of the Russian Federation. A sensitivity analysis indicated that with $n = 300$ and $\alpha = .05$ (two-

tailed), the study had 80% power to detect Spearman correlations of $|\rho| \geq .16$

2.2. Measures

All instruments demonstrated acceptable internal consistency (Cronbach's $\alpha > .70$) in the present sample.

The Revised Paranormal Belief Scale (RPBS; Russian adaptation by Grigoryev, 2015) comprises the total score and seven subscales: Traditional Religious Belief (TRB), Psi-abilities (PSI), Witchcraft (WIT), Superstition (SUP), Spiritualism (SPI), Extraordinary Life Forms (ELF), and Precognition (PRE). $\alpha = .89$.

The Rational-Experiential Inventory (REI; Russian adaptation by Kornilova & Razvalyaeva, 2017) comprises four scales: Rational Engagement (RE), Rational Ability (RA), Experiential Engagement (EE), and Experiential Ability (EA). $\alpha = .78-.85$.

The Test of Divergent Feeling from the Creativity Assessment Packet (CAP; Russian adaptation by Tunik, 2003) comprises the Total Creativity score and four scales: Curiosity, Imagination, Complexity, and Risk-taking. $\alpha = .82$.

The EmIn Emotional Intelligence Questionnaire (Lyusin, 2006) comprises two pairs of main scales (Interpersonal EI and Intrapersonal EI, Emotion Understanding and Emotion Regulation) as well as five subscales (Understanding Others' Emotions, Managing Others' Emotions, Understanding Own Emotions, Managing Own Emotions, and Expressive Control). $\alpha = .76-.88$.

The Behavioral Control Questionnaire (Sergienko et al., 2023) comprises the overall Behavioral Control score and three scales: Cognitive Control, Emotional Control, and Volitional Control. $\alpha = .80$.

The Emotion Regulation Questionnaire (ERQ; Russian adaptation by Pankratova & Kornienko, 2017) comprises two scales: Cognitive Reappraisal (CR) and Expressive Suppression (ES). $\alpha = .79$.

The Moral Disengagement Scale (MD-24; Russian adaptation by Ledovaya et al., 2016) comprises the total score and eight subscales: Moral Justification (MJ), Euphemistic Labeling (EL), Advantageous Comparison (AC), Displacement of Responsibility (DR), Diffusion of Responsibility (DfR), Distortion of

Consequences (DC), Dehumanization (DH), and Attribution of Blame (AB). $\alpha = .87$.

The Moral Identity Questionnaire (MIQ; Russian adaptation by Sychev & Protasova, 2023) comprises two scales: Moral Self (MS) and Moral Integrity (MI). $\alpha = .84$.

2.3. Procedure and Statistical Analysis

Data were collected from May to October 2025 remotely through the Yandex.Forms platform. All participants were informed about the goals of the study and gave consent to anonymous participation; parental consent was obtained for minors.

Associations between magical thinking and the psychological characteristics of adolescents were assessed using Spearman's rank correlation coefficient. The analysis was performed on the full sample and separately for boys and girls. Significant predictors of magical thinking were identified through regression analysis using Bayesian Model Averaging (BMA). The regression analysis was performed for the total paranormal belief score and for each subscale. A $PIP \geq .50$ was treated as substantial evidence for predictor inclusion, $\geq .75$ as strong, and $\geq .90$ as very strong. Data processing was carried out using Microsoft Excel and the R statistical programming environment (RStudio).

3. Results

3.1. Correlations in the Cognitive Sphere

For cognitive styles measured by the REI, the total RPBS score was positively correlated with Experiential Engagement ($\rho = 0.234, p < .001$) and negatively correlated with Rational Engagement ($\rho = -0.181, p < .01$) and Rational Ability ($\rho = -0.248, p < .001$). Experiential Ability showed no significant correlations with either the total score or the subscales and was excluded from further presentation. At the subscale level, Experiential Engagement was correlated with all seven subscales, with the strongest correlations observed for Spiritualism, Witchcraft, and Precognition. Rational Ability was negatively correlated with six of the seven subscales, most strongly with Superstition and Precognition. Rational Engagement was negatively correlated with five subscales, most strongly with Psi-abilities. The values are presented in Table 1a.

Table 1a. Significant Correlations of Cognitive Styles (REI) with Paranormal Belief and Its Subscales ($n = 300$)

Paranormal belief scale	EE	RE	RA
Total (RPBS)	0.234***	-0.181**	-0.248***

Paranormal belief scale	EE	RE	RA
TRB	0.200***	–	–
PSI	0.145***	–0.248**	–0.187*
WIT	0.218***	–0.191**	–0.250***
SUP	0.132*	–0.206***	–0.288***
SPI	0.266***	–0.161*	–0.255***
ELF	0.202***	–	–0.212**
PRE	0.217***	–0.192**	–0.265***

Note. Spearman's rank correlation coefficient. * $p < .05$; ** $p < .01$; *** $p < .001$.

For creativity measured by the CAP, the total RPBS score was negatively correlated with three of the five creativity scales: Total Creativity ($\rho = -0.230, p < .01$), Complexity ($\rho = -0.224, p < .001$), and Risk-taking ($\rho = -0.221, p < .01$). No significant correlations with the total score were found for Curiosity or Imagination, although the direction of the associations was preserved. At the subscale level, all significant correlations were negative.

Superstition was the only subscale correlated with all five creativity scales, with the strongest correlation observed with Risk-taking. Precognition and Psi-abilities were significantly correlated with four of the five scales, most strongly with Complexity and Risk-taking, respectively. Witchcraft and Spiritualism were each correlated with three creativity scales. The values are presented in Table 1b.

Table 1b. Significant Correlations of Creativity Scales (CAP) with Paranormal Belief and Its Subscales ($n = 300$)

Paranormal belief scale	Risk-taking	Curiosity	Complexity	Imagination	Total Creativity
Total (RPBS)	–0.221**	–	–0.224***	–	–0.230**
PSI	–0.253***	–0.198**	–0.162*	–	–0.229**
WIT	–0.184**	–	–0.193**	–	–0.185**
SUP	–0.330***	–0.176**	–0.254***	–0.210***	–0.309***
SPI	–0.152*	–	–0.182**	–	–0.187**
ELF	–	–	–0.191**	–	–0.160*
PRE	–0.257***	–0.168**	–0.290***	–	–0.264***

Note. Spearman's rank correlation coefficient. * $p < .05$; ** $p < .01$; *** $p < .001$.

3.2. Correlations in the Emotional Sphere

For emotional intelligence measured by the EmIn questionnaire, the total RPBS score was negatively correlated with Emotion Understanding ($\rho = -0.223, p < .01$) and Intrapersonal EI ($\rho = -0.197, p < .05$). At the subscale level, all significant correlations were

negative. Emotion Understanding, Intrapersonal EI, and Emotion Regulation were correlated with six, five, and four subscales respectively, most strongly with Superstition and Precognition. Interpersonal EI was correlated with three subscales, most strongly with Superstition. The values are presented in Table 2a.

Table 2a. Significant Correlations of Emotional Intelligence (EmIn) Scales with Paranormal Belief and Its Subscales ($n = 300$)

Paranormal belief scale	IEI	IAEI	EU	ER
Total (RPBS)	–	–0.197*	–0.223**	–
TRB	–	–	–	–
PSI	–	–	–0.165*	–
WIT	–0.176**	–0.189**	–0.214***	–0.172**
SUP	–0.275***	–0.253***	–0.332***	–0.241***
SPI	–	–0.198**	–0.187**	–0.173*
ELF	–	–0.162*	–0.170*	–
PRE	–0.185**	–0.239***	–0.258***	–0.207**

Note. Spearman's rank correlation coefficient. * $p < .05$; ** $p < .01$; *** $p < .001$.

At the subscale level of the EmIn, the total RPBS score was negatively correlated with Understanding Others' Emotions ($\rho = -0.171, p < .05$) and Understanding Own Emotions ($\rho = -0.198, p < .01$). All significant correlations at this level were negative. Understanding Others' Emotions was correlated with four subscales, most strongly with Superstition and Witchcraft. Managing Others'

Emotions and Managing Own Emotions were each correlated with three subscales, most strongly with Superstition. Understanding Own Emotions was correlated with five subscales, most strongly with Superstition and Precognition. Expressive Control was correlated with Superstition and Spiritualism. The values are presented in Table 2b.

Table 2b. Significant Correlations of Emotional Intelligence (EmIn) Subscales with Paranormal Belief and Its Subscales ($n = 300$)

Paranormal belief scale	UOE	MOE	UOE-self	MOE-self	EC
Total (RPBS)	–0.171*	–	–0.198**	–	–
TRB	–	–	–	–	–
PSI	–0.171*	–	–	–	–
WIT	–0.182**	–0.138*	–0.177**	–0.151*	–
SUP	–0.283***	–0.213***	–0.243***	–0.222***	–0.149*
SPI	–	–	–0.179*	–	–0.161*
ELF	–	–	–0.167*	–	–
PRE	–0.185**	–0.159*	–0.227***	–0.203**	–

Note. Spearman's rank correlation coefficient. * $p < .05$; ** $p < .01$; *** $p < .001$.

3.3. Correlations in the Regulatory Sphere

For behavioral control, the total RPBS score was negatively correlated with Emotional Control ($\rho = -0.180, p < .05$). Cognitive Control showed no significant correlations with either

the total score or the subscales and was excluded from further presentation. At the subscale level, all significant correlations were negative. Emotional Control was correlated with five subscales, most strongly with Superstition and Precognition. Volitional Control and Total Behavioral Control were correlated only with Superstition. The values are presented in Table 3a.

Table 3a. Significant Correlations of Behavioral Control Scales with Paranormal Belief and Its Subscales ($n = 300$)

Paranormal belief scale	Emotional Control	Volitional Control	Total (Behavioral Control)
Total (RPBS)	-0.180*	—	—
TRB	—	—	—
PSI	-0.196*	—	—
WIT	-0.198**	—	—
SUP	-0.260***	-0.139*	-0.179**
SPI	-0.147*	—	—
ELF	—	—	—
PRE	-0.237***	—	—

Note. Spearman's rank correlation coefficient. * $p < .05$; ** $p < .01$; *** $p < .001$.

For emotion regulation measured by the ERQ, the total RPBS score was negatively correlated with Cognitive Reappraisal ($\rho = -0.193, p < .01$) and Expressive Suppression ($\rho = -0.184, p < .05$). At the subscale level, all significant correlations were negative. Cognitive Reappraisal was correlated

with five subscales, most strongly with Superstition and Precognition. Expressive Suppression was correlated with five subscales, most strongly with Spiritualism and Extraordinary Life Forms. The values are presented in Table 3b.

Table 3b. Significant Correlations of Emotion Regulation Scales (ERQ) with Paranormal Belief and Its Subscales ($n = 300$)

Paranormal belief scale	CR	ES
Total (RPBS)	-0.193**	-0.184*
TRB	—	—
PSI	-0.212**	—
WIT	-0.195**	-0.174**
SUP	-0.261***	-0.152*
SPI	-0.177**	-0.234***

Paranormal belief scale	CR	ES
ELF	–	–0.215**
PRE	–0.235***	–0.184**

Note. Spearman's rank correlation coefficient. * $p < .05$; ** $p < .01$; *** $p < .001$.

3.4. Correlations in the Moral Sphere

For moral disengagement measured by the MD-24, the total RPBS score was positively correlated with the total Moral Disengagement score ($\rho = 0.303$, $p < .001$) and with six of the eight subscales. Moral Justification and Dehumanization showed no significant correlations and were excluded from further

presentation. At the subscale level, all significant correlations were positive. Five of the displayed subscales and the total Moral Disengagement score were correlated with all seven subscales of paranormal belief. The strongest correlations were observed with Superstition and Precognition, particularly for Displacement of Responsibility and Advantageous Comparison. The values are presented in Table 4a.

Table 4a. Significant Correlations of Moral Disengagement Scales (MD-24) with Paranormal Belief and Its Subscales ($n = 300$)

Paranormal belief scale	EL	AC	DR	DfR	DC	AB	Total (MD-24)
Total (RPBS)	0.205***	0.427***	0.447***	0.318***	0.334***	0.167***	0.303***
TRB	–	0.237***	0.262***	0.166***	0.151**	0.116**	0.160***
PSI	0.201***	0.400***	0.351***	0.239***	0.293***	0.108**	0.237***
WTT	0.176***	0.371***	0.366***	0.280***	0.297***	0.119*	0.245***
SUP	0.216***	0.462***	0.516***	0.325***	0.404***	0.229***	0.330***
SPI	0.184***	0.362***	0.352***	0.271***	0.278***	0.105*	0.243***
ELF	0.213***	0.418***	0.421***	0.358***	0.332***	0.195***	0.334***
PRE	0.231***	0.398***	0.447***	0.324***	0.335***	0.155**	0.306***

Note. Spearman's rank correlation coefficient. * $p < .05$; ** $p < .01$; *** $p < .001$.

For moral identity measured by the MIQ, the total RPBS score was negatively correlated with Moral Self ($\rho = -0.223$, $p < .01$) and positively correlated with Moral Integrity ($\rho = 0.139$, $p < .01$). At the subscale level, Moral Self was negatively correlated with six subscales,

most strongly with Superstition and Psi-abilities. Moral Integrity was positively correlated with six subscales, most strongly with Psi-abilities and Superstition. The values are presented in Table 4b.

Table 4b. Significant Correlations of Moral Identity Scales (MIQ) with Paranormal Belief and Its Subscales ($n = 300$)

Paranormal belief scale	MS	MI
Total (RPBS)	–0.223**	0.139**
TRB	0.092*	–

Paranormal belief scale	MS	MI
PSI	-0.303***	0.204***
WIT	-0.230***	0.119*
SUP	-0.343***	0.196***
SPI	-0.196**	0.100*
ELF	-0.194**	0.142**
PRE	-0.285***	0.175***

Note. Spearman's rank correlation coefficient. * $p < .05$; ** $p < .01$; *** $p < .001$.

3.5. Correlations by Sex

In boys, 201 significant correlations were identified; in girls, 93. Superstition, as in the full sample, displayed the strongest correlations in both subsamples. For cognitive styles, Experiential Engagement was most strongly positively correlated with the total paranormal belief score in girls ($\rho = 0.299$), whereas in boys it showed no significant correlation with the total score. For creativity, negative correlations were observed across most subscales in boys, whereas in girls correlations with the total score were retained only for Complexity and Total Creativity. For emotional intelligence, negative correlations were observed across nearly all scales in boys, whereas in girls no correlations with the total score were found, and the remaining significant correlations primarily involved Superstition. For behavioral control, negative correlations were observed across nearly all scales in boys, and Volitional Control,

which had been correlated only with Superstition in the full sample, was correlated with four subscales in boys. In girls, only the correlation between Emotional Control and Superstition was retained. For emotion regulation, negative correlations were observed for both scales of the questionnaire in boys, whereas in girls only two significant correlations were retained. For moral disengagement, positive correlations were broader and stronger in boys, with the strongest correlation observed between Advantageous Comparison and the total score ($\rho = 0.608$); in girls, correlations with the total score were retained at weaker magnitudes. For moral identity, the negative correlation of Moral Self with the total paranormal belief score was stronger in boys, whereas in girls no correlation between Moral Self and the total score was found. The numbers of significant correlations in the subsamples are presented in Table 5.

Table 5. Number of Significant Correlations Between Psychological Characteristics and Paranormal Belief, in the Full Sample and by Sex ($n = 300$)

Measure	Full sample ($n = 300$)	Boys ($n = 148$)			Girls ($n = 152$)		
		Total	New	Lost	Total	New	Lost
Cognitive styles (REI)	21	18	6	9	21	3	3
Creativity (CAP)	24	30	9	3	17	0	7
Emotional intelligence (EmIn)	39	59	21	1	7	1	33
Behavioral control	8	16	8	0	1	0	7
Emotion regulation (ERQ)	12	15	3	0	2	1	11

Moral disengagement (MD-24)	55	55	1	1	35	3	23
Moral identity (MIQ)	15	8	0	7	10	0	5
Total	174	201	48	21	93	8	89

Note. Counts of statistically significant Spearman rank correlations ($*p < .05$) of psychological scales with the total paranormal belief score and its seven subscales. New = correlations significant in the subsample but not in the full sample. Lost = correlations significant in the full sample but not in the subsample.

3.6. Regression Analysis

Bayesian Model Averaging (BMA) regression was used to identify predictors of the paranormal belief scales. The model R^2 for the total score was .32. The cumulative posterior probability of the five most plausible models was approximately 12%. Four substantial predictors of the total paranormal belief score were

identified, all positive in direction. Advantageous Comparison, Displacement of Responsibility, and Experiential Engagement showed the strongest evidence for inclusion, each at $PIP = 1.00$. Volitional Control exceeded the threshold for substantial evidence with a notable margin ($PIP = .62$). Posterior inclusion probabilities are presented in Figure 1.

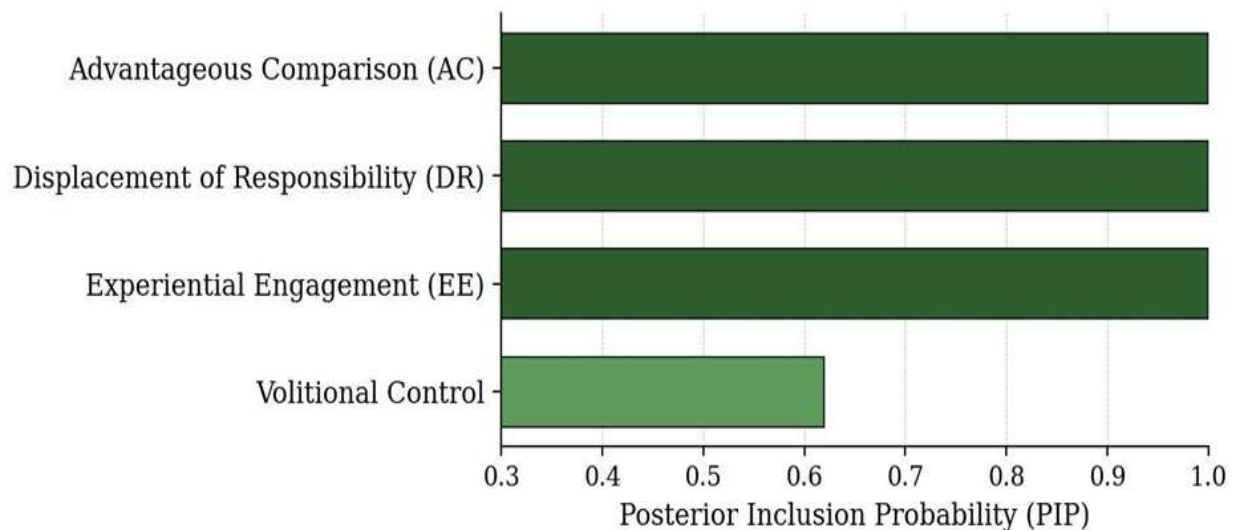


Figure 1. Posterior Inclusion Probabilities (PIP) of Substantial Predictors of the Total Paranormal Belief Score

The three predictors with $PIP = 1.00$ for the total score replicated across most subscales. Experiential Engagement and Advantageous Comparison showed substantial evidence for inclusion in all seven subscales, and Displacement of Responsibility in five of seven. Beyond these three, six additional variables crossed the substantial-evidence threshold selectively in individual subscale models. In Psi-abilities, Rational Engagement and Cognitive Reappraisal additionally crossed the threshold. In Superstition, Risk-taking and Moral Justification additionally crossed the threshold. In Precognition, Cognitive

Reappraisal and Risk-taking additionally crossed the threshold. In Spiritualism and Extraordinary Life Forms, Expressive Suppression additionally crossed the threshold. In Traditional Religious Belief, Moral Self additionally crossed the threshold and was the only positive predictor among all subscale-specific additions. In Witchcraft, only Advantageous Comparison and Experiential Engagement crossed the threshold; no subscale-specific additional predictors were identified. Posterior inclusion probabilities are presented in Figure 2.

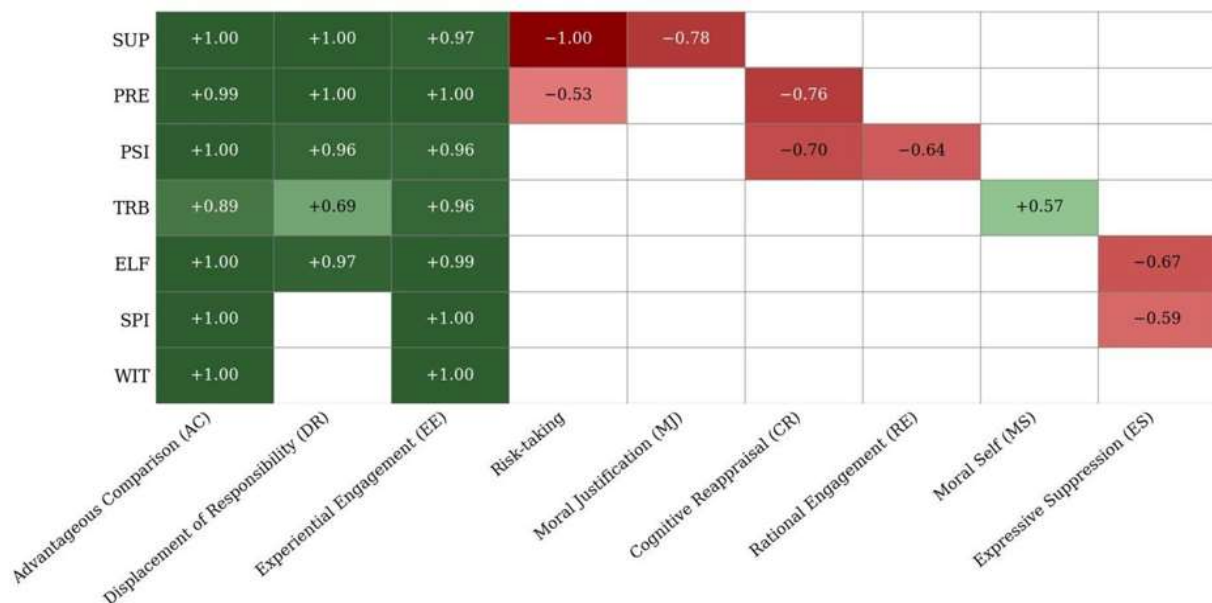


Figure 2. Posterior Inclusion Probabilities (PIP) of Substantial Predictors Across the Seven Paranormal Belief Subscales. Cell color indicates direction (green = positive, red = negative); empty cells indicate PIP < .50.

4. Discussion

4.1. Correlation Analysis

Since Experiential Engagement represents a low-effort strategy of rapid, automatic, affect-driven judgments, whereas Experiential Ability reflects an adaptive cognitive resource grounded in accumulated experience and implicit knowledge, magical thinking was associated only with the former. This distinction is consistent with the separation between the experiential and rational systems in Epstein's cognitive-experiential self-theory (Epstein et al., 1996). Paranormal belief is thus tied not to cognitive resources as such, but to a preference for a particular mode of information processing. The rationality scales demonstrated the inseparability of engagement and ability, since the use of rational strategies rests directly on the corresponding cognitive skill. Rational analysis counteracts the cognitive heuristics that generate magical explanations and that continue to operate in the everyday thinking of educated adults (Rozin & Nemeroff, 2002). The negative associations of both rationality scales with paranormal belief indicate that adolescents with pronounced magical thinking tend to prefer an associative path of information processing. Analytical thinking, moreover, more often endorses an intuitive answer than rechecks it, particularly under reduced motivation (Kahneman, 2024). The differential behavior of Traditional Religious Belief, which was associated with Experiential Engagement but not with rationality or creativity scales, is

consistent with the findings of Van Mulukom et al. (2024), who showed that paranormal beliefs are more closely linked to thinking styles than religious beliefs, and this link is mediated by metacognitive trust in one's own intuition.

The negative association between magical thinking and creativity was not self-evident from the theoretical analysis, since prior data suggested a shared willingness to operate with what lies beyond the possible. The personality component of creativity, including Curiosity and Risk-taking, reflects an adolescent's readiness to continue searching beyond the first explanation that magical thinking supplies in the form of a ready symbolic answer requiring no verification. The cognitive component, represented by Complexity, presupposes analytical immersion in a task and the holding of contradictions, whereas magical thinking removes the need for such immersion by replacing a complex picture of the world with a coherent but simplified one. The pronounced negative association between Risk-taking and Precognition further clarifies this logic: precognition as a mechanism for "looking ahead" represents a strategy of replacing uncertainty with a comforting picture of the world, opposite to a readiness to accept the unknown. This pattern is consistent with Vyse's (2014) view of openness to the "realm of the possible" as being linked both to divergent thinking and to the acceptance of paranormal explanations. At the same time, creativity has also been conceptualized in the literature as a transformational process operating beyond the boundaries of the habitual conceptual order, to

which immersion in the realm of the impossible may contribute (Boden, 2004; Subbotsky, 2012).

Intrapersonal emotional intelligence was more strongly affected than the interpersonal one. The understanding of own emotions requires internal cognitive analysis that allows an experience to be recognized, differentiated, and traced to its cause. When this analysis is poorly developed, emotional experience remains undifferentiated and anxious states are organized through bodily rather than mental schemas, in line with the findings of Gregory and Mustata (2012) on the presymbolic state of adolescents with pronounced magical thinking. More archaic mechanisms are recruited for their processing, magical thinking among them. The understanding of others' emotions was also associated with magical thinking, but this process draws not only on internal cognitive resources but also on external perception, which functions as a compensatory mechanism and attenuates the association overall. This is consistent with the conclusions of Eddy and Hansen (2021) on the selective character of difficulties affecting the perceptual component of emotional intelligence while cognitive empathy remains intact, and with the findings of Canli et al. (2015) on reduced accuracy of facial-expression emotion recognition in adolescents with magical ideation. Within intrapersonal emotional intelligence, the most pronounced associations involved Understanding Own Emotions, the component most directly tied to internal cognitive analysis of affective states.

Magical thinking and behavioral control operate within a shared field of emotional-tension management. Whereas behavioral control integrates emotional tension into a system of conscious self-regulation, magical thinking addresses affect through the sense of influencing the outcome of events, of reducing anxiety, and of restoring the intelligibility of the surrounding world by means of omens, rituals, and appeals to fate. This is consistent with Bayramova and Enikolopov's (2021) notion of "productive illusions" that render the world commensurate with the person, and with Stoyanova's (2007) conception of prelogical defense as a system that stabilizes personality and shields it from anxiety. Emotional Control, which reflects the capacity to cope with affective tension, displayed the most pronounced association with magical thinking among all components of behavioral control. Cognitive Control reflects the capacity to analyze the environment and construct mental schemas that may be filled with either magical or rational content, but the process itself is neutral with

respect to magical thinking. Volitional Control showed only a single, weak association with magical thinking, involving Superstition, since it is tied to drawing upon psychic resources rather than to choosing strategies of engagement with emotional experience. This pattern is paralleled by Vetrova's (2009) findings on the uneven development of behavioral-control subsystems, in which volitional control remains relatively stable across adolescence. Total Behavioral Control similarly correlated only with Superstition, indicating that the general regulatory system is responsive only to the most behaviorally loaded component of paranormal belief.

The two emotion-regulation scales operate at different points of the emotional process and therefore affect different types of paranormal belief. Cognitive Reappraisal intervenes at the stage of construing the situation by offering an alternative interpretation of the event, whereas Expressive Suppression acts later, at the stage of expression of an already-arisen emotion, and, when used consistently, restricts access to affective-bodily signals themselves. Spiritualism and Extraordinary Life Forms describe the admission of a hidden reality that includes spirits of the dead, beings unknown to science, and other forms of life, as well as the possibility of contact with them. The strongest channel for perceiving the otherworldly is open access to affective-bodily and imagistic impressions. Expressive Suppression, as a habitual strategy of holding emotions in, gradually narrows this channel, and the ground for such impressions diminishes. This is consistent with the findings of King et al. (2007), according to which belief in ghosts and extraordinary beings is particularly closely associated with reliance on the experiential system of thinking. The intersection between emotional intelligence and behavioral control is Emotion Regulation, since it represents the step at which understanding is converted into regulation. The association of magical thinking with this scale shows that both spheres are involved and demonstrates their inseparable proximity. An association of magical thinking with one of them spreads naturally to the other, and its influence must therefore be considered jointly. Cognitive mechanisms displayed differential sensitivity to magical thinking depending on whether they operated autonomously or were embedded in the service of emotional processing. The emotional-regulatory system thus emerges as the area of adolescent psychic life in which magical thinking is most consistently present.

Moral disengagement, which rests on cognitive devices that loosen moral constraints,

and magical thinking share the same causal error. Both substitute the attribution of responsibility through an associative replacement of causal links, reproducing the logic of the laws of similarity and contagion described by Frazer (2009). Rational justification, by contrast, requires the matching of true premises with true conclusions and is constructed only after the moral judgment has been delivered, which makes it difficult to displace the authorship of an action outside the agent. A rational view of one's own moral transgressions is painful for self-awareness, as it can undermine the internal self-image, and the psyche defends itself by shifting causal authorship onto higher powers and resorting to prelogical defenses (Stoyanova, 2007). Moral judgments are largely generated intuitively, as shown by Haidt (2012), who described the hundreds of rapid moral judgments that a person makes daily without rational justification. Magical thinking, which belongs to the same mode of processing, is readily incorporated into moral evaluation. Displacement of Responsibility finds direct support in a fatalistic worldview that locates the source of events beyond human will, which is consistent with the data of Au and Savani (2019) on belief in fate as a way of dealing with constraints, turning one's own actions into something incapable of affecting the course of things. The opacity of dominating circumstances heightens the need for protection, and the responsibility for what occurs is transferred onto these unintelligible, uncontrollable forces. Advantageous Comparison, in turn, evaluates not the act itself but the act set against a heavier one, introducing into the moral evaluation a variable that replaces direct analysis. Both devices admit a wide repertoire of properly magical means, from entrusting the outcome to providence to ritual "cleansing" of guilt, and cover the moral situation from two poles. This corresponds to the four points of the self-regulatory system described by Bandura et al. (1996), at which the mechanisms of moral disengagement operate, since Displacement of Responsibility relocates the question of the agent of the action, whereas Advantageous Comparison relocates the question of its gravity.

Moral Justification was not associated with magical thinking. This device requires the reformulation of a harmful action as serving a higher aim, a cognitively costly operation that presupposes the construction of a coherent argument, and the goal-directed character of such reasoning hinders the incorporation of paranormal beliefs. Dehumanization showed no associations with any subscale of paranormal

belief. Paranormal beliefs, despite cultural influence, rest substantially on individual-psychological and biological foundations, whereas Dehumanization belongs primarily to the sociocultural domain, as emphasized by researchers stressing the need to take sociohistorical factors into account in the study of dehumanization (Haslam, 2006; Kronfeldner, 2021). These processes belong to different levels of psychic organization and did not intersect in the present study.

Moral Self, which reflects the place of moral content in self-awareness, was negatively associated with magical thinking. Pronounced paranormal beliefs are accompanied by active use of moral-disengagement devices, and the divergence between judgment and action thereby created is incompatible with retaining moral qualities at the core of identity, which Blasi (1984) regarded as the principal motivator of moral behavior. Moreover, magical views locate causality outside, whereas Moral Self requires internal agency, the sense that it is one's own decisions that determine who one is. Moral Integrity, which reflects adherence to moral principles in actual behavior, was, on the contrary, positively associated with magical thinking. An adolescent with pronounced paranormal beliefs may follow rules at the conventional level described by Kohlberg et al. (1983) as the grounding of moral judgments in the expectations of close others and in the maintenance of social order, reproducing the norms of the immediate environment without their deep internalization. This is not a contradiction with the negative association involving Moral Self but rather reflects two levels of norm-following alongside weak inner endorsement.

Traditional Religious Belief showed a twofold pattern of relations with the moral domain. On the one hand, religious systems are tied to moral prescriptions, set a moral framework, and strengthen moral behavior through representations of a supernatural observer capable of punishing and rewarding, a position supported by the data of Purzycki et al. (2016) on the influence of moralizing-god representations on prosocial behavior. On the other hand, religion employs devices similar to those of moral disengagement, since responsibility is shifted from the person onto an authority figure that defines what is good and what is bad and provides pathways for the remission of guilt (Stoyanova, 2007). A positive contribution is also made by belonging to a religious community, in which moral norms are transmitted through shared practices and a system of values. This position is supported by

data on the link between religiosity and prosocial behavior in adolescents (Hardy & Carlo, 2005) and by the concept of moral communities, according to which religious groups constitute a space that sets and maintains shared moral rules (Graham & Haidt, 2010). The positive association of Traditional Religious Belief with Moral Self differs from that of all other paranormal-belief subscales. Unlike Superstition, Witchcraft, or Precognition, religious affiliation contains a ready-made moral system that enters an adolescent's identity not as the result of inner work but as a part of an adopted tradition. This corresponds to the movement, described by Vygotsky (2008), from externally given moral patterns to internal personal forms, which proceeds through myth and symbol. The literature also contains data according to which belief in the supernatural is associated with greater adherence to moral norms (Atkinson & Bourrat, 2011).

Magical thinking, across all spheres, was associated not so much with psychic resources as such, as with the preference for a particular mode of engaging with experience. Where mature, conscious, and cognitively costly modes of engagement with information, emotions, or moral situations are insufficiently formed or not in demand, magical thinking takes their place. The replacement of causal links by associative ones affects primarily the processes directed inward and systematically relocates causality outward. These two vectors constitute a unified process in which magical thinking is found precisely where the adolescent is turned to the self and offers to shift the point of support beyond it. This is consistent with the findings on the tendency of paranormal belief to bypass the testing of one's beliefs as a moral requirement (Irwin et al., 2022). Two paranormal-belief subscales displayed features warranting separate consideration. Superstition consistently leads in the number and strength of associations across all three domains, since it represents the point at which magical thinking ceases to be a belief and becomes a behavior aimed at influencing the course of events. This pattern corresponds to the functional distinction made by Vyse (2014), who defined superstition as the intention to influence the course of events, as opposed to paranormal belief, which merely admits the existence of unexplained phenomena. It is through action that Superstition comes into contact with cognitive strategies, emotional regulation, and moral decisions. Traditional Religious Belief, in the structure of the instrument, shows the properties not of an individual psychological characteristic but of belonging to an institutional system whose

immediate domain of operation is the moral sphere. This finding is consistent with the view of Rosengren et al. (2000) of magical, scientific, and religious thinking as coexisting systems, each with its own logic and its own domain of application.

The picture obtained can be understood in the context of the gradual maturation of voluntary, conscious, and cognitively costly modes of experience processing during adolescence. Rational thinking, the readiness for cognitive complexity, the voluntary regulation of emotions, and explicit moral justification develop dynamically in adolescence. Frydenberg (2019) noted the gradual acquisition by adolescents of access to cognitive coping strategies such as reappraisal and internal distraction. Vetrova (2009) demonstrated the uneven maturation of behavioral-control subsystems. During the period when these modes are not yet fully formed, magical thinking retains substantial presence in the adolescent's psyche. At the same time, it is not eliminated with age but continues to operate as an automatic system of experience processing that coexists with the rational one. Development consists not in the elimination of magical thinking but in the growing ability to differentiate the two planes.

The observed differences between boys and girls lay in the character of the relations of the rational and intuitive scales with magical thinking and, possibly, in differing degrees of trust in one's own intuition. Boys appear to separate paranormal beliefs from rational analysis and from logical intuition, not incorporating them into the associative processing of implicit experience. Girls, by contrast, appear to weave paranormal beliefs into the intuitive mode of thinking, including its holistic form, in which disparate signals merge into an integral experience of belonging, for example, through Spiritualism and Traditional Religious Belief. This is consistent with Epstein's (2003) notion of the experiential system as an automatic, associative, affect-driven mode of experience processing that serves as a source not only of adaptive decisions but also of superstitions and prejudices. In boys, magical content presumably provides a ready-made answer to uncertainty, and the readiness to continue searching is opposed to it in all forms of paranormal belief. This pattern is consistent with the investment theory of creativity by Sternberg and Lubart (2002), in which tolerance for uncertainty and the readiness to develop an idea despite environmental resistance are central creative resources. In girls, the association emerged selectively, only with those

subscales that involve action or a stated stance, and was absent for subscales defined through admitting the existence of phenomena.

The divergence in correlation patterns between boys and girls in emotional intelligence is likely related to different modes of processing emotional information. In boys, the emotional sphere appears to rely on cognitive recognition of experiences, where magical thinking is recruited only when internal analysis is insufficient. In girls, the emotional sphere appears to operate more often in a prereflective mode that does not require cognitive analysis of experience and therefore coexists with magical thinking without mutual pressure. The assumption of different modes of interaction between cognition and emotion is consistent with Brushlinsky's (2003) principle of the non-disjunctivity of mental processes, according to which the emotional and the cognitive do not exist separately and can be distinguished only in abstraction. The observed sex difference is consistent with Vetrova's (2012) data showing that the gender specificity of emotional intelligence in adolescents is manifested not in level but in the manner in which emotional capacities are integrated into the system of adaptation. In boys, volition is more often directed outward, toward overcoming and goal attainment, and magical thinking may function for them as an alternative way of acting upon the world through appeal to unseen forces that does not require one's own effort. This opposition is also reflected at the cultural level in the symbolism of the warrior and the magician as two non-overlapping male roles. In girls, self-regulation and paranormal belief appear to occupy different planes of the psyche: the former pertains to the management of oneself and one's relationships, the latter to representations of the world and its hidden forces.

The positive association of Expressive Suppression with Psi-abilities in girls is likely to arise at the intersection of two features of female emotional life at this age. Restrained personal experience combined with the urge to read the experience of the other generates a need for a nonverbal mode of mutual understanding, for which real social perception does not always provide sufficient grounds. Belief in Psi-abilities, which admits the possibility of telepathy, mind reading, and the transmission of states without words, becomes a symbolic resolution of this need. This pattern is consistent with the data of Williams et al. (2022) on the central role of emotional reasoning among the cognitive biases predicting paranormal beliefs, where experience serves as an argument for the truth of a judgment. In adolescent boys, socialization

tolerates a wider range of behavioral expressions that come into conflict with the self-image of being a good person. Magical thinking and moral disengagement appear to operate in the service of preserving an integral positive self-image, and the overall dynamic of these mechanisms combines the externalization of causality of actions with their justification from within. This pattern is consistent with Moore's (2015) characterization of moral disengagement as a stable individual propensity that determines how readily a person justifies morally ambiguous acts for oneself. Advantageous Comparison allows for the construction of an abstract image of a substantially heavier act that requires no empirical verification. The creation of an unverifiable mental entity and its use as if it were real belong to the same cognitive errors that underlie magical thinking. This parallel is consistent with the mechanism described by Shweder (1977), in which conceptual similarity between objects is taken as an indicator of their actual relatedness, and correlation is replaced by association. The intersection of these errors likely produces the strongest association in the entire study. In girls, paranormal beliefs in Psi-abilities, Witchcraft, and Superstition, which endow the other with hidden inner content, appear to restrain the adolescent from Dehumanization, which strips the other of inner personal qualities. This pattern is consistent with Hoffman's (2000) theory of empathy as the foundation of moral behavior, tracing its path from the early infant response to mature compassion capable of guiding prosocial behavior and supporting a sense of justice. Religious belief within an institutional framework contains a ready-made moral code whose internalization rests on the adolescent's turning to inner content, a turning more pronounced in girls than in boys, so that religious attitudes become more fully a part of moral self-perception. The quantitative difference in correlations between boys and girls is likely determined by differences in the modes in which magical thinking is integrated into psychic structure. In most domains, comparable levels of psychological characteristics produced fundamentally different correlation pictures. The causes of the differences may include factors of gender-related cultural socialization and the predominant orientation of boys toward action in the external world and of girls toward internal processes. The greater integration of paranormal beliefs into personality in boys is consistent with the data on the positive association of the masculine gender role both with belief in the paranormal and with paranormal experience (Spinelli et al., 2002).

4.2. Regression Analysis

The three predictors with the strongest evidence for inclusion differ in the source to which the subject turns. Experiential Engagement, as reliance on a rapid associative response, is oriented toward one's own inner sensation. Displacement of Responsibility, which relocates the cause of an action to circumstances, and Advantageous Comparison, which evaluates an act through contrast with a heavier one, are oriented outward. What these three scales have in common is an epistemic style of accepting information without verification. In Experiential Engagement the cognitive evaluation of a sensation is bypassed, in Displacement of Responsibility the analysis of personal contribution, and in Advantageous Comparison the moral analysis of the act. The mechanisms of moral disengagement in Bandura's conception represent cognitive operations of constructing justification (Bandura et al., 1996). In the present study, however, they are treated as a stable disposition to accept the result of these operations as true without verification, a treatment consistent with Haidt's (2012) view of the intuitive nature of moral judgments. Magical thinking shapes such an approach to information into an integral worldview, in line with the conception of metacognitive trust in intuition proposed by Van Mulukom et al. (2024). This substantive correspondence makes these three predictors a natural foundation for the prediction of paranormal belief. Volitional Control became a stable positive predictor only when the remaining variables of the model were taken into account, at which point a specific contribution emerged within it that was not overlapped by the other self-regulation scales. The unique component of Volitional Control, as the capacity for the goal-directed maintenance of action, is necessary for the realization of magical practices such as observing omens, performing rituals, and following astrological recommendations. With equal values on the three strongest predictors, an adolescent with higher Volitional Control possesses the resource to translate the magical mode of engaging with the world into stable behavior. This is consistent with the view of magical thinking as a coping strategy that is not reducible to belief and requires active reproduction (Bayramova & Enikolopov, 2021), as well as with the view of rituals as practices that demand and train self-control (Hobson et al., 2018). The behavioral enactment of belief through omens, rituals, and charms makes it most dependent on volitional resources. Direct empirical confirmation of a positive association between Volitional Control and paranormal

belief was not found in the literature. In contrast, in a college-student sample, lower self-control was shown to be a significant predictor of greater endorsement of such beliefs (Mowen et al., 2022). The pattern obtained in the present study may reflect the specificity of adolescence or of the particular component of self-regulation on which the instrument places emphasis, and requires further verification.

For Psi-abilities, additional stable contributions were observed for Rational Engagement, which constitutes a disposition toward analysis and counteracts belief at the level of its very possibility, and for Cognitive Reappraisal, which intercepts the mystical experience at the stage of forming an emotional response. This is consistent with the data of Stanovich and West (2002), according to whom the classical errors of intuitive judgment are attenuated by the work of analytical thinking as an actualizable resource that includes the disposition to reflection. For Superstition, additional stable contributions were observed for Risk-taking, as the readiness to accept uncertainty without ritual guarantees, and for Moral Justification, as an active search for meaning that is incompatible with the passive application of a ready external form. This is consistent with the data of Rudski and Edwards (2007), according to whom ritual practices create an illusion of control and reduce subjective uncertainty regarding the outcome, as well as with Bandura et al.'s (1996) characterization of moral justification as a cognitive reconstruction of an action that requires the construction of a coherent argument. For Precognition, additional stable contributions were observed for Cognitive Reappraisal and Risk-taking, reflecting the epistemic and behavioral aspects already identified in the previous subscales. The posterior inclusion probabilities of both additions are lower than in the source subscales, which is consistent with the hybrid nature of Precognition, in which neither logic is represented in pure form. For Spiritualism and Extraordinary Life Forms, an additional stable contribution was observed for Expressive Suppression. The regression reproduces the correlation pattern in which Expressive Suppression narrows the channel of formation of belief in a hidden reality. The stability of this predictor across both subscales confirms the non-random character of the association. For Traditional Religious Belief, an additional stable contribution was observed for Moral Self, the only positive direction among all subscale-specific additions. This is consistent with the previously established line according to

which Traditional Religious Belief displays the properties of belonging to an institutional system that contains a ready-made moral code, which enters an adolescent's self-awareness as a part of an adopted tradition. For Witchcraft, stable contributions were observed only for two of the three strongest predictors, Advantageous Comparison and Experiential Engagement. No subscale-specific additional predictors were identified, and its structure is fully accounted for by the general mechanisms operating at the level of the strongest predictors. Magical thinking thus emerges as a stable architecture in which a common foundation remains constant, while additional predictors are differentiated according to the content of belief, reflecting the vulnerability of each of its forms to alternative psychological resources.

4.3. Limitations and Future Directions

The cross-sectional design does not allow age-related changes to be separated from cohort effects and provides no access to the individual dynamics of magical-thinking development. The predominance of self-report instruments limits access to content that is poorly reflected upon or lacks verbal form in adolescence. Regression analysis was conducted only on the full sample. The correlation analysis carried out separately for boys and girls revealed fundamentally different patterns of integration of magical thinking into the psyche of adolescents of the two sexes, which renders the conclusions of the full-sample correlation and regression models potentially imprecise at a more localized level of analysis. Magical thinking represents a basic, evolutionarily early mode of making sense of reality and one of the initial forms of cognition, which makes its study a substantive part of psychological science. The findings on the associations and predictors of magical thinking in adolescents open the way for moving from the description of the phenomenon to the study of its mechanisms and for clarifying why precisely these characteristics prove to be relevant and what role they play in the transformation of magical thinking across ontogenesis. Further steps in this direction include a longitudinal study, which would make it possible to trace the individual dynamics of magical thinking in the same adolescents and to separate age-related changes from cohort effects. An extension of the age range to childhood and early adolescence would clarify how magical thinking is transformed from a predominantly adaptive mechanism of childhood into a phenomenon of ambiguous functions in adulthood. Separate regression analyses for boys and girls would allow distinct predictive models to be

constructed and would test the extent to which the predictors with the strongest evidence for inclusion are preserved in each subgroup. A separate direction is constituted by a typological analysis of the sample by the character of paranormal belief, which would make it possible to identify stable subgroups and to test the extent to which the general patterns apply to each of them.

5. Conclusion

Empirical support was obtained for both research hypotheses. Magical thinking in adolescence was found to be associated with characteristics of the cognitive, emotional, regulatory, and moral spheres of the personality, and stable predictors of paranormal belief were identified among the psychological characteristics of adolescents. The correlation analysis indicated that magical thinking in adolescence is accompanied by reliance on the intuitive mode of information processing, by reduced engagement with rational strategies, and by lower levels of creativity. In the emotional and regulatory domain, it is associated with less developed understanding of one's own emotions, with less pronounced emotional control of behavior, and with less active recourse to strategies of emotion regulation. In the moral sphere, magical thinking is associated with greater readiness to draw on mechanisms of moral disengagement. The associations described above are not intended to characterize the individual profile of any particular adolescent and instead allow the listed characteristics to be regarded as interrelated elements of a single picture in which magical thinking occupies a regular place. Regression analysis identified Experiential Engagement, Advantageous Comparison, and Displacement of Responsibility as the predictors with the strongest evidence for inclusion, united by a shared epistemic basis in which a judgment is accepted without subsequent verification, whether of an immediate impression, of a causal connection, or of a moral evaluation. Volitional Control was additionally identified as a resource that allows magical thinking to be carried over into stable behavior in situations requiring active engagement.

Magical thinking in adolescence is thus revealed not as a deficit of psychic resources but as a preference for a particular mode of information processing, one bound to immediate affect and evolutionarily shaped as a way of coping with the unpredictability and uncontrollability of the surrounding world. During the period in which voluntary, conscious, and cognitively costly modes of experience

processing are only being formed, this mode of processing occupies a broad place in the adolescent's psyche and is manifested simultaneously in cognitive, emotional, regulatory, and moral characteristics. These findings have implications for educational interventions: fostering analytical thinking, emotional regulation, and moral reasoning may help adolescents navigate the balance between intuitive and rational processing, reducing reliance on magical thinking when it is maladaptive.

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Highlights:

- Adolescent magical thinking is associated with intuitive over rational processing, lower creativity, and reduced emotional regulation.
- Experiential Engagement, Advantageous Comparison, Displacement of Responsibility are the strongest predictors of paranormal belief, with Volitional Control as an additional predictor.
- Sex differences reveal broader integration of magical thinking in boys (201 correlations) than in girls (93), with distinct patterns across psychological domains.
- Magical thinking in adolescence functions as an affect-driven, evolutionarily shaped coping strategy, not a cognitive deficit.

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Психологические особенности магического мышления в подростковом возрасте

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Резюме. *Актуальность и проблема.* Магическое мышление представляет собой одну из ранних форм осмысления реальности, сохраняющуюся в психике современного взрослого человека. Связь магического мышления с когнитивными, эмоциональными, регуляторными и моральными характеристиками личности зафиксирована в отдельных исследованиях, однако имеющиеся данные носят фрагментарный характер, а подростковый возраст остаётся практически не представленным в научной литературе. *Цель.* Настоящее исследование направлено на комплексное изучение особенностей магического мышления в подростковом возрасте. Проверяется предположение о том, что магическое мышление связано с психологическими характеристиками из разных сфер психики, а также о наличии значимых предикторов среди психологических особенностей подростков. *Методы.* В исследовании приняли участие 300 подростков в возрасте 14–17 лет (148 юношей, 152 девушки). Применялись восемь стандартизированных методик самоотчёта, измеряющих веру в паранормальное, когнитивные стили, креативность, эмоциональный интеллект, контроль поведения, эмоциональную регуляцию, моральное отчуждение и моральную идентичность. Статистическая обработка включала ранговые корреляции Спирмена (на полной выборке и отдельно по полу), а также регрессионный анализ методом усреднения байесовских моделей (ВМА). *Результаты.* Магическое мышление положительно коррелировало с интуитивным стилем мышления ($\rho = 0,234, p < ,001$) и отрицательно — с рациональным стилем ($\rho = -0,248, p < ,001$), креативностью ($\rho = -0,230, p < ,01$), эмоциональным интеллектом ($\rho = -0,223, p < ,01$), когнитивной переоценкой ($\rho = -0,193, p < ,01$) и моральной самостью ($\rho = -0,223, p < ,01$), обнаруживая при этом положительные связи с механизмами морального отчуждения ($\rho = 0,303, p < ,001$).

Регрессионный анализ методом ВМА ($R^2 = ,32$) выделил использование интуиции, выгодное сравнение и смещение ответственности как предикторы с наиболее сильными свидетельствами в пользу включения ($PIP = 1,00$); волевой контроль выступил дополнительным предиктором ($PIP = ,62$). Половые различия проявились в том, что у юношей была выявлена 201 значимая корреляция против 93 у девушек. *Заключение.* Магическое мышление в подростковом возрасте представляет собой не когнитивный дефицит, а предпочтение аффективно-ориентированного способа обработки информации, эволюционно сформировавшегося как механизм совладания с непредсказуемостью. Полученные результаты имеют практические импликации для разработки образовательных интервенций, направленных на развитие критического мышления и морального суждения у подростков.

Ключевые слова: магическое мышление, вера в паранормальное, подростковый возраст, когнитивные стили, эмоциональный интеллект, моральное отчуждение

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Medical Discourse as a Domain for Representing Rational and Irrational Worldviews: A Comparative Linguistic Study

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Abstract. *Relevance and problem.* The opposition between rational and irrational modes of cognition is a foundational dichotomy in philosophy and cognitive science. However, its specific linguistic manifestations in institutional communication, particularly in healthcare, remain insufficiently explored. Given that medical encounters often involve diverse epistemological frameworks, understanding how these worldviews are encoded in language is critical for improving cross-epistemological communication. Previous research has examined rational and irrational worldviews separately in various disciplines, but systematic comparative analysis of their linguistic realisations within the same discursive domain – medical discourse – is lacking. This gap hinders our ability to identify and address communicative breakdowns that may arise from worldview-based differences in information encoding and interpretation. *Objective.* This study aims to identify and describe the linguistic and discursive features that distinguish the expression of rational versus irrational worldviews in Russian-language medical discourse, focusing on two typical communicative situations: product description and consultant-client interaction. *Method.* The study employs a qualitative comparative discourse-analytic approach. Data include (1) official product descriptions of a conventional pharmaceutical (Paracetamol) and a traditional Tibetan remedy (Rinchen Radna Sampel), and (2) transcripts of authentic consultant-client dialogues in a Tibetan medicine clinic. Analytical procedures involved lexicographic definition analysis, componential semantic analysis, and systematic comparison of discourse features across multiple linguistic levels (lexical, syntactic, and pragmatic-discursive). *Results.* Systematic differences were found across all levels. The rational worldview discourse is characterised by precision in dosage, explicit specification of pharmacological mechanisms, systematic inclusion of standardised informational categories (pharmacokinetics, contraindications, drug interactions), and reliance on empirical authority (WHO). In contrast, the irrational worldview discourse exhibits pervasive 'communicative indeterminacy': (a) extensive use of lexemes with vague referential semantics and strong connotative load; (b) systematic omission of obligatory informational blocks; (c) universalised and generalised claims of efficacy; (d) stylistic eclecticism mixing scientific terminology with religious-magical elements; and (e) appeals to non-empirical authority (spiritual tradition, personal experience, auspicious timing). *Conclusion.* The findings support the notion of 'linguistic insufficiency' – the inability of standard rational language to fully encode non-rational content. This leads to a distinct discursive profile marked by indeterminacy and reliance on metaphor, symbol, and context-dependent interpretation. The study contributes to discourse theory by operationalising worldview differences at the linguistic level and offers practical insights for healthcare communication across epistemological divides.

Keywords: Discourse, Worldview, Rationality, Irrationality, Medical Discourse, Linguistic Indeterminacy, Referential Semantics, Traditional Medicine

1. Introduction

The rational and irrational worldviews represent two fundamentally different modes of perceiving, interpreting, and explaining reality. The rational approach is grounded in logic, empirical evidence, and causal determinism, whereas the irrational worldview draws upon intuition, faith, emotional experience, mysticism, and symbolic thinking. This dichotomy has been extensively studied in philosophy (e.g., Lévy-Bruhl, 1910; Cassirer, 1944), anthropology (e.g., Horton, 1967),

psychology (e.g., Epstein, 1994), and sociology (e.g., Weber, 1922). However, its linguistic manifestations have received comparatively less attention, particularly within the domain of institutional discourse.

Since language is the primary medium for encoding, storing, and transmitting knowledge, the opposition between rational and irrational cognition should be reflected in systematic differences in communicative behaviour. This premise aligns with the Sapir-Whorf hypothesis

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of linguistic relativity (Whorf, 1956) and with more recent work on linguistic construal of reality (Langacker, 1987; Talmy, 2000). In healthcare contexts, where accurate transmission of medical information is crucial, the clash between these worldviews can lead to miscommunication, non-adherence, and dissatisfaction (Kleinman, 1980; Helman, 2007). Liao (2024) further notes that physicians often misunderstand or dismiss patient perspectives as irrational, particularly in pluralistic societies where cultural worldviews diverge significantly. This cultural gap underscores the need for systematic investigation of how different epistemological frameworks are encoded in language. Therefore, identifying the specific linguistic markers of each worldview is both theoretically and practically important.

Medical discourse, defined as institutional communication between healthcare professionals and patients (Shuravina, 2013), provides an ideal site for such investigation. Within this broad category, pharmaceutical discourse – the language of medication description and counselling – is particularly revealing because it condenses key information about diagnosis, treatment, and prognosis into standardised formats (Burova, 2008; Nosova, 2012; Fedosova & Koroleva, 2018). Comparing descriptions of conventional (evidence-based) remedies with those of traditional (e.g., Tibetan) medicines can illuminate how different epistemological frameworks shape not only what is said but also what is left unsaid. Recent research by Wei and Mao (2023) demonstrates that in Traditional Chinese Medicine consultations, even seemingly peripheral discourse elements such as "small talk" play a significant role in constructing therapeutic relationships and managing uncertainty. This finding resonates with the present study's focus on how non-rational elements permeate medical communication.

Despite the growing interest in medical discourse analysis (e.g., Gotti, 2013; Candlin & Candlin, 2002; Skelton & Hobbs, 2010), few studies have systematically compared the linguistic encoding of rational versus irrational worldviews within the same discursive domain. Existing work tends to focus either on the rhetoric of evidence-based medicine (e.g., Daly, 1999) or on the discourse of alternative medicine (e.g., Kaptchuk & Eisenberg, 1998; Broom, 2008), but rarely juxtaposes them using a consistent analytical framework. Moreover, while scholars have noted that alternative medicine discourse often employs vague, metaphorical language (e.g., Siahpush, 2000),

the precise linguistic mechanisms – lexical, syntactic, and pragmatic – remain underexplored.

Bosco (2021) critically examines public discourses about science and health, arguing that simplistic interpretations pitting the rational against the irrational obscure the ambivalences that have always surrounded scientific representation. This perspective reinforces the need for more nuanced analytical approaches that can capture the full complexity of medical discourse without reducing it to binary oppositions. Furthermore, Cox et al. (2025) demonstrate that patients generally prefer greater communication of diagnostic uncertainty, even when such communication generates worry. This finding challenges the assumption that rational medical communication should minimise uncertainty and instead suggests that strategic use of indeterminacy may serve important communicative functions – a possibility that aligns with the concept of 'communicative indeterminacy' proposed in the present study.

The present study addresses this gap by asking the following research questions:

RQ1: What are the systematic linguistic differences between rational and irrational worldview expressions in the two typical communicative situations of (a) product description and (b) consultant-client interaction?

RQ2: How do these differences manifest at lexical, syntactic, and pragmatic-discursive levels?

RQ3: Can the concept of 'communicative indeterminacy' serve as a unifying framework for describing the linguistic profile of irrational-worldview discourse in medical contexts?

The aim of this study is to identify and describe the linguistic and discursive features that distinguish rational from irrational worldviews in Russian-language medical discourse. The specific objectives are: (1) to compare product descriptions of a conventional pharmaceutical and a traditional Tibetan remedy; (2) to analyse authentic dialogues between consultants and clients in a Tibetan medicine clinic; (3) to synthesise the findings into a coherent typology of linguistic markers; and (4) to propose the concept of 'communicative indeterminacy' as an explanatory framework.

2. Methods

2.1. Research Design

This study employs a qualitative comparative discourse-analytic approach, following the

principles of discourse analysis as outlined by Fairclough (1992) and Gee (2014), combined with systematic lexicographic and componential semantic analysis. The design is cross-sectional and comparative, with two units of analysis: (a) product descriptions and (b) consultant-client dialogues.

2.2. Material

The material consisted of two data sets:

Data Set 1 (product descriptions):

- Official package insert of Paracetamol (registration number LSR-000062, 200 mg tablets), sourced from the Russian State Register of Medicines.
- Promotional description of Rinchen Radna Sampel ('Precious Wish-fulfilling Jewel'), a poly-component Tibetan medicinal pill, as provided by the Tibetan Medical and Astrological Institute (Men Tsee Khang, Dharamsala, India). The text was officially translated into Russian and distributed to clients.

Data Set 2 (consultant-client interactions):

- Recorded and transcribed dialogues (3 interactions, total duration approx. 25 minutes) between a receptionist (consultant) and prospective clients at a Tibetan medicine centre in a Russian city. The dialogues were naturally occurring and were transcribed verbatim using the conventions of conversation analysis (Jefferson, 2004).

2.3. Analytical Procedure

The analysis proceeded in three stages:

Stage 1: Lexicographic and componential analysis. Key lexical units (e.g., *лекарство* 'medicine', *противоядие* 'antidote', *драгоценный* 'precious', *уникальный* 'unique') were examined using the 4-volume Dictionary of the Russian Language (Evgenieva, 1981-1984) to identify their denotative and connotative components.

Stage 2: Structural comparison of product descriptions. Both texts were segmented into the standard informational categories typical of pharmaceutical discourse (active ingredient, dosage form, pharmacological action, pharmacokinetics, indications, contraindications, etc.). The presence/absence and the content quality of each category were

Table 1. Comparison of Informational Categories in Product Descriptions

Category	Paracetamol	Rinchen Radna Sampel
Active ingredient / composition	Explicit (paracetamol, 200 mg)	Vague (86 components; "metals, minerals, herbs" without specification)

recorded in a comparison matrix (see Table 1, Results).

Stage 3: Discourse-pragmatic analysis of dialogues. The transcribed dialogues were coded for:

- Referential specificity (e.g., precise vs. vague expressions)
- Use of evaluative and emotionally charged lexis
- Type of authority invoked (empirical, traditional, personal)
- Presence of standard procedural information (e.g., required documents, preparation instructions)
- Stylistic hybridity (mixing of scientific and religious-magical registers)

Two independent coders (the author and a trained research assistant) performed the coding, with inter-coder agreement of 87%; disagreements were resolved through discussion.

2.4. Operational Definitions

For the purpose of this study, *rational worldview discourse* is defined as communication that (i) explicitly invokes empirical evidence and cause-and-effect reasoning, (ii) provides specific, quantifiable information (dosage, time, percentages), (iii) includes standardised contraindications and safety warnings, and (iv) refers to verifiable sources (WHO, clinical trials).

Irrational worldview discourse is defined as communication that (i) relies on non-empirical authority (tradition, spiritual teachers, personal intuition), (ii) uses vague, generalised, and metaphorical expressions, (iii) omits or obscures standard safety and efficacy information, and (iv) incorporates elements of religious or magical thinking.

These definitions were applied consistently across both data sets.

3. Results

3.1. Comparative Analysis of Product Descriptions

Table 1 summarises the presence/absence and quality of standard informational categories in the Paracetamol and Rinchen Radna Sampel descriptions.

Category	Paracetamol	Rinchen Radna Sampel
Dosage form	Clear (tablets)	Not specified
Pharmacological action	Detailed mechanism (inhibition of prostaglandin synthesis)	Absent
Pharmacokinetics	Quantitative data (Cmax, T1/2, protein binding)	Absent
Indications	Specific, with ICD-10 codes	Broad, heterogeneous list (neurological, cardiovascular, "wind diseases", "defilements")
Contraindications	Explicit (hepatic impairment, alcoholism, hypersensitivity)	Absent
Dosage regimen	Precise by age, weight, frequency	Vague ("once a month", "3-4 times a year", "may increase")
Adverse effects	Listed by organ system	Denied ("practically no side effects" if used correctly)
Drug interactions	Extensive	Absent
Special populations	Detailed advice	Absent
Storage	Temperature, light protection	Vague ("not in light, fridge, damp"; "special box")
Additional evaluative elements	None	"Unique", "precious", "treasure", "ritual preparation", "mantras"

As Table 1 shows, the Paracetamol description conforms to the standard template of evidence-based pharmaceutical discourse, with all obligatory categories present and quantified. In contrast, the Rinchen Radna Sampel description lacks most of these categories; where information is provided, it is often generalised and lacks precise referents. Moreover, the latter includes elements that are alien to standard pharmaceutical discourse, such as ritual instructions (taking the pill on auspicious lunar days, chanting mantras) and strong evaluative language ("greatest treasure").

Further analysis of the indication lists: The Paracetamol indications map directly onto the pharmacological action (analgesic, antipyretic). The Rinchen Radna Sampel

indications, however, are extremely broad: they cover conditions ranging from neurological disorders (parkinsonism, multiple sclerosis) to malignant neoplasms ("early stages of cancer"), and include categories that resist medical classification, such as "diseases caused by evil spirits", "battles of blood and wind", and "stupidity". This breadth and lack of specificity make the remedy seemingly applicable to almost any condition, a rhetorical strategy that increases its perceived utility without empirical grounding. This pattern of universalised claims is consistent with findings by Markelova and Novikova (2021), who demonstrate that the conceptual sphere of "health–disease" varies significantly across cultural contexts and is shaped by culturally specific value systems.

3.2. Analysis of Consultant-Client Dialogues

The analysis of the three transcribed dialogues revealed the following recurrent features, which were systematically absent in standard evidence-based consultations:

Indeterminacy in diagnostic description: The consultant frequently used hedging and vague expressions when explaining the practitioner's methods: "He does pulse diagnostics... well, I find it hard to say exactly...", "so that they can feel you" (instead of a precise physical examination description).

Vagueness about costs and duration: Costs were presented as ranges with multiple qualifiers: "approximately, roughly speaking, about four-five thousand"; "it depends on the number of pills". This allows flexibility in pricing but undermines transparency.

Authority based on personal trust rather than evidence: Reassurances relied on the practitioner's reputation and personal experience: "He wouldn't prescribe anything harmful, that's certain"; "I had a feeling that I was assembled from small pieces". No mention was made of clinical trials, certifications, or empirical outcomes.

Absence of standard procedural information: When clients asked about necessary documents (passport, medical insurance) or specific preparations, the responses were evasive: "No, nothing is needed"; "If they put you on needles, you might bring a sheet... but we don't know". The consultant did not proactively provide a checklist of what to bring, what to wear, or whether to come fasting, which is standard practice in conventional clinics.

Stylistic eclecticism: The discourse mixed scientific terms (*leukemia, thrombosis*) with mystical concepts (*defilements, evil spirits, auspicious signs*). This blend creates a hybrid register that is neither purely medical nor purely religious, but leverages the authority of both domains. This stylistic hybridity echoes observations by Skelton, Murray and Hobbs (2022), who found that doctors and patients often use key terms ambiguously, allowing both parties to maintain different interpretations while preserving the appearance of shared understanding.

Promotion of immediate feedback: The consultant emphasised the availability of the practitioner via WhatsApp for any post-consultation issues, which, while reassuring, also suggests that the treatment may generate unpredictable side effects that require rapid intervention – a point not mentioned in the product description.

3.3. Summary of Linguistic Markers

Based on the two analyses, we propose a typology of linguistic markers for each worldview, organised by level:

Lexical level:

- *Rational:* precise terms with denotative stability (e.g., *парацетамол, 200 мг, ингибирование синтеза простагландинов*).
- *Irrational:* vague, metaphorical, and evaluative lexis (e.g., *борьба крови и ветра, сокровище, волшебный, слишком, практически*).

Syntactic level:

- *Rational:* conditional and cause-effect structures (*if X, then Y*); quantified nouns (*10-60 min, 500 mg*).
- *Irrational:* generalised and universal statements (*neutralises all types of poisons, helps with all head diseases*); modal hedges (*approximately, usually, can*).

Pragmatic-discursive level:

- *Rational:* systematic inclusion of standard information categories; explicit contraindications; reference to WHO or clinical data.
- *Irrational:* omission of categories; appeals to tradition, personal testimony, and spiritual authority; inclusion of ritual instructions; stylistic hybridity.

4. Discussion

The most striking finding is that the irrational-worldview discourse is consistently marked by what we term *communicative indeterminacy*. This is not merely a stylistic choice but appears to be a systematic response to a fundamental problem: the content to be conveyed – beliefs in spiritual forces, energy imbalances, karmic causality – resists encoding in the standard rational linguistic repertoire. The language, which is inherently designed to represent objective, intersubjectively verifiable states of affairs, proves inadequate for expressing subjective, mystical, and context-dependent experiences. This leads to a reliance on vague referential expressions (e.g., *too hot/cold, practically none*), evaluative overlays (e.g., *precious, unique*), and metaphorical extensions (*wind* as a disease agent).

This observation extends earlier work on referential indeterminacy by Paducheva (1985), who showed that many Russian expressions have fuzzy boundaries. In our data, indeterminacy operates not only at the level of individual referents but also at the level of entire informational categories: the absence of

pharmacokinetic data, for example, is not accidental but reflects the epistemological premise that such mechanistic explanations are irrelevant or even misleading.

Cox et al. (2025) provide complementary evidence from a different perspective: their empirical ethics study shows that patients often prefer greater communication of diagnostic uncertainty, challenging the assumption that medical communication should strive for maximum certainty. This finding suggests that indeterminacy in medical discourse may serve important functions beyond merely reflecting an irrational worldview – it can also be a strategic resource for managing complex clinical situations and patient expectations.

We adopt the term *linguistic insufficiency* (inspired by the earlier work on untranslatability in anthropology, e.g., Leach, 1976) to describe the situation where the conventional linguistic system lacks the resources to adequately represent the speaker's worldview. As a result, speakers must resort to:

- *Metaphor and analogy*: e.g., 'battle of blood and wind' to describe hypertension.
- *Symbolic actions*: e.g., reciting mantras, which are included as part of the 'instructions', though they have no pharmacological function.
- *Contextual and pragmatic clues*: the meaning of vague terms is negotiated anew in each interaction, relying on the client's willingness to accept the practitioner's authority.

This insufficiency is not a deficit but a creative adaptation: it allows the speaker to construct a coherent discourse that is internally consistent from the perspective of the irrational worldview, even though it would appear scientifically inadequate to an external observer. Wei and Mao (2023) similarly demonstrate that in Traditional Chinese Medicine consultations, seemingly peripheral discursive elements such as small talk serve important functions in building therapeutic relationships and managing the inherent uncertainties of clinical practice. This parallels the present study's finding that communicative indeterminacy is not merely a symptom of linguistic failure but can be a functional adaptation to the constraints of cross-worldview communication.

Our findings resonate with studies on alternative medicine discourse, such as Siahpush (2000), who noted that complementary medicine practitioners often use holistic and individualised language to differentiate themselves from 'reductionist' biomedicine. However, we extend this by providing a granular linguistic analysis that pinpoints specific markers (e.g., lexical vagueness, omission

categories) and links them to the cognitive/epistemological level.

Moreover, our study contributes to the broader literature on institutional discourse (Drew & Heritage, 1992) by showing that even within a single institution (healthcare), different sub-discourses can be governed by radically different epistemic principles, and these are systematically encoded in language. Liao (2024) reinforces this point by demonstrating that the cultural gap between physicians and patients in pluralistic societies often leads physicians to dismiss patient perspectives as irrational, when in fact these perspectives are rational within different cultural worldviews. This finding underscores the importance of recognising that what appears as "irrational" discourse may be perfectly coherent within its own epistemological framework.

The concept of communicative indeterminacy has potential applications beyond medical discourse. It may be relevant to legal discourse (where ambiguous laws are interpreted), political discourse (where vague promises are made), and even everyday conversation (where speakers strategically use vagueness to avoid commitment). Our study suggests that indeterminacy is not a failure of communication but a functional strategy for managing knowledge asymmetries and epistemic differences.

Furthermore, the findings support the idea that language is not a neutral tool but actively shapes the way we conceptualise and experience health and illness (Lakoff & Johnson, 1980). The use of metaphors in traditional medicine (e.g., *wind*, *heat*, *cold*) creates a coherent, albeit non-literal, model of the body that can be therapeutic in its own right (Kirmayer, 1996). Markelova and Novikova (2021) provide additional support for this view, demonstrating that the conceptual sphere of "health–disease" is culturally coded and varies significantly across linguistic and cultural contexts. This cultural variability reinforces the need for analytical frameworks that can accommodate different ways of conceptualising health and illness.

In clinical settings where patients hold traditional beliefs, healthcare providers need to be aware that their evidence-based explanations may be encoded in a very different linguistic framework. Misunderstandings can arise not only from vocabulary differences but from whole categories of expected information being absent or differently weighted. For example, a patient who asks about the 'dosage' may expect a specific number, but a traditional practitioner might respond with a ritual time (lunar day) instead.

Recognising such mismatches can improve patient-centred communication.

Bosco (2021) argues that moving beyond simplistic oppositions between rationality and irrationality in health discourse requires attention to the multiple dimensions involved in science communication. This perspective aligns with the practical implications of our study: effective healthcare communication requires not just translation between languages but between entire epistemological frameworks. Cox et al. (2025) further suggest that doctors should err on the side of greater diagnostic uncertainty communication, as withholding such information may deprive patients of information they value and exacerbate inequalities. This recommendation, while focused on diagnostic uncertainty, resonates with our argument that communicative indeterminacy can serve legitimate functions in medical discourse.

This study has several limitations. First, the data are limited to Russian-language interactions and two specific types of products; generalisation to other languages and medical traditions requires further research. Second, the dialogues were recorded in a single clinic; variation across practitioners and settings may exist. Third, the analysis is qualitative and descriptive; future quantitative studies could measure the frequency of indeterminacy markers and correlate them with patient outcomes.

Future research should also examine how patients with different worldviews respond to each type of discourse, and whether the linguistic patterns we identified are also present in written health information (e.g., websites, pamphlets) beyond the product insert. Longitudinal studies could investigate whether exposure to rational discourse can shift a patient's linguistic habits or vice versa. The growing body of research on diagnostic uncertainty communication (Cox et al., 2025) and cultural gaps in medical encounters (Liao, 2024) suggests that this is a fertile area for further investigation.

5. Conclusion

This study has demonstrated that medical discourse is a fertile ground for observing the linguistic expression of rational and irrational worldviews. Through systematic comparison of product descriptions and consultant-client interactions, we identified a constellation of features that characterize each worldview: precision, quantification, and empirical grounding for the rational; vagueness, evaluative lexis, omission of standard categories, and

incorporation of ritual elements for the irrational.

We proposed the concept of *communicative indeterminacy* as a unifying framework, arguing that it arises from the inherent insufficiency of rational language to encode non-rational content. This insight deepens our understanding of how language interacts with cognition and culture, and it has practical applications for improving healthcare communication across epistemological divides.

The study makes three main contributions:

1. It operationalizes the rational-irrational dichotomy at the linguistic level, providing a replicable analytical tool.
2. It introduces the concept of linguistic insufficiency, which can be applied to other domains of institutional discourse.
3. It offers practical guidance for healthcare professionals who encounter patients with different worldviews, highlighting the need for epistemic flexibility in communication.

Future work should extend this analysis to other languages and medical systems, and explore the dynamic aspects of worldview negotiation in real-time interactions.

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Highlights:

- Rational and irrational worldviews produce systematically different linguistic patterns in medical communication.
- Irrational worldview discourse is defined by 'communicative indeterminacy' – both explicit (vague reference, evaluative lexis) and implicit (omission of standard informational categories).
- The concept of 'linguistic insufficiency' explains why speakers resort to metaphor and symbolism when expressing non-rational content.
- The study provides a replicable analytical framework for cross-worldview comparison in institutional discourse.
- Results have practical implications for patient-practitioner communication in

multicultural and multi-epistemological healthcare settings.

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Медицинский дискурс как сфера репрезентации рациональной и иррациональной картин мира: сравнительное лингвистическое исследование

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Резюме. *Актуальность и проблема.* Противопоставление рационального и иррационального способов познания является фундаментальной дихотомией в философии и когнитивной науке. Однако его конкретные языковые проявления в институциональной коммуникации, особенно в здравоохранении, остаются недостаточно изученными. Поскольку медицинские взаимодействия часто вовлекают различные эпистемологические рамки, понимание того, как эти картины мира кодируются в языке, критически важно для улучшения кросс-эпистемологической коммуникации. Предыдущие исследования рассматривали рациональную и иррациональную картины мира по отдельности в разных дисциплинах, но систематический сравнительный анализ их языковых реализаций в рамках одного дискурсивного домена – медицинского дискурса – отсутствует. Этот пробел препятствует выявлению и устранению коммуникативных сбоев, которые могут возникать из-за различия в кодировании и интерпретации информации, обусловленных картиной мира. *Цель.* Настоящее исследование направлено на выявление и описание лингвистических и дискурсивных признаков, отличающих выражение рациональной и иррациональной картин мира в русскоязычном медицинском дискурсе, с фокусом на двух типичных коммуникативных ситуациях: описание продукта и взаимодействие консультанта с клиентом. *Метод.* Исследование выполнено в качественном сравнительном дискурс-аналитическом ключе. Материал включает (1) официальные описания продуктов – обычного фармацевтического препарата (парацетамол) и традиционного тибетского средства (Ринчен Радна Сампэл) – и (2) расшифровки аутентичных диалогов консультанта с клиентами в клинике тибетской медицины. Аналитические процедуры включали лексикографический дефиниционный анализ, компонентный семантический анализ и систематическое сравнение дискурсивных характеристик на нескольких языковых уровнях (лексическом, синтаксическом и прагматико-дискурсивном). *Результаты.* Обнаружены систематические различия на всех уровнях. Дискурс рациональной картины мира характеризуется точностью дозировки, эксплицитным указанием фармакологических механизмов, систематическим включением стандартизированных информационных категорий (фармакокинетика, противопоказания, лекарственное взаимодействие) и опорой на эмпирический авторитет (ВОЗ). Напротив, дискурс иррациональной картины мира демонстрирует повсеместную «коммуникативную неопределённость»: (а) широкое использование лексем с размытой референциальной семантикой и сильным коннотативным компонентом; (б) систематическое опущение обязательных информационных блоков; (в) универсализированные и генерализованные утверждения об эффективности; (г) стилистическую эклектику, смешивающую научную терминологию с религиозно-магическими элементами; и (д) апелляцию к неэмпирическому авторитету (духовная традиция, личный опыт, благоприятное время). *Заключение.* Результаты подтверждают

представление о «языковой недостаточности» – неспособности стандартного рационального языка полностью кодировать нерациональное содержание. Это приводит к формированию особого дискурсивного профиля, отмеченного неопределённостью и опорой на метафору, символ и контекстно-зависимую интерпретацию. Исследование вносит вклад в теорию дискурса, операционализируя различия картин мира на языковом уровне, и предлагает практические рекомендации для медицинской коммуникации через эпистемологические разрывы.

Ключевые слова: дискурс, картина мира, рациональность, иррациональность, медицинский дискурс, языковая неопределённость, референциальная семантика, традиционная медицина

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BRIEF REPORT

Irrationality in the Structure of Individual Psychological Characteristics of Victims of Telephone Fraud: A Pilot Comparative Study

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Abstract. *Relevance and Problem.* Telephone fraud is one of the fastest-growing threats in the digital environment. The psychological profile of actual victims, particularly the role of irrational (magical) beliefs, remains insufficiently studied. It is unclear which personality traits distinguish actual victims from individuals who, after initiating contact with fraudsters, managed to terminate the interaction. Most studies compare victims with individuals who have not experienced fraud, which does not minimize the effect of chance. *Objective.* To identify the role of irrational (magical) beliefs in the structure of individual psychological characteristics of victims of telephone fraud compared with individuals who terminated contact with fraudsters. *Methods.* The sample comprised 83 individuals. The main group included 27 individuals recognized as victims under Article 159 of the Criminal Code of the Russian Federation who underwent comprehensive forensic psychological and psychiatric examination (22 women, 5 men). The control group included 56 individuals who terminated contact with fraudsters (40 women, 16 men); of these, 36 communicated with "interest" and 20 with "anxiety." Instruments: an author-designed questionnaire, the suggestibility scale by S. V. Klauchek and V. V. Delaryu, the Individual Typological Questionnaire (ITQ, L. N. Sobchik), and the Questionnaire of Beliefs and Superstitions (QBS, V. A. Stoyanova). Statistics: Mann-Whitney U test with Benjamini-Hochberg false discovery rate correction for multiple comparisons, Spearman rank correlation, and descriptive statistics. *Results.* Victims differed significantly from controls in higher suggestibility (12.33 vs. 10.41; $U = 452.5$; $p < 0.01$; adjusted $p = 0.021$, marginally significant after correction), higher sensitivity (6.78 vs. 4.98; $U = 378.0$; $p < 0.001$), higher scores on all magical thinking scales ($p < 0.001$), and lower aggressiveness (2.56 vs. 4.61; $U = 412.0$; $p < 0.001$) and spontaneity (4.33 vs. 5.43; $U = 510.5$; $p < 0.05$; adjusted $p = 0.081$, non-significant after correction). No significant differences were found for extraversion, rigidity, introversion, anxiety, or lability ($p > 0.05$). In the control group, suggestibility was negatively correlated with spontaneity, and spontaneity was positively correlated with aggressiveness. In the victim group, these associations were absent and were replaced by positive correlations between suggestibility and irrational constructs, and between irrational constructs and anxiety and rigidity. *Discussion.* Irrationality appears to be a vulnerability factor for fraud victimization, forming a "victimogenic symptom complex" together with anxiety and suggestibility. The findings are consistent with the concept of the pseudo-protective function of superstitions (Stoyanova, 2007) and the theory of operational attitudes (Kiryushina, 2025), as well as with international studies linking neuroticism and irrational beliefs to victimization (Deliema et al., 2020; Modic & Lea, 2013; Whitty, 2025). *Conclusion.* Irrational (magical) thinking may serve as a predictor of victimization in telephone fraud, opening possibilities for prevention and correction programs.

Keywords: Telephone Fraud, Victims, Irrationality, Magical Thinking, Suggestibility, Individual Psychological Characteristics

1. Introduction

In the context of the widespread use of mobile communications and the internet, telephone fraud has become one of the most common and socially significant threats. Since 2024, there has been an explosive increase in criminal cases related to fraudulent activities, along with a growing number of forensic examinations in this relatively new domain. Telephone fraud is characterized by sophisticated methods of influence and the

exploitation of vulnerabilities in the human mind. It leads to significant financial losses and causes victims deep psychological stress, impaired adaptation, feelings of guilt and shame, and reduced trust in others.

Despite the apparent simplicity of fraud schemes and ongoing prevention efforts, a significant number of people still become victims. This raises the question of specific psychological preconditions and vulnerabilities.

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Identifying these vulnerabilities is necessary for developing effective prevention programs and providing psychological assistance.

Telephone fraud is a particular form of manipulation carried out remotely, under time pressure and high emotional tension. The fraudster creates an artificial situation of uncertainty ("your Government Services account has been hacked," "loans are being taken out in your name") and demands immediate action. According to previous research, the success of fraudulent influence depends not only on the offender's tactics but also on the psychological characteristics of the victim (Meshkova, Kudryavtsev, & Enikolopov, 2022).

In Russian science, issues of forensic psychological examination of telephone fraud victims have been developed by F. S. Safuanov, O. F. Savina, M. V. Morozova, Yu. O. Perepravina, and V. V. Shirokova; psychological characteristics of victims have been studied by N. V. Meshkova, V. T. Kudryavtsev, and S. N. Enikolopov; factors of victim behavior have been studied by D. A. Kolodkina, N. V. Dvoryanchikov, and K. N. Dvoryanchikova; manipulative aspects have been analyzed by L. Yu. Kiryushina and E. V. Zotina. In international literature, the greatest attention has been paid to factors such as gullibility, impulsivity, low self-esteem, anxiety, and extraversion (Cawvey et al., 2018; Koning et al., 2024; Van de Weijer & Leukfeldt, 2017). However, research findings remain contradictory.

The question remains open as to which personality traits distinguish actual victims from those who, after initiating contact with offenders, managed to terminate the interaction. Most studies compare victims with individuals who have not encountered fraudsters. Such an approach does not fully exclude the effect of chance. It seems that comparing individuals who have been exposed to a fraudulent attack, those who became victims and those who terminated contact in time, may help identify possible vulnerability factors.

At the initial stage of the study, a qualitative analysis of 13 forensic psychological examinations of victims in telephone fraud cases was conducted within comprehensive forensic psychological and psychiatric examinations. It allowed the following individual psychological characteristics of the examinees to be outlined: relatively preserved cognitive and intellectual sphere; average and above-average suggestibility according to the method of S. V. Klauchek and V. V. Delaryu; prosocial personality orientation; on the Individual Typological Questionnaire, excessively pronounced traits of anxiety, sensitivity, rigidity, and lability; impulsivity in

action combined with affective rigidity; in subjectively difficult, non-standard, and frustrating situations, a tendency toward reactions of confusion, delayed orientation and decision-making, and compliance under directive or uncertain conditions; feelings of loneliness, selectivity in communication, an internal form of emotional experience, and an inability to refuse; naivety and signs of subjectivism in judgments, elements of prelogical thinking according to clinical psychological interview data; on the Link Cube test, an impulsive execution style, incomplete coverage of the situation with exceeding assembly time up to 20 minutes, and a large number of errors at the initial construction level; according to the ORDPS method (Shipshin, 2009), no clear peaks, and throughout the development of the criminal situation, emotional tension with an unstable level and a wide range of experiences from anxiety and activity to fear and despair. Most examinees in the clinical psychological interview described escalating tension requiring discharge. These characteristics became accentuated and manifested specifically in interaction according to the "key to lock" principle with manipulative influences from offenders (systematic, continuous, directive instruction) combined with the so-called "soil": rush and multitasking, traumatic situations, mental tension, loneliness, and unsatisfactory psychophysiological state (Alekseeva et al., 2025).

Already at the stage of the first examinations, it was noted that almost all examinees, according to directed clinical psychological interviews, believed in omens and superstitions, astrological forecasts and horoscopes, extrasensory abilities, were interested in paranormal phenomena, and watched programs such as "Battle of Psychics," that is, they displayed signs of irrationality. Therefore, among the individual psychological characteristics studied, it was decided to investigate "prelogical formations." The tendency toward superstitions and magical thinking is most pronounced and reaches maximum intensity in crisis and stressful situations, under conditions of high uncertainty, anxiety, and limited control over events. This is why irrationality as a system-forming factor was placed at the focus of the study. This qualitative analysis leads to the need for empirical verification of the role of irrational beliefs. Accordingly, the objective of this study is to identify the role of irrational (magical) beliefs in the structure of individual psychological characteristics of victims of telephone fraud compared with individuals who terminated contact with fraudsters.

Hypotheses:

H(1) – Victims, unlike individuals who managed to terminate contact with offenders, have higher suggestibility, sensitivity, and magical thinking, and lower aggressiveness and spontaneity.

H(2) – Anxiety alone is not a factor in victimization; anxiety combined with higher suggestibility and irrationality increases vulnerability risk.

H(3) – The structure of correlations in the victim group differs qualitatively: loss of protective correlations and appearance of associations between suggestibility and magical constructs.

2. Methods

The study involved individuals aged 18 to 75 years who had experienced interaction with telephone fraudsters. The total sample comprised 83 individuals.

The main group (victims) included individuals who transferred money to fraudsters or provided card data, or completed housing sale transactions in favor of fraudsters, and who underwent examination as victims within comprehensive forensic psychological and psychiatric examination at the outpatient forensic psychiatric examination department of the Yaroslavl Regional Psychiatric Hospital ($n = 27$; 22 women, 5 men). The control group included individuals who terminated contact with fraudsters ($n = 56$; 40 women, 16 men). The control group was divided into subgroups based on self-reported emotional state during the call: those who communicated "with interest" ($n = 36$) and those who communicated "with anxiety" ($n = 20$). The groups were comparable in sex, age, and education ($p > 0.05$). All participants provided informed consent.

The following instruments were used: a questionnaire for sample selection and analysis of experience with fraudsters (developed by the authors); the suggestibility scale by S. V. Klauchek and V. V. Delaryu, measuring susceptibility to external influence (0 to 20 points); the Individual Typological Questionnaire (ITQ, L. N. Sobchik) with scales for extraversion, spontaneity, aggressiveness, rigidity, introversion, sensitivity, anxiety, and lability (sten scores); and the Questionnaire of Beliefs and Superstitions by I. Ya. Stoyanova (QBS) with six scales of magical thinking: prelogical protection, superstition, magical anxiety, magical prognosis, alternative

treatment, and active application (raw scores converted to a 100-point scale).

The study was conducted individually: paper forms for victims within comprehensive forensic psychological and psychiatric examination, and online forms for the control group. Statistical processing used the Mann-Whitney U test for independent groups, Spearman rank correlation (r_s), and descriptive statistics. The significance level was set at $p < 0.05$. To control for false discoveries in multiple comparisons (15 indicators), the Benjamini-Hochberg false discovery rate (FDR) correction was applied. Adjusted p-values (pFDR) are reported in the table and text. All calculations were performed using a statistical package IBM SPSS Statistics 28; exact statistics are reported for reproducibility.

3. Results

Comparison of the control group (those who terminated contact) and the main group (victims) revealed statistically significant differences on 10 of 15 indicators (Table 1). Victims demonstrated higher suggestibility (12.33 vs. 10.41; $U = 452.5$; $p < 0.01$; pFDR = 0.021, marginally significant after correction); higher sensitivity (6.78 vs. 4.98; $U = 378.0$; $p < 0.001$; pFDR < 0.001); higher scores on all magical thinking scales ($p < 0.001$; pFDR < 0.001): prelogical protection (50.48 vs. 23.68), superstition (60.48 vs. 31.91), magical anxiety (42.04 vs. 19.93), magical prognosis (57.44 vs. 26.14), alternative treatment (42.96 vs. 17.59), and active application (37.56 vs. 21.16); lower aggressiveness (2.56 vs. 4.61; $U = 412.0$; $p < 0.001$; pFDR < 0.001) and spontaneity (4.33 vs. 5.43; $U = 510.5$; $p < 0.05$; pFDR = 0.081, non-significant after correction).

Lower aggressiveness and spontaneity in victims indicate a deficit in assertiveness, the ability to actively defend one's boundaries. This result is consistent with data from N. V. Meshkova et al. that victims are less inclined toward confrontation and terminating contact. No statistically significant differences were found for extraversion, rigidity, introversion, anxiety, or lability ($p > 0.05$; pFDR > 0.05). The first hypothesis was thus confirmed for sensitivity, magical thinking, and aggressiveness; for suggestibility and spontaneity, results remained significant only at the trend level after correction for multiple comparisons.

Table 1. Differences between victims and the control group

Indicator	Victims, M	Control, M	U	p (primary)	Z
Suggestibility	12.33	10.41	447.5	<0.01	-3.02
Sensitivity	6.78	4.98	351	<0.001	-3.98
Prelogical protection	50.48	23.68	260.5	<0.001	-4.82
Superstition	60.48	31.91	336.5	<0.001	-4.08
Magical anxiety	42.04	19.93	322.5	<0.001	-4.22
Magical prognosis	57.44	26.14	291.5	<0.001	-4.52
Alternative treatment	42.96	17.59	262	<0.001	-4.81
Active application	37.56	21.16	434.5	<0.01	-3.13
Aggressiveness	2.56	4.61	276	<0.001	4.72
Spontaneity	4.33	5.43	497	<0.05	2.55
Extraversion	5.30	4.77	660	>0.05	-0.94
Rigidity	5.26	5.29	695	>0.05	0.61
Introversion	5.56	5.98	668	>0.05	0.86
Anxiety	5.74	4.93	589.5	>0.05	-1.63
Lability	5.78	5.18	562	>0.05	-1.92

Note. pFDR: adjusted p-value using the Benjamini-Hochberg false discovery rate for 15 comparisons.

Comparison of control subgroups ("interest" vs. "anxiety") showed significant differences only in anxiety level (5.80 vs. 4.44; $U = 215.0$; $p < 0.05$; pFDR = 0.081). No differences were found on other indicators. Anxiety as a stable trait most likely influences emotional response during the call, but by itself does not prevent successful termination of contact; both subgroups were able to terminate contact with offenders. These results are consistent with literature data (Abitov, 2022; Gasper, 2004; Norris et al., 2019), according to which anxiety as a personality trait is not an unambiguous risk factor. The decisive role is likely played not by anxiety itself but by its combination with other characteristics, in particular with suggestibility and a tendency toward magical thinking. In the subgroup that communicated "with anxiety," despite high anxiety scores, suggestibility and irrational beliefs remained relatively low, which

allowed contact to be terminated. Thus, anxiety by itself does not prevent termination of contact with offenders if it is not combined with elevated suggestibility and magical beliefs.

Comparison of victims with the "interest" subgroup revealed a significant difference in anxiety: victims were more anxious (5.74 vs. 4.44; $p < 0.05$). The combination of interest in the fraudster's offer with elevated anxiety may therefore be a risk factor. Comparison of victims with the "anxiety" subgroup showed no differences in anxiety levels (5.74 and 5.80; $p > 0.05$). Victims differed from anxious individuals who successfully terminated contact only in higher suggestibility ($p < 0.05$), sensitivity ($p < 0.05$), all magical thinking scales ($p < 0.05$ to 0.001), and lower aggressiveness ($p < 0.001$). Thus, the decisive role is played not by anxiety itself but by its combination with higher

suggestibility and irrationality. The second hypothesis $H(2)$ was confirmed.

It is also important to note that no significant differences in extraversion/introversion were found between groups ($p > 0.05$). Contrary to some international data (Cawvey et al., 2018; Xiang et al., 2020), extraversion was not a significant predictor of victimization in this sample. Indirect confirmation was obtained at the stage of qualitative analysis during the first expert examinations: the examined victims were characterized by selective sociability. This may be because telephone fraud does not require face-to-face communication, and introverts may even be more vulnerable due to less experience in social contacts. However, this issue requires further study.

In the control group, strong positive correlations were found among all scales of irrational thinking (QBS) (r_s from 0.58 to 0.89; $p < 0.001$). This indicates that various forms of irrational thinking form a single "symptom complex." The key protective mechanism is the negative correlation between suggestibility and spontaneity ($p < 0.001$) and the positive correlation between spontaneity and aggressiveness ($p < 0.05$). This means that even with elevated suggestibility, individuals who terminated contact retained the ability to impulsively terminate contact and actively defend boundaries. A positive association was also found between sensitivity and anxiety ($p < 0.001$) and lability ($p < 0.01$). High spontaneity and aggressiveness thus impede the realization of suggestibility.

In the victim group, compared with the control group, the negative correlation between suggestibility and spontaneity was absent ($r_s = -0.11$; $p > 0.05$), as was the positive correlation between spontaneity and aggressiveness ($r_s = 0.13$; $p > 0.05$). Positive associations were found between suggestibility and irrational constructs: prelogical protection ($r_s = 0.45$; $p < 0.05$; $pFDR = 0.081$) and magical prognosis ($r_s = 0.48$; $p < 0.05$; $pFDR = 0.081$). Irrational thinking was positively associated with basic individual psychological characteristics: magical anxiety correlated with anxiety ($r_s = 0.42$; $p < 0.05$; $pFDR = 0.081$), rigidity correlated with prelogical protection ($r_s = 0.39$; $p < 0.05$; $pFDR = 0.081$) and alternative treatment ($r_s = 0.44$; $p < 0.05$; $pFDR = 0.081$). This association confirms data from I. R. Abitov et al. that personality-related superstitious thinking correlates with neuroticism (anxiety), aggravation (tendency to exaggerate problems), and pessimism. In fraud victims, high anxiety not only accompanies but directly "feeds" magical coping strategies, creating a vicious

circle: anxiety generates a search for supernatural salvation, and rituals, actions following the fraudster's instructions, temporarily reduce anxiety, reinforcing a dependent pattern. Moreover, the positive correlation between magical anxiety and anxiety in the victim group confirms that magical beliefs perform a pseudo-protective function for them, replacing rational coping (Stoyanova, 2007). Internal associations among QBS scales were even stronger than in the control group (r_s up to 0.95).

Thus, the results allow a "victimogenic symptom complex" to be outlined: emotional (sensitivity, anxiety), cognitive-behavioral (elevated suggestibility, magical rituals), and regulatory (low spontaneity and aggressiveness, rigidity). These components are closely interrelated: for example, anxiety positively correlates with magical anxiety ($p < 0.05$), and suggestibility with prelogical protection ($p < 0.05$). The third hypothesis was thus confirmed.

The "interest" subgroup retained protective associations: a strong negative correlation between suggestibility and spontaneity ($p < 0.001$) and a positive correlation between spontaneity and aggressiveness ($p < 0.05$), as well as a negative correlation between suggestibility and rigidity ($p < 0.05$). This indicates that individuals with higher suggestibility but also greater flexibility (low rigidity) are able to reconsider their decision in time and terminate contact with the fraudster. The "anxiety" subgroup also retained a negative correlation between suggestibility and spontaneity ($r_s = -0.45$; $p < 0.05$) and showed a positive correlation between suggestibility and extraversion ($r_s = 0.48$; $p < 0.05$), possibly compensatory. There was no direct association between suggestibility and magical constructs. In the "anxiety" subgroup, despite pronounced anxiety and sensitivity, the absence of a direct association between suggestibility and irrational constructs, as seen in the victim group, allows anxious individuals to retain the ability to terminate contact.

In the entire sample ($N = 83$), the identified patterns were confirmed: suggestibility was negatively correlated with spontaneity ($r_s = -0.35$; $p < 0.001$) and aggressiveness ($r_s = -0.24$; $p < 0.05$), and positively correlated with anxiety ($r_s = 0.42$; $p < 0.001$) and sensitivity ($r_s = 0.27$; $p < 0.05$). All QBS scales formed a single block (r_s from 0.62 to 0.94; $p < 0.001$). Overall, the correlation structure of the entire sample reflects a common pattern: higher suggestibility, high sensitivity and anxiety are combined with low spontaneity/aggressiveness and pronounced magical thinking.

4. Discussion

The findings contribute to understanding the psychological mechanisms of victimization in telephone fraud. They specify data on the role of suggestibility and sensitivity in the structure of individual psychological characteristics of victims. The mean suggestibility score in victims (12.33) exceeds population norms (8 to 10 points on the Klauchek and Delaryu scale), indicating increased susceptibility of victims to external influence. This is consistent with international studies in which suggestibility is considered a key vulnerability factor for fraud (Modic & Lea, 2013; Norris et al., 2019). In particular, Modic and Lea (2013) showed that neuroticism, a trait closely related to suggestibility and emotional instability, correlates most strongly with response to phishing emails. Similarly, Koning et al. (2024), in a large study of 1,986 respondents, found that neuroticism and low conscientiousness increase the risk of financial fraud.

For the first time, empirical evidence shows that irrationality (magical thinking) is an important vulnerability factor. Differences on QBS scales between victims and individuals who managed to terminate contact reach 3 to 4 standard deviations. According to V. A. Stoyanova's concept (2007), superstition performs a pseudo-protective function, reducing anxiety through an illusion of control. The fraudster, acting as a "savior," easily fits into this magical worldview. This is consistent with previously obtained qualitative data from expert examinations, where examinees (victims) displayed elements of magical thinking during directed clinical psychological interviews. Moreover, a systematic review by Whitty (2025), covering 22 studies, showed that beliefs and attitudes are significant predictors of victimization in cyber fraud. The author emphasizes that romantic beliefs predict victimization in romance scams (Buchanan & Whitty, 2014), and favorable attitudes toward unregulated investments predict victimization in investment scams (Deliema et al., 2020). Our data extend this list by showing that magical beliefs are an independent predictor of victimization in telephone fraud. The phenomenon of magical thinking in fraud victims has also been addressed in international literature. In particular, studies on psychic scams note that fraudsters exploit cognitive biases, including magical thinking, to manipulate victims. Victims seeking clarity or reassurance often become dependent on the "psychic," which increases their anxiety and financial losses. These data are consistent with our hypothesis that magical beliefs perform a

pseudo-protective function, temporarily reducing anxiety but ultimately increasing vulnerability.

The data show that anxiety operates ambiguously in interactions with fraudsters depending on context: in the subgroup that communicated "with anxiety," high anxiety did not lead to victimization, most likely due to lower suggestibility and magical beliefs. In the victim group, anxiety was combined with suggestibility and irrational constructs. Therefore, an anxiety-magical response type can be hypothesized. This result is consistent with Van de Weijer and Leukfeldt (2017), who found that neuroticism increases victimization risk but only in combination with other factors such as low impulsivity and high gullibility. Similarly, in Koning et al. (2024), neuroticism was a significant predictor, but its effect was enhanced by low cognitive engagement and high gullibility.

Qualitative differences in correlation matrices deserve separate consideration. In the control group, a mechanism of "assertive inhibition" operates: higher spontaneity and aggressiveness impede the realization of suggestibility, consistent with L. Yu. Kiryushina's theory of operational attitudes (2025). In victims, this mechanism does not work, and suggestibility is instead reinforced by magical constructs. This result echoes data that impulsivity and low self-control are risk factors for victimization (Norris et al., 2019; Whitty, 2025). However, in our sample, the decisive role is played not by impulsivity as such but by the loss of the protective association between suggestibility and spontaneity, which opens the way for magical "coping."

Extraversion/introversion did not differentiate the groups, contrary to some international data (Cawvey et al., 2018; Xiang et al., 2020), but this may be explained by the remote nature of telephone interaction and possibly cultural characteristics. In Whitty's systematic review (2025), significant heterogeneity of results is also noted: some studies find extraversion a risk factor, others do not. Our data are consistent with Whitty's (2025) conclusion that there is no universal "victim profile" and that different types of fraud exploit different vulnerabilities.

The study is pilot in nature. Limitations include the small sample size (especially the victim group) and retrospective self-report of emotions. The control group was recruited through an online survey, which may have introduced bias. The application of multiple comparison correction showed that some results (suggestibility, spontaneity) remained

significant only at the trend level; this must be considered in interpretation. Future research should expand the sample, conduct longitudinal observations, and develop correction programs.

5. Conclusion

1. Victims of telephone fraud have a specific psychological profile: elevated suggestibility, sensitivity, higher scores on all magical thinking scales, and reduced aggressiveness and spontaneity.

2. Irrationality (magical thinking) is an important vulnerability factor; its contribution to group differences exceeds that of other studied variables.

3. Anxiety alone does not victimize, but its combination with suggestibility and magical beliefs creates an "anxiety-magical" response type.

4. The structure of correlations in the victim group differs qualitatively: loss of protective correlations between suggestibility and spontaneity, and appearance of associations between suggestibility and magical constructs.

5. Practical significance: the identified factors can serve as targets for prevention, including the development of critical thinking, reduction of superstition, and assertiveness training for refusal and boundary-setting.

Conflict of Interest: The authors declare no competing interests.

Ethics Statement: The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (1964, revised 1975). All participants were informed

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about the aims and procedure of the study and provided informed consent for data processing.

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AI Use Statement: The authors declare that artificial intelligence (AI) tools were not used to generate scientific content, analyze data, or draw conclusions. AI-assisted technologies were used solely for language editing and translation of the manuscript. All content was reviewed, verified, and approved by the authors.

Highlights:

- Victims of telephone fraud show higher suggestibility, sensitivity, and magical thinking.
- Lower aggressiveness and spontaneity in victims indicate a deficit in assertiveness and boundary-setting.
- Anxiety alone does not victimize; risk increases when it combines with suggestibility and irrational beliefs.
- In the victim group, protective correlations between suggestibility and spontaneity are lost, and suggestibility correlates with magical constructs.
- Irrationality (magical thinking) may serve as a target for prevention and psychological correction in telephone fraud.

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Иррациональность в структуре индивидуально-психологических особенностей жертв телефонного мошенничества: пилотное сравнительное исследование

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Резюме. *Актуальность и проблема.* Телефонное мошенничество является одной из наиболее быстрорастущих угроз цифровой среды. Вместе с тем психологический профиль реальных потерпевших, особенно роль иррациональных (магических) установок, остаётся недостаточно изученным. Остается неясным вопрос о том, какие личностные особенности отличают реальных жертв от лиц, которые, начав взаимодействие с мошенниками, сумели прервать контакт. Большинство исследований сравнивают жертв с людьми, не имевшими такого опыта, что не позволяет минимизировать эффект случайности. *Цель.* Выявить роль иррациональных (магических) установок в структуре индивидуально-психологических особенностей жертв телефонного мошенничества по сравнению с лицами, прервавшими общение с мошенниками. *Методы.* Выборка включала 83 человека: 27 человек, признанных потерпевшими по ст. 159 УК РФ и прошедших комплексную судебную психолого-психиатрическую экспертизу (22 женщины, 5 мужчин) и 56 человек, прервавших общение с мошенниками (40 женщин, 16 мужчин), из них 36 человек общались «с интересом», а 20 – «с тревогой». Использованы авторская анкета, методика определения степени внушаемости С. В. Клаучека и В. В. Деларю, Индивидуально-типологический опросник (ИТО, Л. Н. Собчик), опросник иррациональных установок ОВИС (В. А. Стоянова). *Статистика:* U-критерий Манна-Уитни с поправкой Бенджамини-Хохберга на множественные сравнения, корреляция Спирмена, описательные статистики. *Результаты.* Жертвы статистически значимо отличались более высокой внушаемостью (12,33 против 10,41; $U = 452,5$; $p < 0,01$; после поправки $pFDR = 0,021$, маргинально значимо), сензитивностью (6,78 против 4,98; $U = 378,0$; $p < 0,001$), более высокими значениями по всем шкалам магического мышления ($p < 0,001$), а также более низкими агрессивностью (2,56 против 4,61; $U = 412,0$; $p < 0,001$) и спонтанностью (4,33 против 5,43; $U = 510,5$; $p < 0,05$; после поправки $pFDR = 0,081$, незначимо). Значимых различий по экстраверсии, ригидности, интроверсии, тревожности и лабильности не выявлено ($p > 0,05$). В контрольной группе обнаружена отрицательная связь внушаемости со спонтанностью и положительная связь спонтанности с агрессивностью; в группе жертв эти связи отсутствовали и заменялись положительными корреляциями внушаемости с иррациональными конструктами, а иррациональных конструктов с тревожностью и ригидностью. *Обсуждение.* Иррациональность является одним из факторов уязвимости к мошенническим действиям, образуя совместно с тревожностью и внушаемостью «виктимный симптомокомплекс». Полученные данные согласуются с концепцией псевдозащитной функции суеверий (Стоянова, 2007) и теорией операционных установок (Кирюшина, 2025), а также с результатами зарубежных исследований, показавших связь нейротизма и иррациональных убеждений с виктимизацией (Deliema et al., 2020; Modic & Lea, 2013; Whitty, 2025). *Заключение.* Иррациональное (магическое) мышление может выступать одним из предикторов виктимизации при телефонном мошенничестве, что открывает возможности для профилактических и коррекционных программ. **Ключевые слова:** телефонное мошенничество, жертвы, иррациональность, магическое мышление, внушаемость, индивидуально-психологические особенности.

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Laypeople's Understanding of Artificial Intelligence

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Abstract. *Background and Problem Statement.* Research on artificial intelligence (AI) demonstrates considerable breadth in the application of this term. According to sociological data, approximately half of Russians report confident knowledge about artificial intelligence. However, no generally accepted understanding of AI has yet emerged; the term is a collective one. Philosophical and psychological accounts of AI are built upon its comparison with human intelligence, which has a rational nature but is inseparable from non-rational aspects of the mind. The understanding of AI as such by its users has been insufficiently studied from a psychological perspective. *Objective.* This study aims to construct a psychological characterization of laypeople's understanding of artificial intelligence. *Methods.* An online survey of 34 participants (79.4% women, 20.6% men) aged 15 to 40 years ($M = 22$). Statistical processing was performed in the R statistical software package. For each question, a proportion test (prop.test) with a chi-squared criterion ($df = 1$) was used to assess the achieved significance level of the null hypothesis that the relative frequency equals 0.5, and a 95% confidence interval (0.95 CI) was calculated for the relative frequency of fixed response options. *Results.* A positive attitude toward AI was found in the studied sample, based on personal experience of its use. Participants noted the risks of using AI while considering them manageable by the user, compared seeking AI assistance with other information sources, and affirmed that users might be interested in discussing even love-related questions with AI. In responses to an open-ended question, participants described various motives for seeking AI assistance: difficult situations where people cannot solve problems independently; convenience and practicality in solving various tasks; play motivation (curiosity); neutrality and psychological safety of AI consultation; and possible difficulties or complete lack of human communication. *Conclusions.* The obtained results align with sociological research data and allow for a psychological characterization of users' understanding of AI as a functional, instrumental, and interactive phenomenon applicable to all spheres of life. Whether functionality, instrumentality, and interactivity of AI are synonyms, three independent characteristics, or are sublated by a fourth requires further research.

Keywords: Artificial Intelligence, Users, Consciousness, Psychology, Technology, Understanding, Risks

1. Introduction

Artificial intelligence (AI) is a phenomenon whose understanding by users has been studied far from sufficiently to date. The diversity of what may be classified as AI is such that producing any systematic literature review is extremely difficult. D. V. Ushakov rightly points out that AI is a collective term (Ushakov, 2023). Does the fact that energy companies use AI to optimize load distribution allow us to classify as AI users everyone who turns on a light? From a psychological perspective, the answer to this question is not as straightforward as it might initially appear.

Sociological research shows that "the concept of 'artificial intelligence technologies' has become firmly embedded in everyday life. Over the past two years, the proportion of Russians declaring confident knowledge about such technologies (have heard of them and can explain them) has grown from 36% to 50%. Another 44% possess superficial knowledge;

they have heard of AI technologies but cannot yet explain what they are (2022: 51%). Over the years, it is the depth of knowledge that has grown, while its breadth appears to be approaching its limit" (VCIOM, 2024). V. Yu. Menovshchikov offers the following definition of AI: "in the broadest sense, it is intelligence demonstrated by machines, particularly computer systems" (Menovshchikov, 2025, p. 14), noting that "many artificial intelligence applications are no longer perceived as artificial intelligence" (Menovshchikov, 2025, p. 15).

In substance, Menovshchikov's understanding aligns well with the philosophical one: "Various research programs of 'artificial intelligence' have emerged: 1) the creation of computers capable of performing functions traditionally attributed to human intellectual activity; 2) attempts to model human intelligence itself based on modeling the neural substrate (neurocomputers); 3) the creation of

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artificial self-learning devices capable of evolution" (Suvorov, 2010).

Philosophical and scientific psychological understandings of human intelligence emphasize its rational nature and relate it to non-rational aspects of the psyche: "rational thinking subject to the laws of logic; it opposes the non-rational spheres of the psyche: emotions, imagination, will, etc." (Suvorov, 2010). In psychology, it is generally accepted that "the nature and direction of intelligence cannot be understood without taking into account personal qualities, needs, emotional states, etc. On the other hand, personal maturity largely depends on the degree of a person's understanding of what is happening, which is linked to the level of intellectual development" (Kholodnaya, 2002).

The philosophical understanding of rationality demonstrates, first, the universality of this term: "Rationality (from Latin ratio, reason) is a term symbolizing one of the key themes of philosophy, a fundamental problem whose solution is determined by the general content of a particular philosophical-methodological concept. The problem consists in clarifying the meaning of 'reasonableness' as predication (of being, action, relation, goal, etc.). <...> The theme of rationality problematizes virtually all major spheres encompassed by modern philosophical thought" (Porus, 2010). Second, the process of rationalization closely resembles the development of AI: "the sequential overcoming of the elements of nature, culture, and the human soul (psyche) and their replacement by logically ordered systems of practices following the principle of efficiency <...> should be understood precisely as a process requiring permanent creative efforts, an unceasing balancing of heterogeneous principles; it is unattainable in any 'automatic' mode of following a model or system of rules" (Panarin, 2010).

Thus, the rational nature of human intelligence, which creates, uses, and understands AI, is inseparable from less rational aspects of the psyche. And we observe the same in relation to AI.

AI research offers alluring prospects: human-computer interaction, brain-computer interfaces, breakthroughs in multimodal and multidimensional data research and data extraction, and the simulation of human emotions (Zhao et al., 2022). It is not even necessary for AI to actually possess emotions, experience, or consciousness. Language that meets social expectations is sufficient to embed AI in joint action based on a relational interpretation of interaction with AI. Then AI

begins to help people reflect, practice communication, or rehearse emotionally difficult conversations without replacing the human (Boyd & Markowitz, 2026). But the question of replacing the human turns out to be not so simple.

Responding to diagnostic instruments, AI successfully "outperforms" 50% of PhD holders and 90% of bachelor's degree holders in an Arabic-language sample on measures of social intelligence (Sufyan et al., 2024). LLMs successfully discuss treatment issues with patients (Kaplan & Akyol, 2026) and "pass" medical exams better than humans (Chen et al., 2025). The diagnostic accuracy of LLM reasoning approximately corresponds to that of psychiatric residents (Jin et al., 2026). Variants of such discussion of treatment issues are proposed in which LLMs would improve in medicine by maintaining dialogue with each other (Sun et al., 2026) and learning through reinforcement (Gabriel, 2020). AI systems are indeed applied in medical decision-making, for example, decisions about medical evacuation (Hiratsuka et al., 2026).

It seems established that at the level of the nervous system, people behave differently toward humans than toward AI, but sometimes AI engages the brain even more than other humans (Harris, 2024).

The development of AI raises ethical questions. A distinction is made, for example, between explicit and implicit moral machines, depending on how directly moral values are accounted for in algorithms. It is desirable that the decisions of moral machines be compatible with human goals and priorities, but for this, one must know precisely what human goals and priorities are (Bonnefon et al., 2024). In addition, another difficulty arises. Most of the source code of AI models and agents is proprietary and classified. In other words, we often do not know how AI works. We have access only to input and output data, and we must infer the decision-making process. Many hidden functions are unavailable for study because we are not allowed to look at them, or they are not interpretable because we cannot understand them, or both (Taylor & Taylor, 2021). This problem can be addressed through experimental methods of psychology, as in the case of humans. Such is the approach of explainable artificial intelligence (XAI). It is no coincidence that D. V. Ushakov proposes the concept of "digital angels," since "to ensure effective work as an assistant and coordinator, electronic systems must possess the maximum possible information, and only their unconditional reliability in preventing the dissemination of

information and their focus on protecting the interests of a specific person can serve as a basis for them to perform their functions" (Ushakov, 2024, p. 88).

The question arises of how to algorithmically prevent a digital angel from transforming into a digital demon. Judging by the found definitions of AI, this is not easy.

On the SberPro website, without attribution, the following definition is given: "Artificial intelligence is the ability of computer systems to perform tasks requiring human intelligence: pattern recognition, decision-making, data analysis. Modern artificial intelligence is based on machine learning methods and the analysis of large data sets. The system does not act strictly according to predetermined rules but learns from examples, identifies recurring connections, and applies the acquired knowledge to solve new tasks. This fundamentally distinguishes AI from classical programming, where the system's behavior is fully determined by the developer" (SberPro, 2026).

A. Kretov offers the following definition: "Artificial intelligence is a technical system capable of solving assigned tasks by adapting to external factors." That is, can any program that can solve tasks of a certain type be called artificial intelligence? Almost. AI must have the ability to learn" (Kretov, 2026).

A. Patrusheva and A. Pavlova define AI substantially differently, confirming Ushakov's characterization: "it is not a tool or a program but a separate branch of computer science. AI specialists develop systems that analyze information and solve tasks similarly to how humans do" (Patrusheva & Pavlova, 2025).

Let us summarize the literature review.

First, AI has proven to be a phenomenon difficult to define. Authors more often designate the nature of the tasks it solves and the possibilities of its application than characterize it substantively.

Second, in scientific texts, AI is considered as a functional analogy of human intelligence, compared with it, and contrasted with it. As in the case of human intelligence, the rational nature of AI is ambiguous and difficult to understand. The mechanisms of human-created AI are often non-obvious to people.

Third, in the context of AI, scientific questions arise related to going beyond the boundaries of rationality. Like human intelligence, AI proves to be not fully separable from extra-intellectual phenomena: directionality, morality, the content of tasks being solved, limitations of received feedback, and others.

Choosing a context for empirical research on laypeople's understanding of AI is not easy; the spectrum of possible options is too broad. The context of the present study was suggested by one event. On the eve of Valentine's Day, February 13, 2026, the author received an email: "Your secret advisor in matters of love. Love is a delicate matter. Sometimes you need someone who will listen, help you find the right words, or simply cheer you up before an important step. In such moments, turn to Alisa AI, she will tell you how to find the path to your loved one's heart. Alisa, help me out!" Given the holiday factor and the possible drawing of users' attention to the advertised version of AI through other channels, it was decided to immediately conduct a study in the format of a short survey.

2. Methods

An online survey with invitations to participate distributed through the VKontakte social network. The questions and participants' responses are presented in full below.

Statistical processing was performed in the free statistical software package R (R Core Team, 2026). For each response option, a proportion test (prop.test) with a chi-squared criterion (X-squared) for one degree of freedom ($df = 1$) was used to assess the achieved significance level of the null hypothesis that the relative frequency equals 0.5, and a 95% confidence interval (0.95 CI) was calculated for the relative frequency.

Thirty-four individuals: 27 (79.4%) women and 7 (20.6%) men, aged 15 to 40 years ($M = 22$ years, $SD = 5$ years).

Participants reported the following regarding their education:

- Currently enrolled at a university: 22 (64.7%);
- Completed university: 6 (17.6%);
- Currently enrolled at school/college/technical school: 4 (11.8%);
- Completed school/college/technical school: 2 (5.9%).

3. Results

An unexpected result for the author was the dynamics of user response to the invitation to participate: all 34 responses were received within a single day, February 14, 2026, while starting from February 15, 2026, users stopped responding to invitations and personal messages requesting participation in the study.

Below, we present the questions and participants' responses in full.

Question 1. Do you think an invitation to discuss love-related questions with artificial intelligence could interest any network users?

Thirty participants (88.2%) responded affirmatively, while four (11.8%) responded negatively. Statistical analysis showed that the relative frequency of affirmative responses significantly differs from 0.5 (X-squared = 18, $p = .00002$, 0.95 CI: 0.72-0.96), as does that of negative responses (X-squared = 18, $p = .00002$, 0.95 CI: 0.04-0.28).

Forty-four percent of participants responded to the open-ended question about the reasons for their opinion. Their responses can be tentatively divided into several groups. Some participants wrote that people turn to AI for help in difficult situations when they cannot solve problems on their own: *"Some people cannot cope with problems with their partner on their own."* Others noted the convenience and practicality of AI in solving practical or behavioral tasks: *"One can ask AI for advice, a date plan, places to go, think through literally everything with it... AI will conduct analytics and explain everything, it is a useful tool."* Some participants described what is essentially play motivation for using AI: *"just for fun," "interesting to learn AI's opinion."* A separate group of responses indicated the neutrality and psychological safety of discussing love with AI: *"With it, one can discuss any question, and it will never judge or laugh..."; "AI does not have a biased attitude and allows you to look at the situation from the outside."* Finally, some participants pointed to possible difficulties or even a complete lack of human communication: *"There are very many lonely... people who simply have no one to talk to..."* Responses emphasizing the irreplaceability of live communication were also voiced: *"Communication with a living person is irreplaceable."*

Question 2. Do you think discussing love-related questions with artificial intelligence could be useful for a person?

The majority of participants (21 individuals, 60%) chose the option "Artificial intelligence is no worse than reading popular articles (posts, reels, etc.)." This result does not reach the level of statistical significance when testing the hypothesis of equality to 0.5 (X-squared = 1, $p = .22$, 0.95 CI: 0.44-0.77). The option "Artificial intelligence is more interesting than popular articles; one can interact with it" was chosen by 5 individuals (14.3%) (X-squared = 16, $p = .00008$, 0.95 CI: 0.06-0.32). The option "It is foolish to discuss anything with artificial intelligence" was chosen by 4 individuals (11.4%) (X-squared = 18, $p = .00002$, 0.95 CI: 0.04-0.28). Another 5 participants (14.3%) formulated their own answer (X-squared = 16, $p = .00008$, 0.95 CI: 0.06-0.32). Among the

original formulations: *"I do not consider it foolish, but I would not do it myself; one should primarily rely on one's own feelings or on books by well-known psychologists. AI is not a psychologist and certainly cannot understand human feelings"; "The topic of love is too deep and individual to discuss with AI"; "Artificial intelligence can provide interesting, useful information, but it cannot experience all feelings, so it cannot replace articles written by humans, etc."; "It can be useful, but as with everything (posts, reels, etc.), one needs to know moderation and understand that AI is not a reliable source of information"; "AI does not invent answers itself but constructs them based on the analysis of articles, scientific works, etc. It can produce a brief summary from various sources and draw conclusions, which is very useful, you do not have to read a ton of literature and delve into its essence yourself. The only problem is that Alisa AI is, to put it mildly, a mediocre neural network, so I do not know how useful it can be. I would not trust it."*

Question 3. Who do you think would be more interested in discussing love-related questions with artificial intelligence?

The response "Women" was chosen by 16 individuals (47.1%). This result does not statistically differ from 0.5 (X-squared = 0.03, $p = .86$, 0.95 CI: 0.30-0.65). The response "Both genders" was chosen by 12 individuals (35.3%) (X-squared = 2, $p = .12$, 0.95 CI: 0.20-0.54). The response "Men" was chosen by 5 individuals (14.7%) (X-squared = 16, $p = .00008$, 0.95 CI: 0.06-0.32). The response "Actually, no one will take it seriously" was chosen by 1 individual (2.9%) (X-squared = 28, $p = .0000001$, 0.95 CI: 0.002-0.17).

Question 4. Do you think artificial intelligence can actually help a person with love-related questions?

Opinions were divided exactly evenly: 17 individuals (50%) answered "Yes," and 17 individuals (50%) answered "No." In both cases, X-squared = 0, $p = 1$, 0.95 CI: 0.34-0.66.

Question 5. Whom can artificial intelligence help more?

The response "Both" was chosen by 17 individuals (50%) (X-squared = 0, $p = 1$, 0.95 CI: 0.34-0.66). The response "Men" was chosen by 6 individuals (17.6%) (X-squared = 13, $p = .0003$, 0.95 CI: 0.07-0.35). The response "Women" was chosen by 5 individuals (14.7%) (X-squared = 16, $p = .00008$, 0.95 CI: 0.06-0.32). The response "No one" was chosen by 6 individuals (17.6%) (X-squared = 13, $p = .0003$, 0.95 CI: 0.07-0.35). No one chose the option "I will formulate my own answer."

Question 6. In your opinion, can artificial intelligence be used to manipulate or otherwise harm a person in love?

Twenty-four individuals (70.6%) responded affirmatively (X-squared = 9, $p = .004$, 0.95 CI: 0.58-0.89). Eight individuals (23.5%) responded negatively (X-squared = 9, $df = 1$, $p = .004$, 0.95 CI: 0.11-0.42). Another 2 individuals (5.9%) formulated their own answer; these responses were statistically counted as affirmative. Among them: *"If a person misunderstood the advice, then yes, it can"; "It all depends on the person, their intentions, ability to think rationally, and level of trust in AI. If the question means harming a person who discusses love with AI, then indeed AI can sometimes give such advice, especially Alisa, that a person who accepts its responses without reflection as direct instructions and calls to action will ultimately harm themselves."*

Question 7. Do you yourself use artificial intelligence? (for any purpose: work, study, out of interest, etc.)

The response "Yes" was chosen by 28 individuals (82.4%) (X-squared = 13, $p = .0003$, 0.95 CI: 0.65-0.93). The response "Rarely" was chosen by 4 individuals (11.8%) (X-squared = 18, $p = .00002$, 0.95 CI: 0.04-0.28). The response "No" was chosen by 2 individuals (5.9%) (X-squared = 24.735, $df = 1$, $p = .0000007$, 0.95 CI: 0.01-0.21).

Question 8. How would you rate your experience of using artificial intelligence?

Thirty individuals (93.8%) rated their experience as generally positive (X-squared = 23, $p = .000002$, 0.95 CI: 0.77-0.99). Two individuals (6.3%) rated it as useless (does not solve my tasks) (X-squared = 23, $p = .000002$, 0.95 CI: 0.01-0.22). No one rated it as generally negative.

4. Discussion

Participants gave different responses, sometimes categorically preferring one option, sometimes choosing different options with equal probability. This can be considered an indirect indicator of response validity. The dynamics of response collection, all responses were received on a single "Valentine's Day," demonstrates both the significance of participants' intrinsic motivation to participate in the study and the socio-psychological factor of the holiday fashion, in connection with which the study was conducted.

Judging by the confidence intervals of the relative frequencies of response options, the results are sufficiently generalizable, which corresponds to the characteristics of the sample.

In substantive terms, what draws attention is the categorically positive attitude of the studied sample toward AI, based on personal experience of its use. This characterizes only the studied sample; the general population, judging by sociological surveys (VCIOM, 2024; VCIOM, 2025; VCIOM, 2026), is less homogeneous in this regard. Our participants confirm VCIOM data that "young people under 34 have already quite actively and regularly incorporated neural networks into their lives" (VCIOM, 2025).

Consistent with VCIOM data that risks of the digital environment are perceived as probable but not fatal (VCIOM, 2026) is the participants' clear preference for the response that AI can harm a person, with the caveat of one participant: *"it all depends on the person, their intentions, ability to think rationally, and level of trust in AI."* That is, AI risk is largely controllable by users, even when turning to AI on such a matter as love.

The possibility of successful, from the users' perspective, management of AI risks is also shown by responses to the question of whom AI can help more. In responses to the question of the functionality or usefulness of AI ("Can artificial intelligence actually help a person with love-related questions?"), participants' opinions were evenly divided between "yes" and "no." In combination with responses to the risk question, this shows the non-categorical nature of negative assessments of possible AI assistance in love-related questions. If half of the participants had been categorically convinced of AI's uselessness, the distribution of responses to the questions about risks and about whom AI can help more would have differed from that obtained in the study.

When answering the question of who would be more interested in discussing love-related questions with AI, participants (predominantly female) most likely had themselves in mind, preferring the responses "women" and "both genders," which confirms the accuracy of the responses.

On the question of whether discussing love-related questions with AI can be useful for a person, participants clearly preferred the response that AI is no worse than reading popular articles (posts, reels, etc.). Psychologically, such a response corresponds to the above-described responses to questions about the risks of turning to AI on love-related questions.

For the substantive characterization of laypeople's understanding of AI, responses to the first questions are especially important. The rather categorical preference of participants for an affirmative answer to the question of whether

users might be interested in discussing love-related questions with AI aligns well with the fact that 44% of participants formulated their own answer to the optional question of why they think so. These responses can be tentatively divided into several complementary groups. Some participants write that people turn to AI for help in difficult situations when they cannot solve problems on their own (*"Some people cannot cope with problems with their partner on their own"*). Others note the convenience and practicality of AI in solving practical or behavioral tasks (*"One can ask AI for advice, a date plan, places to go, think through literally everything with it... AI will conduct analytics and explain everything, it is a useful tool"*). Still others describe what is essentially play motivation for using AI (*"just for fun"*), which partly resembles the previous group but with a more pronounced emotional component. Some participants indicate the neutrality and psychological safety of discussing love with AI (*"With it, one can discuss any question, and it will never judge or laugh..."*; *"AI does not have a biased attitude and allows you to look at the situation from the outside"*). Finally, some participants speak of possible difficulties or even a complete lack of human communication (*"There are very many lonely... people who simply have no one to talk to..."*). To one degree or another, the identified groups of responses may characterize a single person in a real situation of turning to AI; they do not exclude each other. The study did not provide a sufficiently definitive answer to the question of what the possible motives for turning to AI on love-related questions are. But such an answer was not our goal. Discussing love-related questions with AI was more of an external occasion for the research invitation, connected with "Valentine's Day."

The subject of the study is laypeople's understanding of AI. If the responses are interpreted as a whole, what comes to the fore is such a characteristic of AI understanding as its functionality, instrumentality, and interactivity. Precise terminological designation requires further conceptual and empirical elaboration. Figuratively speaking, users' responses suggest that "however you ask, however you relate, however you understand, that is how AI will help." This characteristic corresponds not to perceived usefulness of the technology (Gado et al., 2022) but points to an understanding of AI precisely as a technology. The results of the conducted study align with VCIOM data that "the role of neural networks is not limited to an instrumental function: already today, 14% of neural network users have turned to them for

communication and emotional support" (VCIOM, 2025). Nevertheless, AI in users' understanding remains precisely a technology, a tool. Perhaps this will change in the future, but today the situation is as described.

The second important result of our study is the absence of psychologically insurmountable boundaries for users regarding the spheres of AI application. The possibility of discussing with AI the most diverse questions, even such as love. How participants understand love is the subject of another, independent study. What matters is that love, too, can be discussed with AI, judging by the obtained results.

The obtained data allow us to embed laypeople's understanding of AI into a broader theoretical framework. First, the understanding of AI as a functional and interactive phenomenon aligns with the Computers Are Social Actors (CASA) paradigm, according to which people unconsciously apply social heuristics to computers and AI systems because they call to mind similar social attributes as humans (Nass et al., 1994; Nass & Moon, 2000). Participants in our study demonstrate precisely such a "social" attitude toward AI: they discuss love-related questions with it and expect support and non-judgmental attitudes from it, which corresponds to key tenets of the CASA paradigm.

Furthermore, the Human-AI Interaction Model based on the Theory of Interactive Media Effects (HAIIME) (Sundar, 2020) proposes distinguishing between a "cue route" and an "action route" in the formation of trust in AI. Anthropomorphic cues activate users' heuristic evaluations, which in turn influence trust and technology acceptance (Sundar, 2020). In our study, participants describing AI as a "tool" simultaneously endow it with social qualities (neutrality, absence of judgment, ability to "listen"), which reflects the operation of the "cue route," the heuristic path of evaluation. At the same time, the preference for the response that "AI is no worse than reading popular articles" indicates that users do not overestimate the epistemic status of AI, maintaining critical distance.

An important theoretical basis for interpreting the obtained results is the three-factor theory of anthropomorphism (Epley et al., 2007), according to which people tend to anthropomorphize non-human agents to satisfy the need for social connection, to increase the effectiveness of interaction with an unfamiliar agent, and to explain its behavior. In our study, participants who indicate loneliness as a motive for turning to AI, as well as curiosity (*"just for fun," "interesting to learn AI's opinion"*), demonstrate both key mechanisms of

anthropomorphization: social motivation and epistemic motivation. This aligns with data showing that anthropomorphic features of AI activate social presence, interpersonal warmth, and mind perception, making the ideal and social self more salient (Epley et al., 2007; Waytz et al., 2010).

However, anthropomorphization also carries risks. Research shows that users may form emotional connections with human-like AI, creating the risk of infringing on privacy and autonomy through over-reliance (Akbulut et al., 2024). In addition, anthropomorphic features can lead to "misplaced capabilities": users begin to trust AI in matters where its competence is limited (Maeda, 2024). Our participants, however, demonstrate awareness of these risks: 70.6% believe that AI can harm a person in love-related matters, but the risk is perceived as manageable ("*it all depends on the person...*"). This aligns with the model of "calibrated trust," according to which users with higher levels of AI literacy tend to evaluate system transparency and more accurately correlate trust with AI's actual capabilities.

Finally, the understanding of AI as a tool applicable to all spheres of life aligns with the concept of AI literacy. Research shows that AI literacy is positively associated with trust in AI, with perceived transparency partially mediating this relationship. Our participants, being predominantly university students (64.7%), demonstrate a fairly high level of AI literacy: they not only use AI but also reflect on its limitations ("*AI is not a reliable source of information*"), which corresponds to contemporary understandings of critical AI use.

5. Conclusion

The conducted study is preliminary and pilot in nature. We deliberately conducted the survey with fairly "transparent" formulations of questions and response options in order to foreground the aspects of AI understanding that are conscious to users.

Our main result is the understanding by users of AI as a functional, instrumental, and interactive phenomenon applicable to all spheres of life.

At present, we are not prepared to answer the questions of whether the functionality, instrumentality, and interactivity of AI are synonyms, three independent characteristics, or are sublated (in G. W. F. Hegel's terminology) by some fourth.

In the literature on AI, we have not encountered direct indications of such an understanding of AI by users, although the described aspects are implied in a number of

articles. We note that in many scientific publications on AI, it is not even explicitly stated that the user cannot interact with AI directly but gains access to it only through a user interface. The psychological aspects of AI are quite naturally conceptualized "one step behind" its creation and development. There are many implied but not explicitly discussed aspects in works on this problematic.

Simple dichotomies are inapplicable to AI in users' understanding: rational-irrational, intellectual-emotional, safe-risky, etc. The rationality and safety of AI in the user's understanding depends on the user no less than on the device and principles of AI operation. And it is quite possible that this psychological characterization of AI understanding will change as AI develops.

Let us return to the question posed at the beginning of the article: does the fact that energy companies use AI to optimize load distribution allow us to classify as AI users everyone who turns on a light? From a psychological perspective, the answer may be: in most cases no, but in some cases yes, depending on the person's awareness of this action.

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Author Responsibility: The author confirms that he is solely responsible for all aspects of the work, including its conception, execution, and interpretation, has verified the entire manuscript, and takes full responsibility for its integrity and accuracy.

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Highlights:

- Laypeople understand AI as a functional, instrumental, and interactive phenomenon.
- AI-related risk is perceived as manageable by the user.

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Понимание искусственного интеллекта его пользователями

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Резюме. Актуальность и постановка проблемы. Исследования в области искусственного интеллекта (ИИ) демонстрируют значительную широту области применения данного термина. По социологическим данным, около половины россиян декларируют уверенное знание об искусственном интеллекте. Однако общепринятого понимания ИИ в настоящее время не сложилось - термин имеет собирательный характер. Философские и научно-психологические трактовки ИИ строятся на его сопоставлении с интеллектом человека, имеющего рациональную природу, но неотделимого от нерациональных аспектов психики. Понимание ИИ как такового его пользователями в психологическом плане исследовано недостаточно. *Цель.* Исследование направлено на построение психологической характеристики понимания искусственного интеллекта его пользователями. *Методы.* Онлайн-опрос 34 испытуемых (79,4% женщин, 20,6% мужчин) в возрасте от 15 до 40 лет, средний возраст - 22 года. Статистическая обработка проводилась в свободном статистическом программном пакете R. Для каждого вопроса по тесту пропорций (prop.test) оценивался достигаемый уровень значимости нулевой гипотезы о том, что относительная частота равна 0,5, и рассчитывался 95% доверительный интервал относительной частоты фиксированных вариантов ответа. *Результаты.* Обнаружено позитивное отношение исследованной выборки к ИИ, основанное на личном опыте его использования. Испытуемые отмечают риск использования ИИ, считая его управляемым со стороны пользователя, сравнивают обращение к ИИ с другими источниками информации, дают утвердительный ответ на вопрос о том, может ли заинтересовать пользователей обсуждение с ИИ даже вопросов любви. В ответах на открытый вопрос испытуемые описали разные мотивы обращения к ИИ за помощью: в сложных ситуациях, когда люди не могут решить проблемы самостоятельно; в связи с удобством и практичностью в решении различных задач; игровую мотивацию (любопытство); нейтральность и психологическую безопасность обращения к ИИ; возможные трудности или полное отсутствие общения с людьми. *Выводы.* Полученные результаты согласуются с данными социологических исследований и позволяют дать психологическую характеристику понимания пользователями ИИ как функционального, инструментального, интерактивного явления, применимого в любых сферах жизни. Вопросы о том, являются ли функциональность, инструментальность, интерактивность ИИ синонимами, тремя самостоятельными характеристиками либо они снимаются четвёртой, требуют дальнейших исследований.

Ключевые слова: искусственный интеллект, пользователи, сознание, психология, технология, понимание, риски

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