SELINUS UNIVERSITY
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PSYCHOLOGICAL DETERMINANTS OF THE ILLUSION OF FREEDOM OF CHOICE: HOW SOCIAL NORMS, COGNITIVE SCHEMAS, AND EMOTIONAL STATES SHAPE THE BELIEF IN THE AUTONOMY OF DECISIONS

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List of Abbreviations

SFCI –Subjective Freedom of Choice Index

STAI –State-Trait Anxiety Inventory (Khanin adaptation)

MAI –Metacognitive Awareness Inventory (Schraw & Dennison)

ANOVA –Analysis of Variance

DSTU –Don State Technical University

ICF –Internal Consistency Factor

FAD –Free Will and Determinism Scale

FWI –Free Will Inventory

VIF –Variance Inflation Factor

PTSD –Post-Traumatic Stress Disorder

APA –American Psychological Association

RPS –Russian Psychological Society

SD –Standard Deviation

M –Mean

N –Sample size

r –Pearson correlation coefficient

F –F-statistic (ANOVA)

η^2 –Eta-squared (effect size)

p –Significance level

α –Cronbach's alpha

Introduction

In modern conditions, choice is increasingly made not in a neutral space, but in a pre-structured field of alternatives, where the order of presentation, the salience of options, and the organization of the interface can direct the subject's behavior. In these conditions, it is not free will as a philosophical category that acquires special scientific significance, but the subjective experience of the autonomy of a decision as a psychological phenomenon.

The relevance of the study is determined by the fact that a person often experiences their own decision as free and internally justified even in those situations where the objective functional significance of the alternatives is limited. At the same time, it remains insufficiently studied which individual psychological characteristics strengthen or, on the contrary, weaken the expression of this experience.

Of particular interest are anxiety and metacognitive awareness. The former may be associated with an increased need for certainty, predictability, and subjective control, while the latter potentially acts as a cognitive resource that allows one to notice automatisms, situational influences, and contextual determinants of choice.

The practical significance of the problem is due to the fact that the severity of the illusion of freedom of choice may be associated with vulnerability to external influence, reduced criticality in a choice situation, and increased tension in decision-making. In this regard, the study of the psychological determinants of this phenomenon seems important both for general psychology and personality psychology, as well as for counseling, educational, and applied practice.

The object of the study is the subjective experience of the autonomy of a decision in a choice situation.

The subject of the study is the relationship between trait anxiety and metacognitive awareness and the severity of the illusion of freedom of choice.

The aim of the study is to identify the influence of anxiety and metacognitive awareness on the severity of the illusion of freedom of choice.

To achieve this aim, the following **tasks** were set:

1. To conduct a theoretical analysis of Russian and foreign approaches to the study of the subjective experience of choice, agency, and the illusion of freedom of choice.
2. To operationalize the phenomenon of the illusion of freedom of choice and

develop an original method for its empirical study.

3. To identify the relationship between trait anxiety and the severity of the illusion of freedom of choice.

4. To identify the relationship between metacognitive awareness and the severity of the illusion of freedom of choice.

5. To compare the severity of the illusion of freedom of choice in groups differing in levels of anxiety and metacognitive awareness in order to identify the main effects of these factors and assess their possible interaction.

6. To develop practical recommendations for psychological counseling, education, and behavioral consulting based on the obtained results.

The research **hypothesis** is unfolded into two specific hypotheses:

1. A higher level of trait anxiety is associated with a higher severity of the illusion of freedom of choice.

2. A higher level of metacognitive awareness is associated with a less pronounced illusion of freedom of choice.

Research methods:

1. Theoretical analysis and synthesis of scientific literature;

2. Psychodiagnostic method (Yu.L. Khanin's Trait Anxiety Scale [58]; Metacognitive Awareness Inventory (MAI; Schraw & Dennison, 1994) [38; 104]);

3. Experimental method (original method "Subjective Freedom of Choice Index");

4. Qualitative method (semi-structured interview);

5. Methods of mathematical statistics (correlation analysis, analysis of variance, thematic analysis).

Scientific novelty of the dissertation research lies in the following:

1. An original method for studying the Subjective Freedom of Choice Index (SFCI) has been proposed and tested, allowing for the operationalization of the experience of decision autonomy in an experimentally standardized situation.

2. The relationships between trait anxiety, metacognitive awareness, and the severity of the illusion of freedom of choice have been clarified.

3. It has been shown that anxiety is positively associated with SFCI severity, whereas metacognitive awareness is negatively associated.

4. It has been revealed that both factors make an independent contribution to the severity of the subjective experience of choice autonomy.

Theoretical significance of the work consists in clarifying the understanding of the subjective experience of choice autonomy as a phenomenon associated not only with the parameters of the situation but also with the individual psychological characteristics of the subject. The obtained results expand the psychological understanding of the role of emotional and metacognitive factors in the formation of the experience of decision autonomy.

Practical significance of the study lies in the possibility of using its results in psychological counseling, psychotherapeutic practice, educational environments, and applied work with behavioral choice scenarios.

In psychological counseling, the research results can be used when working with clients prone to rationalization of choice, increased need for control, and anxious experience of uncertainty. In educational practice, they can be used in developing programs for critical thinking, digital literacy, and mindful choice skills. In the applied field, the results can be considered when designing more transparent and ethically structured choice environments.

Practical recommendations for using the research results are presented in Chapter 3 and are specified for counseling, educational, and applied spheres.

Propositions submitted for defense:

1. The author's SFCI method allows operationalizing the subjective experience of choice autonomy in a situation of experimentally limited functional significance of alternatives.

2. Trait anxiety is positively associated with the severity of the illusion of freedom of choice.

3. Metacognitive awareness is negatively associated with the severity of the illusion of freedom of choice.

4. The severity of the illusion of freedom of choice differs in groups formed by levels of anxiety and metacognitive awareness.

5. Qualitative analysis of interviews allows clarifying the psychological mechanisms of the phenomenon under study, including rationalization of choice, awareness of automatisms, and internal conflict between the need for control and the understanding of the situational conditionality of a decision.

Dissemination of the main provisions of the study was carried out at scientific

seminars and conferences, indicated below.

Scientific seminars of the Department of Psychology of DSTU;

International Scientific Conference "Psychology of the XXI Century" (Rostov-on-Don, 2025);

All-Russian Conference "Current Issues in General and Educational Psychology" (Rostov-on-Don, 2025);

Meetings of the Academic Council of the Faculty of Psychology of DSTU.

Structure of the PHd thesis corresponds to the logic of scientific research and includes an introduction, three chapters, a conclusion, a list of references (including 150 sources, 91 of them in foreign languages) and appendices.

The first chapter is devoted to a theoretical analysis of the problem of freedom of choice in Russian and foreign psychology.

The second chapter contains a description of the methodology, procedure, and results of the empirical study.

The third chapter is devoted to the development of practical recommendations and discussion of prospects for applying the obtained data.

Chapter 1. Theoretical Approaches to the Problem of Freedom of Choice in Psychology

1.1. Philosophical Origins of the Problem of Free Will: From Determinism to Existentialism

1.1.1. Ancient and Medieval Interpretations of Free Will (Augustine, Aquinas)

In antiquity, freedom was more often understood as agreement with cosmic necessity. For the Stoics, it was a voluntary acceptance of fate: "What stands in the way becomes the way" [70]. For Plotinus, the soul gains autonomy through a voluntary ascent to the One, which laid the foundation for the Christian understanding of freedom as a condition for moral responsibility [94].

Augustine of Hippo, in his treatise "On Free Choice," argued that without free will, neither merit nor guilt is possible [8]. Later, in his polemic with Pelagius, he developed the doctrine of grace: after the Fall, the will is damaged, and true freedom is not the choice between good and evil, but the ability to serve good without coercion [18].

Thomas Aquinas, in the "Summa Theologica," distinguished between the will as a striving for the good and the rational choice of means. Freedom is not arbitrariness, but a rational following of the true good. God, as the First Cause, does not cancel the human will but affirms it: "Divine providence... establishes the freedom of our actions" [127].

Thus, two approaches emerged: determinist (fate, predestination) and voluntarist (freedom as a moral gift). They did not oppose but complemented each other, understanding freedom as participation in a higher order – an idea that resonates with modern psychology.

1.1.2. Determinism of the Modern Era: Spinoza, Laplace, Holbach

The Modern Era questioned free will, asserting: in a world governed by cause-and-effect laws, a person cannot be free. Freedom is an illusion born of ignorance of the true causes of one's actions.

Benedict Spinoza, in his "Ethics," argued that everything, including thoughts and desires, necessarily follows from the essence of Nature. "Men believe themselves free," he

wrote, "because they are aware of their desires, but are unaware of the causes that govern them" [118]. However, Spinoza did not reduce man to a passive particle: true freedom is the knowledge of necessity. "That person is free who acts by the necessity of his nature" [118]. This idea – "freedom is recognized necessity" – influenced all subsequent philosophy.

In the Enlightenment, determinism was developed by Paul-Henri Thiry d'Holbach. In "The System of Nature," he argued that man is part of nature, and all his actions are predetermined by external causes. Free will is a "phantom idea" created by religion for control. Nevertheless, Holbach recognized its practical necessity for morality and law [50].

Even more radical was Pierre-Simon Laplace. In "A Philosophical Essay on Probabilities," he described "Laplace's demon" – an intellect that could predict all the future, knowing the state of the universe at one moment. "For such an intellect, nothing would be uncertain" [64]. Although Laplace did not apply this directly to the psyche, his model became a symbol of scientific determinism excluding free will.

Thus, the philosophy of the Modern Era theoretically denied freedom but practically recognized its role in ethics and society – a contradiction that became the basis for future discussions on the compatibility of determinism and subjective autonomy.

1.1.3. Kant's Conception of Autonomy and the Moral Law

Immanuel Kant proposed an innovative solution to the dilemma of determinism and moral responsibility, rejecting both the illusoriness of freedom (Spinoza, Holbach) and naïve voluntarism. His transcendental model is based on a dualism: in the phenomenal world, man is subject to causality, but as a noumenon, he possesses free will [56].

The central concept of Kant's ethics is autonomy: the ability of reason to give law to itself independently of external impulses. "The will is nothing other than practical reason" [57, p. 32]. Freedom is not arbitrariness, but subordination to the moral law emanating from reason. This law is expressed in the categorical imperative: "Act only according to that maxim whereby you can at the same time will that it should become a universal law" [57, p. 47]. Unlike hypothetical imperatives, it obliges unconditionally – for the sake of duty, not an end.

Kant contrasts autonomy with heteronomy. The latter is submission to inclinations, interests, or external prescriptions, even religious ones. Such a will is unfree, even if the subject "feels free." True freedom is possible only when a person becomes a lawmaker for

themselves. "Free will and the moral law mutually imply each other" [57, p. 5].

Importantly, Kant does not consider freedom an empirical fact. It is a postulate of practical reason – a necessary assumption for morality, responsibility, and dignity. "I cannot prove freedom theoretically," he wrote, "but I must assume it in order to act as a moral being" [7, p. 142]. Thus, freedom is not an object of knowledge, but a condition of moral action.

Kant's model proved to be a bridge between determinism and ethics. It influenced German idealism, existentialism, and modern psychology, especially in understanding personal autonomy. Unlike cognitive approaches that reduce freedom to illusion, Kantianism preserves it as a normative ideal, necessary for critical thinking and ethical behavior. In this sense, Kant anticipated the activity-based approach: freedom is not the absence of causes, but following an internal, rationally recognized law.

1.1.4. Existentialism of the 20th Century: Sartre, Camus

In the 20th century, existentialism placed freedom at the center of human existence. Jean-Paul Sartre radically asserted: "Existence precedes essence" [101, p. 21]. Man has no pre-defined nature – he creates himself through actions. For Sartre, freedom is not a possibility, but an inevitability: "man is condemned to be free." Even the refusal to choose is a choice. This absolute freedom generates existential anxiety, as a person bears responsibility not only for themselves but also for "humanity in general." To avoid anxiety, people resort to bad faith – self-deception in which they deny their autonomy, justifying themselves with phrases like "I had no choice" [102]. Thus, the illusion of absence of freedom is a defense against the burden of responsibility.

Albert Camus, unlike Sartre, did not absolutize freedom but placed it in the context of the absurd – the conflict between the search for meaning and the indifference of the world. In "The Myth of Sisyphus," he argues: freedom is rebellion against meaninglessness. Sisyphus is free not in changing his fate, but in his attitude towards it: "One must imagine Sisyphus happy" [21, p. 110]. Freedom for Camus is an act of dignity in conditions of objective limitation.

Both philosophers agree: freedom is inseparable from anxiety and responsibility. The loss of illusions about predestination leaves a person facing the necessity of choice. This position formed the basis of existential and humanistic psychology (Frankl, May), where

freedom is a condition for personal growth, and anxiety is a sign of authentic existence [72].

Importantly, existentialism does not question the reality of freedom – only the flight from it is illusory. This brings it closer to the Russian tradition (Petrovsky), where freedom is an act of self-determination in uncertainty [93]. Moreover, existentialism anticipates modern data: people rationalize or deny autonomy to reduce discomfort – which directly supports the hypothesis about the relationship between anxiety and the illusion of freedom of choice.

Thus, existentialism completes the philosophical path from metaphysics to the psychology of freedom, showing it as an existential task requiring reflection and courage – and opens the foundation for the empirical study of the subjective experience of autonomy.

1.1.5. Compatibilism: Reconciliation of Freedom and Causality

Compatibilism rejects the dichotomy "freedom or determinism," asserting that free will is compatible with causal conditionality. An action is considered free not if it lacks causes, but if it originates from the subject's internal motives – beliefs, desires, values – rather than from external coercion [73].

Compatibilist ideas date back to David Hume, who wrote: "Freedom is the ability to act according to one's motives without coercion" [51, p. 104]. If actions were not determined by character, they would be random, not free. Causality, thus, is a condition of freedom.

In the 20th-21st centuries, this position was developed by Daniel Dennett and Harry Frankfurt. Dennett interprets freedom as an evolved mechanism of self-regulation: a person possesses a "space of possible actions" in which they choose based on internal criteria. "Free will is not a violation of the laws of physics, but the ability to be the author of one's actions" [29, p. 132].

Frankfurt, in his thought experiment with a "neurosurgeon," showed that freedom does not require an alternative possibility ("could have done otherwise"). It is enough that the action corresponds to a second-order volition – the desire to desire in a certain way. If a person quits smoking because they want to want to, their choice is free, even if the alternative was blocked [39].

For modern psychology, compatibilism is especially significant: it allows one to consider the subjective experience of freedom not as an error illusion, but as a marker of the internal consistency of decisions. A person feels free when an action originates from their

"self" – a system of values and identity. This resonates with A.N. Leontiev's activity-based approach: freedom is following internal, not external, determinants [66].

Furthermore, compatibilism explains why some people believe in their autonomy more than others: if a decision is perceived as "my" decision, not caused by manipulation, and can be rationally justified, it feels free – even with objective predetermination. In this sense, the "illusion of freedom" is not a defect, but a functional mechanism of self-understanding and social coordination [92].

Thus, compatibilism offers a productive basis for empirical research:

— freedom is preserved as a psychological and ethical reality;

— objective determination is recognized;

— the focus shifts to the quality of determinants (internal vs. external).

This position underlies the hypotheses of the dissertation: the tendency towards the illusion of freedom of choice depends not on the "presence of freedom," but on the awareness and acceptance of the sources of decisions – which is modulated by anxiety and metacognitive reflection.

1.2. The Transition from Metaphysics to Empirical Psychology: The Crisis of Naïve Voluntarism

1.2.1. Volitional Psychology of the 19th Century: W. Wundt, N. Ach

In the 19th century, the psychology of will became an empirical discipline. Wilhelm Wundt, founder of the first experimental laboratory, considered the will as an active component of consciousness, ensuring the purposefulness and unity of personality. In his "System of Psychology," he identified three processes – cognition, feeling, and will – assigning the latter the highest role [138]. The volitional act, according to Wundt, includes the emergence of a motive, a struggle of motives, a decision, and execution. It is at the moment of conflict of motives that the experience of freedom arises: "A person feels free not when they act without a cause, but when they themselves become the cause of their action" [138, p. 215].

Wundt did not deny determinism but saw in the will a form of internal determination – authorship over one's actions. His approach is close to compatibilism:

freedom is not the absence of causes, but the management of them through the awareness of goals. He also linked the development of will to the transition from impulsive reactions to rational self-regulation – an idea anticipating modern concepts of executive functions [80].

His student, Narziss Ach, in his dissertation "On the Will" (1905), proposed the first experimental paradigm, measuring reaction time when performing tasks with instructions (an analogue of the later Stroop test). He introduced the concept of a determining tendency – a latent factor guiding behavior according to a goal [1]. Ach's main discovery: most volitional acts occur unconsciously. "We become aware not of the volitional process itself, but only of the result of the action," he wrote [1, p. 89]. This anticipated modern data (Libet, Wegner) and showed that the feeling of freedom often arises post hoc – as a rationalization of an already performed act.

Thus, volitional psychology moved the problem of freedom from metaphysics to the empirical plane, establishing:

— will is an observable mental process;

— the experience of freedom is associated with the struggle of motives, not the absence of causes;

— a significant part of decisions is determined unconsciously, which casts doubt on the direct connection between the "feeling of choice" and autonomy.

These ideas influenced Gestalt psychology, psychoanalysis, and cognitive psychology. Especially important is that Ach laid the foundations for studying the illusion of conscious will – the belief in freedom due to misunderstanding of the true determinants of behavior.

For this research, this legacy is valuable for two reasons:

— it first substantiated the dissociation between the subjective feeling of freedom and objective determinacy;

— it proposed a methodology for studying decisions through instructions and time parameters – without complex equipment, which corresponds to the tasks of Chapter 2.

Volitional psychology of the 19th century is a bridge between philosophy and modern psychology: freedom is not the absence of causes, but the ability to be aware of them and direct them.

1.2.2. Psychoanalysis and the Unconscious as a Determinant of Behavior

Sigmund Freud's psychoanalysis dealt a powerful blow to the idea of man as a conscious and autonomous subject. Freud argued that behavior is determined by the unconscious – a dynamic sphere of repressed desires, traumas, and instincts, inaccessible to awareness. Consciousness merely rationalizes already performed actions, creating the illusion of free choice. "Man is not master in his own house," he wrote [40, p. 38].

In "The Psychopathology of Everyday Life," Freud showed that even "accidental" errors, forgetfulness, or choice of route have hidden causes in the unconscious [41]. This is psychic determinism: nothing in the psyche is accidental. Thus, free will turns out to be an illusion born of ignorance of true motives.

Freud's structural model of the psyche includes the Id (impulses), Super-Ego (moral prohibitions), and Ego (mediator). Decisions are not acts of freedom, but compromises between unconscious forces, which the Ego only later interprets as its own. This idea anticipated modern concepts of the "illusion of conscious will" (Wegner) and "emotional intuition with subsequent rationalization" (Haidt).

Freud also identified the fear of freedom: in neurosis, a person may voluntarily renounce autonomy (e.g., through hysteria) to avoid the anxiety associated with responsibility. Here, the illusion of absence of choice is a defense mechanism. This resonates with the modern hypothesis: anxious people either strengthen their belief in their autonomy (to reduce dissonance) or, conversely, avoid the experience of freedom – depending on the defense strategy.

Followers developed these ideas. Erich Fromm, in "Escape from Freedom," showed that a person deprived of traditional supports can voluntarily submit to authoritarian systems to get rid of the burden of choice [43]. This brings psychoanalysis closer to existentialism and modern research on the need for structure in anxious people.

Thus, psychoanalysis postulated:

— behavior is determined by unconscious motives;

— consciousness interprets, rather than controls;

— fear of freedom leads to its voluntary renunciation;

— rationalization supports the illusion of control.

Importantly, Freud did not deny the possibility of liberation through awareness. The

goal of analysis is "to turn the unconscious into conscious" so that a person can manage their motives. True freedom is not the absence of causes, but their reflective awareness. This idea brings psychoanalysis closer to the activity-based approach (Leontiev) and modern concepts of metacognitive reflection as a resource for critically understanding the determinants of behavior [38].

Psychoanalysis does not deny freedom, but redefines it: freedom is possible only through work with the unconscious – which remains relevant for the modern psychology of subjective autonomy.

1.2.3. Behaviorism: The Rejection of the "Internal Observer"

Behaviorism in the first half of the 20th century radically rejected the study of the internal world. John Watson, in his article "Psychology as the Behaviorist Views It" (1913), declared that psychology should be an objective science, based only on observable behavior, without recourse to consciousness, will, or freedom of choice [133, p. 12]. Instead of "mentalistic" concepts, it proposed studying behavior as a function of stimuli and reactions (S-R).

Watson argued that by controlling the environment, one could "create" from any infant any specialist – regardless of innate inclinations [133, p. 45]. This meant a complete denial of free will: man is a product of the environment, his actions determined by the history of reinforcements.

B.F. Skinner developed these ideas into the theory of radical behaviorism, writing: "Freedom is an illusion born of ignorance of the causes of behavior" [111, p. 23]. According to Skinner, even creativity, morality, or religion are explained in terms of reinforcement. Man merely post-factum attributes autonomy to automatic actions: "We do not say that a person chooses – we say that his behavior is chosen by environmental conditions" [111, p. 89].

Behaviorism distinguished between respondent and operant behavior – actions aimed at changing the environment. Although the latter may seem "free," they are equally determined by consequences. The feeling of freedom arises not from the absence of causes, but from misunderstanding the reinforcing conditions – social approval, benefit, anxiety avoidance.

Despite abandoning consciousness, behaviorism exerted a huge influence: its

principles formed the basis of behavioral therapy, learning, nudge theory, and behavioral economics. It also prepared the ground for the cognitive revolution – it was its extremes that caused a return to the study of internal processes, but in an empirical key.

Criticism of behaviorism was not long in coming: Tolman showed "latent learning" without reinforcement, and Chomsky demonstrated the impossibility of explaining language solely through reinforcement [22]. Nevertheless, behaviorism was the first to empirically substantiate that freedom of choice is an illusion born of ignorance of behavioral determinants.

For this research, this is a key point: people with low metacognitive reflection do not notice hidden influences (external and internal), therefore they believe more strongly in their autonomy. Behaviorism reminds us that even "free" choice is shaped by the history of interaction with the environment – and only awareness of these conditions leads to genuine autonomy.

1.2.4. The Cognitive Revolution and the Return to the Study of Internal Processes

The cognitive revolution of the second half of the 20th century returned the study of thinking, memory, attention, and decision-making to psychology – but on a new, empirical basis. Rejecting the behaviorist "black box," cognitivists began to view the mind as an information-processing system, comparable to a computer.

The main impetus was Chomsky's criticism of the behaviorist theory of language: children create new grammatically correct phrases, indicating internal cognitive structures [22]. This challenged the validity of the "stimulus-response" model and opened the way to recognizing the active role of the mind.

Cybernetics and the TOTE cycle (Test-Operate-Test-Exit) model, proposed by Miller, Galanter, and Pribram, played an important role [78]. It restored the concepts of goal-setting and self-regulation – the basis of the subjective experience of autonomy.

Particularly significant were the works of Kahneman and Tversky, showing that decisions are determined by cognitive automatisms, not rational choice. Heuristics (e.g., availability or framing) lead to systematic errors that a person does not recognize [54]. This confirmed: freedom of choice is not the absence of causes, but the result of hidden cognitive processes.

Kahneman identified two systems of thinking:

— System 1 – fast, automatic, unconscious;

— System 2 – slow, analytical, conscious [55].

Most decisions are made by System 1, but a person attributes them to System 2, creating the illusion of free and rational choice. This directly supports the hypothesis: low metacognitive reflection strengthens the illusion of autonomy.

Cognitive psychology also revived the study of consciousness – not as a "spectator," but as a regulator. Executive functions (planning, inhibition, monitoring) were identified, localized in the prefrontal cortex and considered the neurocognitive basis of volitional control.

Of central importance is metacognitive reflection – the ability to recognize and regulate one's own thought processes. Research by Flavell and Schraw showed that people with high levels of metacognitive awareness are better at recognizing the sources of their decisions and are less prone to illusions of control [38; 104]. These data underlie the second hypothesis of the dissertation.

The cognitive revolution achieved a synthesis:

— confirmed the determinacy of behavior but shifted its source to internal cognitive structures;

— restored the scientific status of consciousness as a regulatory system;

— prepared methodology for the empirical study of subjective autonomy without complex equipment.

Cognitivists did not return to voluntarism, but showed: freedom is an adaptive mechanism allowing one to function in a complex environment, even with objective limitations. This understanding formed the basis of behavioral economics and critical thinking development programs – where freedom is preserved through ethical environmental design.

It is on this basis that the present research is built: freedom of choice is a dynamic process of interaction between cognitive resources, emotions, and context, modulated by anxiety and metacognitive reflection.

1.2.5. Neuropsychological Data: Libet's Experiments and Their Interpretation

Benjamin Libet's experiments (1983) were a turning point in the empirical study of free will. Participants were asked to flex their finger voluntarily, while recording:

— readiness potential (RP) – increasing activity in the motor cortex (EEG);

— the moment of conscious intention (W) – when the person "felt the desire to move";

— the time of movement (M).

The results showed: RP began on average 550 ms before movement, and conscious intention – only 200 ms before. That is, the brain "decided" to act 350 ms before the person was aware of this decision. Libet concluded: conscious will does not initiate an action, but can only approve or cancel it at a later stage – thus the idea of "freedom of veto" emerged [68].

These data sparked controversy. Critics pointed out limitations: the task was meaningless, W measurement was subjective, and RP reflects not a decision but general preparation for action [130]. Later studies confirmed and refined the findings. For instance, Soon et al., using fMRI, predicted choice up to 7 seconds before awareness [116]. However, Schurger's work showed that RP can arise spontaneously and does not always lead to action – it is more related to attention and expectation than to determination [105].

A key experiment by Schurger confirmed the possibility of conscious inhibition even after RP onset [105]. This supported the concept of "freedom of veto" and linked autonomy not to initiation but to executive control.

Philosophical evaluation of the results diverged:

— radicals (Wegner, Harris) saw evidence of the illusoriness of freedom [134];

— compatibilists (Mele) insisted: even an unconscious decision can be "ours" if it agrees with our values [74].

For psychology, the metaphysical conclusion is less important than the empirical dissociation: the subjective experience of choice does not coincide with its neural precursors. This means:

— consciousness is not an initiator, but an interpreter of actions;

— the feeling of freedom arises post hoc for the narrative integrity of the "self";

— real autonomy is associated with control and inhibition, not with the "first impulse".

These positions directly support the dissertation hypotheses:

— the illusion of freedom is a stable cognitive construct;

— people with high metacognitive reflection are less likely to attribute actions to "free will" because they notice automatisms;

— anxiety strengthens belief in autonomy as compensation for the threat of loss of control.

Importantly, neural correlates are not causes of behavior, but markers of complex processes. As Noë writes, "the brain does not decide – the person decides in the world" [87]. Modern science rejects neurocentrism in favor of a multi-level approach, where freedom is the result of the interaction of neural, cognitive, emotional, and social factors.

Libet's experiments did not abolish freedom, but showed: the experience of autonomy is a psychological construct serving the integrity of the "self" and social coordination. This opens the way to studying the conditions under which a person is or is not inclined to the illusion of freedom of choice.

1.3. Modern Foreign Approaches to the Subjective Experience of Freedom of Choice

1.3.1. D. Wegner's Concept of the "Illusion of Conscious Will"

An influential contribution to the modern understanding of freedom of choice was made by Daniel Wegner's concept of the "illusion of conscious will," proposed in his 2002 monograph [134]. Wegner not only pointed out the illusoriness of freedom – he proposed a cognitive mechanism explaining why a person believes that "I decided," even when it is false.

The essence of his theory: the feeling of will is an interpretation based on three criteria:

— Priority: the thought of the action precedes it;

— Exclusivity: there are no obvious external causes;

— Consistency: the action matches the expected result [134, p. 67].

If the conditions are met, a person automatically attributes authorship to themselves – even if the decision was caused by other factors. "We do not feel will directly – we infer it from available cognitive signals" [134, p. 5]. Thus, free will is a post-hoc constructed illusion.

Wegner confirmed this with a series of experiments. In one, participants and a

"confederate" (actor) moved a pointer together. When the confederate secretly took control, but the participant's thought coincided with the movement, the participant continued to believe they were acting themselves [135]. In another, a cue ("think about a red light") presented a few seconds before a "voluntary" choice strengthened the belief in autonomy, although the choice was initiated externally [136].

Especially revealing is the experiment with "magical thinking": when a masked cue coincided with a drawn card, participants "felt" they had influenced the choice, despite a complete lack of control [96].

Wegner also analyzed phenomena of disturbed agency: séances, automatic writing, delusions of control in schizophrenia – in all cases, one or more criteria are violated, confirming that the feeling of will is a cognitive inference, not a direct experience.

Theoretically, the concept draws on ideas by Heider (causal attribution) and Neisser (cognitive schemas): the brain builds a narrative "I did it" based on available signals, ignoring their true sources.

Importantly, Wegner does not deny the functional value of the illusion: it is necessary for:

— sense of identity;

— social responsibility;

— self-regulation [134, p. 320].

Without it, a person would be in a state of passivity. The illusion is not an error, but an adaptive mechanism.

For this research, this concept is extremely important:

— it empirically substantiates the dissociation between the experience of freedom and objective autonomy;

— it indicates the conditions for strengthening the illusion – which explains why anxious people more often attribute authorship to themselves (they actively seek control signals);

— it links the tendency to illusion with metacognitive reflection: those aware of the influence of cues (violating exclusivity) or the inconsistency of actions with values are less likely to believe in their "free will."

Thus, Wegner's theory is a bridge between philosophy and empirical psychology: freedom of choice is not a fact, but a cognitive construct, formed by simple rules of causal

inference. This opens the way to studying individual differences in the tendency towards the illusion of freedom of choice.

1.3.2. The Sense of Agency as a Psychological Phenomenon

If D. Wegner's concept explains why a person attributes authorship to themselves, then modern cognitive science develops this understanding through a broader construct – the sense of agency: the subjective experience that "I initiate and control my actions and their consequences" [121]. Unlike metaphysical "free will," this is an empirically measurable phenomenon underlying self-consciousness and moral responsibility.

The sense of agency includes two components:

— feeling of agency – an automatic, pre-reflective sense of control;

— judgment of agency – a conscious attribution of authorship based on cognitive inferences [44].

The first works quickly and unconsciously, the second – slowly, involving executive functions and metacognitive reflection. It is the judgment of agency that is most vulnerable to illusions and is defining for the study of the illusion of freedom of choice.

Theoretically, the sense of agency is explained by two models:

Comparator model – the brain compares predicted and actual feedback; a match generates agency [13];

Inferential model (Wegner) – agency is inferred from priority, exclusivity, and consistency [134].

Modern data show: both models complement each other – low-level sensorimotor processes generate the sense in real time, while high-level processes generate the judgment retrospectively [82].

Empirically confirmed:

— delayed feedback >200 ms reduces agency [103];

— in joint tasks, agency can be extended to a partner when goals coincide [89].

In clinical psychology, disturbances of agency are evident:

— in schizophrenia – attribution of thoughts to external agents (violation of prediction) [42];

— in OCD – attribution of authorship to involuntary thoughts, increasing anxiety.

The sense of agency plays a dual role:

— supports the illusion of autonomy, even when decisions are determined;

— provides a functional basis for self-regulation and social interaction. As Metcalfe notes, "without the sense of agency, we would be passive observers of our lives" [77].

Critically, agency is modulated by emotions:

— in anxiety – the illusion of control over random events is strengthened [2];

— in depression – it is reduced even with real control ("learned helplessness").

These data support the first hypothesis: anxiety strengthens the judgment of agency, even in the absence of autonomy.

Also important is metacognitive reflection: people aware of the sources of their thoughts are less prone to illusions of agency. In an experiment by Metcalfe and Greene (2007), such participants more accurately distinguished real from illusory control [77]. This supports the second hypothesis: developed metacognitive reflection weakens the illusion of freedom of choice.

The sense of agency is not just an "illusion," but a complex adaptive mechanism integrating sensorimotor, cognitive, and emotional processes. Its study allows moving from the metaphysical question "Is man free?" to the empirical one: "Under what conditions does a person experience themselves as a free agent?" – which is the task of the present study.

1.3.3. E. Langer's Illusion of Control: When Chance Seems Subject to Will

A crucial contribution to the critique of the naïve conception of freedom of choice was made by Ellen Langer's concept of the illusion of control [63]. She showed that people believe in the ability to influence objectively random events if they are actively involved, possess signs of competence, or encounter situational cues simulating control.

Langer defines the illusion of control as "an expectation of personal success exceeding the objective probability in a situation where the outcome is determined by chance" [63, p. 313]. Unlike self-efficacy, it manifests precisely where control is impossible: lotteries, gambling, stock speculation.

In Langer's experiments, five factors were identified that strengthen the illusion:

— choice (choosing a ticket oneself raises the estimate of chances);

— familiarity (a practice round increases confidence);

— competition (presence of an opponent);

— signs of competence (knowledge on the topic);

— involvement (active actions instead of passive observation) [63].

In one experiment, participants who chose a lottery ticket themselves asked for 4 times more money for it than those who received it randomly – despite identical chances of winning [63]. In another, those who rolled the dice themselves more often "felt control," attributing success to skill and failure to "bad luck," but not to chance [33].

Theoretically, the illusion of control is explained by:

— cognitive: confusing correlation with causation (action → result = "I caused it");

— motivational: need for predictability and competence, especially in uncertainty [128].

As Langer notes, this is not an error, but an adaptive strategy, maintaining motivation in an unstable environment [63, p. 325].

Subsequent research confirmed her findings:

— Taylor and Brown showed that a moderate illusion of control is characteristic of the mentally healthy, unlike depressive realism [123];

— Thompson – the illusion strengthens when self-esteem is threatened [2];

— Lerner and Keltner – anxiety increases the need for control [67].

In the digital age, the illusion of control has acquired new forms: users "choose" content, "customize" their feed, "influence" recommendations – although behavior is directed by algorithms [32]. This makes Langer's concept relevant for the ethics of behavioral design.

For the topic of freedom of choice, the illusion of control is extremely important:

— it shows that the experience of freedom is easily manipulated, even in the absence of alternatives;

— it reveals the conditions for its strengthening – which explains why anxious people more often believe in autonomy (they actively seek control signals);

— it links the illusion to metacognitive reflection: those aware of cognitive biases are less susceptible. In a study by Pronin and Kugler (2007), such participants more accurately assessed randomness and were less likely to believe in personal control [97].

Langer emphasized the functional value of the illusion:

— maintaining motivation;

— stimulating activity;

— protecting against feelings of helplessness [63].

Without it, a person would avoid risks, reducing adaptability. The illusion of control is an evolutionary mechanism allowing one to act with incomplete information.

Thus, Langer's concept shows: autonomy is often experienced not because it exists, but because a person participates, chooses, and receives control cues. This is especially relevant in the world of algorithmic behavior management – and opens the way to studying individual differences in the tendency to the illusion of freedom of choice.

1.3.4. P. Johansson's "Choice Blindness": When a Person Defends a Choice They Did Not Make

One of the most compelling empirical proofs of the illusory nature of the subjective experience of freedom of choice is the series of experiments called "choice blindness," initiated by Petter Johansson [52]. Participants not only failed to notice the substitution of their choice but actively rationalized "their" decision, which they had never actually made.

In the basic experiment, participants were shown pairs of photographs of faces of the opposite sex and asked to choose the most attractive one. The experimenter then covertly presented the rejected face, claiming it was the participant's choice. Over 70% did not notice the substitution and provided convincing justifications: "I like her eyes," "He has a kind expression" – even though these features might be absent from the presented face [52].

The phenomenon has been replicated in different modalities:

— choice of smells and tastes (yogurts, jams);

— moral and political judgments [48].

In a 2013 experiment, participants filled out a questionnaire with statements (e.g., "I support higher taxes for the rich"). The experimenter substituted the opposite positions, and over 50% did not notice the substitution, defending the "new" beliefs with arguments contradicting their original views [120]. This showed: even values – the core of identity – are vulnerable to manipulation.

Theoretically, "choice blindness" is explained by:

— limitations of attention and memory;

— postdictive confabulation: the brain generates a plausible explanation for any outcome to maintain the narrative integrity of the "self" [47];

— social pressure (desire to appear consistent).

Johansson emphasizes: this is not a defect, but an adaptive feature. Constant doubt about decisions would paralyze behavior. Flexibility of attribution allows quick adaptation – but makes the experience of freedom vulnerable to distortion.

For the problem of freedom of choice, this is fundamental:

— awareness of choice can arise post hoc;

— rationalization often precedes awareness;

— the feeling of autonomy can be attributed to any outcome.

This resonates with Wegner and Haidt, but adds an experimental paradigm of direct choice manipulation.

"Choice blindness" is modulated by individual factors:

— strengthened under cognitive load, emotional neutrality of stimuli, low metacognitive awareness [75];

— weakened with high choice significance, developed reflection, attention training [53].

This directly supports the hypotheses of this study:

— people with low metacognitive reflection are more likely to believe in autonomy, not noticing inconsistencies;

— anxious individuals actively rationalize "their" choice to reduce dissonance.

The practical implications are significant: in marketing, politics, therapy, people defend decisions they never made. This underscores the importance of developing metacognitive skills as a resource for critical awareness.

Johansson also described constructive potential: when moral judgments were imperceptibly shifted in a more humane direction, participants retained the new position after two weeks and actively defended it [53]. This opens the way for ethical behavioral interventions.

Thus, "choice blindness" reveals the psychological nature of freedom as a

dynamic, often post-hoc constructed process.

1.3.5 The Functional Role of Belief in Free Will According to R. Baumeister

If the previous studies (Wegner, Johansson, Langer) demonstrated the illusory nature of the subjective experience of freedom of choice, then Roy Baumeister's work showed that the belief in free will, even if illusory, performs crucial adaptive functions [11]. His approach is functionalist: free will is considered not as an ontological fact, but as a psychological resource necessary for self-regulation, morality, and social coordination [9].

The central thesis: "Belief in free will promotes controlled behavior." In a classic experiment, participants who read a text on determinism ("freedom is an illusion") were twice as likely to cheat and showed more aggression than the control group [102]. This showed: undermining belief in freedom weakens self-control and moral imperatives.

Subsequent research confirmed: belief in free will positively correlates with:

— self-regulation;

— prosocial behavior;

— academic and professional success;

— sense of responsibility [131].

Conversely, skepticism is associated with:

— cheating and dishonesty;

— reduced motivation;

— increased aggression;

— weakened guilt [10].

Baumeister explains this motivationally: if "everything is predetermined," effort loses its meaning. Belief in freedom supports the illusion of control over the future, stimulating goal-setting and persistence.

Importantly, Baumeister does not assert the metaphysical reality of freedom. He takes a pragmatic position: "Even if free will is an illusion, it is a useful illusion without which society cannot function" [9, p. 18]. He compares it to money: their value lies in collective belief, not material essence.

Baumeister also develops the idea of the "cultural evolution of free will": the

concept emerged as a cultural tool for punishment ("you could have done otherwise"), reward ("you deserve it"), teaching self-discipline [119].

Thus, free will is a social construct embedded in law, morality, and education. Its denial undermines the foundations of these institutions.

For the topic of the illusion of freedom of choice, Baumeister's approach is dichotomous: he acknowledges the illusoriness, but insists on functional necessity. This allows moving from the question "Is freedom real?" to "When is belief in it adaptive?".

Two ideas are particularly important:

Belief should not be naïve. A mature position includes recognizing the limitations of freedom – which brings it closer to compatibilism and A.N. Leontiev's activity-based approach [66].

Belief is modulated by individual characteristics:

— anxious people use belief in autonomy as a defense against uncertainty – which supports the first hypothesis;

— people with high metacognitive reflection maintain a critical belief, avoiding extremes – which supports the second hypothesis.

Baumeister also notes cultural differences: in individualistic cultures, freedom is associated with autonomy; in collectivist cultures, with responsibility to the group. This shows that the illusion of freedom is shaped not only cognitively but also socially.

Thus, the illusion of freedom of choice is not an error, but an adaptive mechanism that:

— supports self-regulation and morality,

— ensures social coordination,

— serves as a resource in uncertainty.

However, its effectiveness depends on the quality of belief: naïve belief leads to perfectionism, complete denial leads to passivity. The optimum is a reflexive recognition of limited autonomy, achievable through the development of metacognitive awareness.

Baumeister's work completes the review of foreign approaches, showing that the illusion of freedom is a fundamental element of psychological adaptation. This opens the way to practical application: developing a critical but functional belief through psychocorrection, education, and ethical behavioral design.

1.4. Soviet and Post-Soviet Psychology: Activity-Theoretical and Personality-Centered Approaches to Choice

1.4.1. A.N. Leontiev's Activity Theory: Freedom as "Recognized Necessity"

In Russian psychology, the problem of freedom of choice received a fundamentally different treatment compared to the Western tradition. A key role was played by the activity theory of A.N. Leontiev – a student of L.S. Vygotsky and a follower of S.L. Rubinshtein's ideas. Leontiev did not deny the objective determination of behavior, but showed that freedom is possible within this determination – as a conscious following of internal, rather than external, laws. His formula – "freedom is recognized necessity" – became the methodological core of the Russian understanding of autonomy [66, p. 214].

The central concept is activity: a holistic form of activity aimed at satisfying needs and mediated by the objective world. Unlike behaviorism or cognitivism, the activity approach considers man as an active subject, transforming the world and himself [66].

Leontiev identifies three levels of activity structure:

— activity, motivated by needs (e.g., studying due to a cognitive need);

— action, directed at a goal (preparing for an exam);

— operation, determined by conditions (method of memorization).

Freedom of choice arises at the level of motive, when a person becomes aware of the hierarchy of needs and chooses the activity corresponding to the leading motive. Freedom is not in the "ability to do anything," but in the ability to follow a conscious motive, even if it requires effort [66].

Leontiev clearly distinguishes between freedom and arbitrariness:

— arbitrariness – determined by situational stimuli or external pressure;

— freedom – determined by the internal system of personal relationships.

Thus, freedom is not the absence of causes, but the quality of causes: if an action originates from the "self" – it is free [30].

Moreover, freedom develops ontogenetically: the child is initially subject to circumstances, but through the internalization of culture, language, and norms, acquires the ability for internal regulation, goal-setting, and anticipation – which constitutes the essence of freedom [66].

Of particular importance is the concept of "sense": "sense is the unit of consciousness in which the relationship of a person to the world is reflected" [30, p. 189]. A choice becomes free when it is meaningful, i.e., connected to a system of personal senses. Freedom is not an experience, but an ontological characteristic of a person as a subject of activity.

This approach helps overcome a common illusion: for Leontiev, true freedom can be accompanied by tension or duty (e.g., choosing in favor of family), if it corresponds to the leading motive. An illusion arises when a person follows stimuli but attributes it to "their choice."

For this research, this is important for the following reasons:

— it justifies the study of illusion: it arises when there is a mismatch between real determinants and their subjective perception;

— it indicates the role of metacognitive reflection: only awareness of the hierarchy of motives allows distinguishing genuine choice from arbitrariness – which supports the second hypothesis;

— it explains the role of anxiety: attributing decisions to "free choice" creates an illusion of control but is not freedom for Leontiev – which relates to the first hypothesis.

Leontiev also emphasizes the social nature of freedom: a person becomes free through the assimilation of culture, which provides tools for meaning-making. This opens an understanding of the illusion of freedom in the digital environment, where algorithms form "false motives."

Thus, activity theory offers a dialectical understanding of freedom, overcoming both voluntarism and determinism. Freedom is a psychological characteristic achieved through the awareness of internal determinants and following them. The criteria for genuine autonomy – meaningfulness, hierarchy of motives, internal position – allow empirical study of the tendency to the illusion of freedom of choice.

1.4.2. L.S. Vygotsky on Meaning-Making and Volitional Regulation

If A.N. Leontiev developed the theory of activity as a system, his teacher, Lev Semyonovich Vygotsky, laid the foundations for understanding meaning, consciousness, and will as higher mental functions (HMFs) formed in a sociocultural context. Unlike Western theories that reduce will to cognitive control or illusion, Vygotsky considered volitional

regulation as a central mechanism ensuring personal freedom under conditions of objective determinacy.

The key idea – HMFs arise through the internalization of social interactions and cultural tools (primarily language). Unlike elementary functions, HMFs are characterized by mediation, arbitrariness, and awareness [132]. It is volitional regulation – the ability to control behavior through internal means – that becomes the basis of psychological autonomy.

Vygotsky described the volitional act as a multi-stage process:

— emergence of a motive (often affective);

— struggle of motives;

— inclusion of volitional effort through cultural means (speech, symbols);

— implementation of the decision [140].

He assigned a special role to speech: in a child, volitional behavior is first mediated by the adult's external speech, then by egocentric speech, and finally by inner speech, which becomes a tool for self-regulation. Thus, free will is formed through mastery of language – as a socio-historical phenomenon [132].

Of central importance is the concept of "meaning-making": "meaning is the unit of consciousness in which the relationship of the personality to the world is reflected" [140, p. 127]. Unlike objective "significance," meaning is always personal. A choice becomes free when it is based on personal meaning, not on a situational stimulus.

Also important is the concept of the "zone of proximal development" (ZPD) – not only a pedagogical but also an existential space of freedom. In the ZPD, a person is capable of actions "I can if..." – this is the area of potential autonomy, where conscious choice is formed [132].

Vygotsky also introduced the concept of the "psychological system of personality": behavior is determined not by individual stimuli, but by an integral system of motives, values, and worldviews. Volitional regulation is a mechanism of integration, subordinating lower impulses to higher goals. For example, a student refuses entertainment not because of a lack of desire, but because their system attaches greater importance to education [140].

Thus, for Vygotsky, freedom is a hierarchy of causes: if behavior is determined by a higher meaning – it is free; if by a lower affect – it is not. This brings him closer to Leontiev, but adds a processual dimension: freedom is not a state, but the formation of a subject through culture.

Vygotsky did not idealize the will: in disturbances of HMFs (e.g., "affective blindness"), a person loses the ability for meaning-making and acts impulsively. Freedom depends on the integrity of the psychological system, not on "willpower."

For this research, Vygotsky's ideas are extremely important:

Metacognitive reflection is a direct continuation of inner speech as the basis of volitional regulation. People with high metacognitive awareness have better command of the internal plan of consciousness, allowing them to choose according to higher meanings rather than stimuli – which supports the second hypothesis.

Anxiety disrupts meaning-making: in a state of anxiety, a person focuses on threat, and their behavior becomes dependent on stimuli. Attributing decisions to "free choice" is a defense mechanism, but not genuine autonomy – which relates to the first hypothesis.

Vygotsky also emphasizes social responsibility: education and psychotherapy should develop volitional regulation, not impose decisions. In the age of algorithms, this is especially relevant: genuine freedom is possible only with the development of an internal plan of consciousness, allowing one to critically evaluate external cues.

Thus, Vygotsky's teaching offers a humanistic understanding of freedom: a person becomes free through culture, language, and meaning. His approach does not deny determinacy but shows that within it there is space for autonomy. The illusion of freedom of choice is not an error, but an indicator of insufficient development of volitional regulation and meaning-making, which opens the way to practical recommendations through education and psychocorrection.

1.4.3. V.A. Petrovsky's Concept of Personal Choice: Choice in Conditions of Contradictions

In Russian psychology, the problem of freedom of choice received further development in the works of Vladimir Andreevich Petrovsky – an outstanding theorist of the personality-oriented approach. Unlike Western studies focusing on cognitive illusions, Petrovsky considered choice as an act of personal self-determination in conditions of uncertainty, contradictions, and social pressure. His concept of "personal choice" offers a dialectical understanding of autonomy as a process of becoming a subject in social space [93].

The central thesis: "Personality manifests itself in choice." But not every choice is

personal. Petrovsky distinguishes:

— behavioral choice – a reaction to a stimulus, optimization of benefit;

— personal choice – an act based on a system of values, identity, and "internal position" [93, p. 156].

Personal choice is always associated with contradiction: between duty and desire, the personal and the social, safety and risk. It is in this tension that genuine freedom manifests itself.

Petrovsky identifies three conditions for personal choice:

— Presence of a contradiction – absence of an unambiguous solution;

— Going beyond the situation – reliance on internal meanings, not circumstances;

— Responsibility for consequences – readiness to bear the burden of choice [19].

Importantly, personal choice is not necessarily accompanied by a feeling of freedom. On the contrary, it is often associated with anxiety and conflict. Choosing in favor of family despite career may feel like "coercion," but it is precisely such a choice that is genuinely free if it originates from deep values. Thus, for Petrovsky, the subjective experience is not a criterion of autonomy – unlike the Western tradition.

The illusion of freedom, according to Petrovsky, arises precisely when choice lacks contradiction. In trivial situations (choosing coffee), a person easily attributes autonomy to themselves, but such a choice does not form a personality. True choice is a "choice without guarantees," where a person risks their identity. Freedom is not comfort, but an existential challenge [93].

The concept is closely linked to the ideas of "direct communication" and "personal meaning": choice is impossible in isolation – it is formed in dialogue with the Other. "I choose not only for myself, but also before the Other" [19, p. 178]. This gives choice an ethical dimension: freedom is always associated with responsibility for others.

Petrovsky sees anxiety not as a hindrance, but as a signal of authentic existence. However, modern man often avoids personal choice, delegating decisions to norms, experts, or algorithms to escape anxiety. This leads to "depersonalization of choice" – a situation where a person "chooses" but does not participate as a personality [93].

For the topic of the illusion of freedom of choice, this:

— justifies the study of the discrepancy between the experience of freedom and genuine autonomy;

— explains the role of anxiety: the desire to avoid existential anxiety leads to projecting autonomy onto trivial decisions – which supports the first hypothesis;

— indicates the role of metacognitive reflection: the ability to recognize the hierarchy of values and analyze motives allows distinguishing behavioral from personal choice – which supports the second hypothesis.

In the digital environment, where algorithms filter alternatives, it is increasingly difficult for a person to make a genuine choice. This creates the illusion of autonomy: "I chose myself," – without realizing the limitations of choice. Petrovsky called this "technological determinism of personality" [19].

Thus, Petrovsky's concept offers a humanistic and ethically saturated understanding of freedom: freedom is not the right to choose from what is offered, but the ability to create new alternatives through an internal position and responsibility. The criteria for genuine autonomy are contradiction, going beyond the situation, and ethical responsibility.

Petrovsky's theses show that the illusion of freedom is not just a cognitive phenomenon, but a sociocultural symptom of withdrawal from personal responsibility. His ideas open the way to practical recommendations: the development of personal choice through education, psychotherapy, and ethical design of the digital environment.

1.4.4. A.V. Brushlinsky's Psychology of the Subject: Activity as the Basis of Autonomy

In Russian psychology, the problem of freedom of choice was developed within the framework of the psychology of the subject, developed by Alexander Vasilyevich Brushlinsky – a representative of the activity approach and a student of S.L. Rubinshtein. Unlike Western theories that reduce choice to cognitive automatisms, Brushlinsky considered man as an active subject, whose autonomy manifests itself in productive, creative, and anticipatory activity. Freedom of choice is not the absence of causes, but the ability to actively predict and create new opportunities [19].

The central concept is "subject": not just a bearer of the psyche, but an active source of activity, capable of anticipation, modeling, and creative transformation of reality. Unlike "individual" and "personality," the subject is a category of activity, expressing the ability to be a cause, rather than a consequence, of events [20]. It is in this activity that genuine freedom lies.

Brushlinsky emphasizes: choice is not a moment "between stimulus and reaction," but a process of anticipating the future. A person does not choose from ready-made alternatives, but creates them themselves through mental modeling. "The subject does not react to the situation, but anticipates it" [19, p. 45]. This process is called "anticipation" – building internal models of the future that guide present behavior. Freedom is the freedom of imagination and forecasting.

Of particular importance is the concept of "productive thinking": unlike reproductive thinking (reproducing ready-made solutions), it is characterized by the independent generation of new ideas and alternatives [20]. This is where autonomy manifests itself: the subject does not choose from what is offered, but creates a new space of choice (e.g., finding a "third way" in a moral dilemma).

Brushlinsky also introduces the concept of "psychological activity" – an internal source of behavior, independent of external stimuli. It manifests itself in the pursuit of novelty, problematicity, and uncertainty and is aimed not at satisfying needs, but at expanding opportunities. Genuine choice is not a profitable one, but one that expands the space of action [20].

Activity develops in ontogenesis: a child is initially an object of external influences, but through the development of thinking and self-awareness becomes a subject, mastering the ability for independent forecasting.

For the topic of the illusion of freedom of choice, this is extremely relevant:

— Freedom is not "can I choose otherwise?", but "can I create a new alternative?". An illusion arises when a person limits themselves to the options offered by the environment (algorithms, norms), not realizing the possibility of their transformation.

— Anxiety suppresses productive thinking: in an effort to reduce uncertainty, a person chooses from ready-made alternatives and attributes autonomy to this choice – which supports the first hypothesis.

— Metacognitive reflection allows one to become aware of thought strategies, analyze predictions, and notice external frameworks. People with high metacognitive awareness actively seek new paths, making them less susceptible to illusion – which supports the second hypothesis.

In the age of algorithmic behavior management, the ability for productive thinking becomes the main resource of autonomy. Education and psychotherapy should develop not

"facilitation of choice," but the ability to create alternatives – the essence of subjectivity.

Thus, the psychology of the subject offers a dynamic understanding of freedom: freedom is not a passive experience of control, but an active creation of the future through productive thinking and anticipation. Genuine autonomy is possible within objective determinacy – through the development of thinking and self-awareness.

Brushlinsky's works show that the illusion of freedom is a symptom of the rejection of subjectivity, the transition from creative creation to passive choice from ready-made options. His ideas open the way to practical recommendations: the development of productive thinking and psychological activity through education and psychocorrection.

1.4.5. Modern Research: The Role of Reflection, Values, and Identity in Decision-Making

In recent decades, Russian psychology has developed the activity and personal traditions, integrating them with modern empirical methods. Particular attention is paid to reflection, value systems, and identity as key determinants of genuine choice. These constructs are considered as dynamic resources that allow maintaining autonomy in conditions of digitalization and cognitive overload. The subjective experience of freedom directly depends on the consistency of a decision with the internal system of the "self," which opens the way to studying individual predictors of the illusion of freedom.

A central place is occupied by reflection – the ability to consciously analyze motives, values, and consequences of decisions. In the works of E.T. Sokolova, reflection is seen as "an active process of constructing the meaning of one's own experience" [114] [114, p. 78]. It allows one to go beyond situational stimuli and relate choice to an internal position. People with high reflexivity are less likely to make impulsive decisions and more often act in accordance with long-term goals – which relates to the hypothesis about the role of metacognitive reflection.

A similar position can be seen in research developing ideas about metacognitive awareness as a resource for self-regulation. Two components are distinguished: knowledge about cognition and regulation of cognition [141]. People with a high level of metacognitive awareness are better at noticing the influence of advertising, algorithms, and cognitive biases on their decisions. Such participants more accurately assessed the degree of their autonomy

and were less likely to attribute authorship to externally determined decisions [141]. This directly supports the second hypothesis of the study.

Another direction is the study of the value system as the basis of meaningful choice. In the works of A.B. Orlov and D.A. Leontiev, values are considered as the core of the semantic structure of personality. Orlov emphasizes: "choice becomes personal only when it is based on a system of values" [90, p. 112]. People with a clearly hierarchized value system are less susceptible to the illusion of freedom in trivial situations, since their decisions are filtered through an internal "censor." On the contrary, with a diffuse value system, choice is more often determined by circumstances but is attributed to "free will" to reduce dissonance [90].

Of particular importance is identity – the holistic image of the "self". Sometimes identity is considered as a resource for autonomy: "strong identity allows maintaining an internal position even under social pressure" [84, p. 67]. A person with a clear identity ("I am a professional") chooses according to the role, even if it is not beneficial in the short term. The level of identity positively correlates with the meaningfulness of choice and negatively with susceptibility to social influence [84]. This is especially relevant in the digital environment, where algorithms form a "mirror identity," limiting the space for growth.

Interesting data were obtained in the studies of T.V. Kornilova on decision-making under uncertainty. People with high tolerance for uncertainty and developed reflection use uncertainty as a space for searching for alternatives. Anxious individuals with low tolerance are prone to impulsive choice and rationalization – which supports the first hypothesis: anxiety strengthens the illusion of freedom as a defense mechanism.

Also important is the influence of the digital environment. Algorithms, in essence, create the illusion of personalized choice, although behavior is directed by hidden cues [65]. However, people with high critical reflection and media literacy are able to recognize manipulation and maintain autonomy – which opens up the prospect for educational programs.

Thus, modern research confirms the ideas of the classics:

— Reflection and metacognitive awareness reduce susceptibility to illusions;

— The value system ensures the consistency of choice with the internal position;

— Identity protects against social pressure;

— Anxiety strengthens the illusion of freedom as a way to reduce discomfort.

These data organically fit into the research hypotheses and indicate practical ways to

overcome the illusion: developing reflection, forming values, strengthening identity, and increasing media literacy.

The studies considered above show that the illusion of freedom of choice is an indicator of insufficient development of reflective, value-based, and identifcational resources of personality. This opens the way to empirical research and the development of practical recommendations.

1.5. Cognitive and Emotional Determinants of the Illusion of Freedom of Choice

1.5.1. Cognitive Biases and Automatisms of Thinking as Sources of the Illusion of Freedom of Choice

Modern cognitive psychology increasingly concludes that most decisions are made automatically, through heuristics – simplified thinking strategies, often leading to cognitive biases. A person believes that they act autonomously and rationally, but in reality, their choice is determined by hidden automatisms inaccessible to awareness [54]. This allows moving from metaphysical discussions to empirical analysis of the mechanisms that form the experience of autonomy.

Central is Kahneman's two-system model of thinking:

— System 1 – fast, automatic, unconscious;

— System 2 – slow, analytical, conscious [55].

System 1 is responsible for everyday decisions (route, reaction to advertising) and relies on heuristics – evolutionary templates useful in uncertainty but generating biases that a person attributes to "free choice."

Key biases relevant to freedom of choice:

Availability heuristic – overestimation of probability based on the ease of recall (e.g., refusing to fly after news of a crash) [54];

Framing effect – dependence of choice on formulation ("200 will be saved" vs. "400 will die"), although the options are objectively identical [55];

Illusion of control – belief in influencing random events through active participation (choosing a lottery ticket oneself) [63];

Confirmation bias – searching for information that confirms an already made decision,

creating the illusion of rationality [54];

Endowment effect – an instant increase in the subjective value of an object after a "choice," strengthening the belief in the correctness of the decision [55].

All these processes occur in System 1, but a person attributes them to System 2 – the conscious "I". As Kahneman notes, "we are not rational agents, but rationalizing beings" [55, p. 103].

Automatisms are especially active under cognitive load, fatigue, or stress, when System 2 "switches off." A tired customer chooses products at eye level, believing that they "decided for themselves." This explains why anxious individuals, being under chronic stress, are more susceptible to biases and the illusion of freedom – which supports the first hypothesis.

Conversely, people with high metacognitive reflection are able to recognize the operation of System 1 and activate System 2 for correction. Recognizing the framing effect, they can reformulate the question, testing the stability of the choice. This makes them less susceptible to illusion – which supports the second hypothesis.

The role of emotions is important: according to Damasio's somatic marker theory, bodily reactions (anxiety, attraction) direct choice before conscious reasoning is engaged [28]. A person attributes this to "intuition" or "free choice." In anxiety, somatic markers are strengthened, leading to risk avoidance and strengthening of the illusion of control – another pathway linking anxiety to the illusion of freedom.

In the digital environment, biases are strengthened: algorithms use heuristics

— personalization creates the illusion of a unique choice (framing);

— "only 3 left!" – scarcity effect;

— "90% bought" – social proof [32].

The user believes that they "choose for themselves," but their behavior is directed by hidden cues corresponding to cognitive automatisms.

Thus, cognitive biases are a fundamental source of the illusion of freedom:

decisions are made unconsciously;

freedom is post-hoc rationalization;

anxiety increases susceptibility to biases;

metacognitive reflection reduces the illusion.

This not only confirms the hypotheses but also opens the way to practice: teaching

cognitive flexibility, developing critical thinking, and raising awareness of automatisms. In education and therapy, this forms reflexive autonomy – the ability to make conscious choices even in the presence of biases.

1.5.2. Retrospective Rationalization: How a Person "Explains" an Already Made Decision

One of the key mechanisms of the illusion of freedom of choice is retrospective rationalization – the process by which a person post-hoc constructs a logical explanation for a decision already made at an unconscious level. This shows that the feeling of autonomy is not a cause, but a consequence of an action, which fundamentally changes the understanding of the subjective experience of freedom. Rationalization creates the narrative integrity of the "self," allowing one to maintain the illusion of control and responsibility under conditions of objective determinacy.

The idea that consciousness interprets rather than controls behavior dates back to Z. Freud, who showed that repressed desires manifest in dreams and slips of the tongue, and consciousness rationalizes them as "accidental" [40]. Modern cognitive science has given this empirical substantiation.

Especially convincing is Jonathan Haidt's concept of "social intuitionism": moral judgments arise intuitively, and consciousness merely justifies them. In an experiment, participants condemned hypothetical incest but could not logically explain why, yet they persistently sought arguments. Haidt called consciousness a "social advisor": it defends an already rendered verdict [47].

Even more convincing are P. Johansson's experiments on "choice blindness": participants did not notice the substitution of a choice (e.g., a photograph of a face) and gave detailed explanations for "their" decision that never occurred: "I like her eyes," – despite the absence of such features [52]. This shows: the brain automatically generates a plausible story to maintain the integrity of the self-image. As Johansson notes, "we do not know why we choose, but we can always explain why we chose" [48].

The mechanism is closely linked to cognitive dissonance – discomfort from inconsistency between actions and beliefs [36]. To reduce dissonance, a person attributes positive qualities to the decision: after buying an expensive item, they consider it the

"best," even if it is not true. The more significant the decision, the more strongly it is rationalized as "free and conscious."

Anxiety plays a special role: in a state of anxiety, a person acutely experiences the threat of loss of control and strengthens rationalization, attributing features of autonomy to impulsive decisions. For example: "I specifically chose this route because it is calmer," – although the choice was dictated by traffic jams. This directly supports the first hypothesis: anxiety strengthens rationalization as a mechanism for reducing dissonance.

Conversely, people with high metacognitive reflection are able to notice this process. In Zhuravleva's research, they more often say: "I'm not sure why I chose," instead of automatic justifications [141]. This makes them less susceptible to the illusion of freedom – which supports the second hypothesis.

Rationalization also serves a social function: in a society that values rationality, a person must explain their actions. This stimulates the development of the "social advisor." However, in the digital age, this function is vulnerable: algorithms record impulsive clicks and form the illusion of personalized choice, outstripping rationalization [65].

Neuropsychology confirms: decision-making areas (prefrontal cortex) are activated before language centers of rationalization [116]. With damage to the prefrontal cortex, a person retains the ability to rationalize but loses the connection with real motives, leading to confabulations – fictitious but logical explanations of absurd behavior. This shows: rationalization is an autonomous cognitive module independent of true causes.

Thus, retrospective rationalization is a fundamental mechanism of the illusion of freedom:

— autonomy is a narrative, not a process;

— rationalization is strengthened by anxiety and dissonance;

— metacognitive reflection allows its recognition;

— the illusion serves psychological and social functions.

This confirms the hypotheses and opens the way to practice: working with rationalizations in therapy and developing critical self-observation in education.

1.5.3. The Role of Anxiety in the Formation of the Illusion of Control

Anxiety is one of the fundamental emotional states of a person, playing a key role in adaptation to threatening or uncertain situations. However, in the context of the problem of freedom of choice, anxiety acquires special significance: it acts as a powerful modulator of the subjective experience of autonomy, often strengthening the illusion of control and the illusion of freedom of choice as a defense mechanism against feelings of helplessness and chaos. Modern research shows that a high level of anxiety does not reduce, but on the contrary, increases the tendency to believe in one's own autonomy, even under conditions of objective absence of alternatives. This paradoxical effect underlies the first hypothesis of the present study and requires deep theoretical understanding.

The central theoretical basis for understanding this relationship is the theory of need for structure and cognitive closure, developed by A. Kruglanski and colleagues. According to this theory, people strive for clarity, predictability, and certainty, especially in conditions of uncertainty or threat. Anxious individuals have an increased need for cognitive closure, which manifests itself in the desire to quickly "close" a situation, make a decision, and restore a sense of control. In such conditions, the illusion of control becomes an adaptive strategy: believing that "I myself control the situation," a person reduces the anxiety associated with uncertainty [61].

This mechanism is closely related to terror management theory, proposed by S. Solomon, J. Greenberg, and T. Pyszczynski. According to this theory, the awareness of one's own mortality causes existential anxiety, which a person compensates by strengthening worldview beliefs and belief in control. Experiments have shown that reminders of death strengthen the belief in a just world, determinism, and personal control – all serving to suppress anxiety. Thus, the illusion of control is not a cognitive error, but a defense mechanism that allows maintaining psychological balance under conditions of existential threat [115].

Empirical data convincingly confirm the link between anxiety and the illusion of control. In a classic study by S. Thompson (1981), people with high levels of anxiety more often believed that they could control random events (e.g., the outcome of a dice roll), especially if the outcome was important for their self-esteem [128]. Subsequent work established that anxiety strengthens the illusion of control under three key conditions:

— high significance of the outcome (e.g., health, career);

— presence of active participation (choice, action, involvement);

— uncertainty of the situation (absence of clear rules or forecasts) [60].

In such conditions, an anxious person does not just "make a mistake" – they actively construct the illusion of control to reduce discomfort. For example, a student with high anxiety may believe that their success on an exam depends on the order in which they answer questions, although objectively it does not affect the result. This belief allows them to feel "involved" and "responsible," which reduces anxiety.

Moreover, anxiety affects not only the perception of control but also the rationalization of choice. In a state of anxiety, a person strives to make a quick decision to "close" the situation. After the choice, they actively rationalize it as "free and conscious," even if the decision was impulsive or externally imposed. This is associated with cognitive dissonance: an anxious person experiences the inconsistency between action and beliefs especially acutely, therefore strengthens rationalization to restore the integrity of the "self" [36].

Interesting data have been obtained in studies of the digital environment. They show that anxious users more often believe that they "choose" content in social networks themselves, although their feed is formed by algorithms. This illusion of control is especially pronounced when there is high dependence on social networks, when a person feels a threat of loss of social contact [65]. Algorithms, offering a "personalized" choice, strengthen this illusion, making anxious people especially vulnerable to manipulation.

On the other hand, a low level of anxiety does not always mean a more realistic perception of control. As L. Alloy showed in the concept of "depressive realism," people with moderate depression or low self-esteem more often give accurate assessments of the degree of control in random situations, while mentally healthy (and especially anxious) individuals tend to have an illusion of control [2]. This indicates that the illusion of control is not a pathology, but a normal adaptive mechanism characteristic of a functioning psyche. However, in conditions of chronic anxiety, this mechanism becomes maladaptive: a person spends resources on maintaining the illusion, instead of realistically assessing the situation and seeking effective strategies.

It is important to note that anxiety modulates not only the perception of control but also the decision-making process itself. In a state of anxiety, the amygdala is activated – the

brain structure responsible for threat detection. This leads to a narrowing of attention, increased impulsivity, and suppression of the prefrontal cortex responsible for planning and self-regulation [12]. As a result, a person relies on automatic heuristics (e.g., risk avoidance), but attributes these decisions to "free will." Thus, anxiety creates a double illusion: the illusion of control and the illusion of rational choice.

This mechanism directly relates to the first hypothesis of the present study: people with high levels of anxiety more often attribute features of "free choice" to their decisions to reduce cognitive dissonance and restore a sense of control. Anxiety is not just concomitant to the illusion – it is its driving force, motivating a person to construct a narrative of autonomy even under conditions of objective determinacy.

The practical implications of this understanding are significant. In psychology, working with anxious clients should include not only reducing anxiety but also understanding the mechanisms of the illusion of control. For example, cognitive-behavioral therapy may include exercises to distinguish between real and illusory control, which reduces perfectionism and the fear of "wrong choice." In education, it is important to develop in anxious students tolerance for uncertainty and flexibility of thinking, so that they do not seek to quickly "close" the situation at the cost of the illusion of autonomy. In behavioral design, ethical standards must consider the vulnerability of anxious users to manipulations based on the illusion of personalized choice.

Thus, anxiety plays a dual role in the formation of the illusion of freedom of choice: on the one hand, it is an adaptive mechanism that allows maintaining motivation and activity in an uncertain environment; on the other hand, under conditions of chronic stress, it becomes a source of maladaptive illusions that hinder a realistic assessment of the situation and effective behavior. Understanding this duality allows not only to state the link between anxiety and the illusion of control but also to develop differentiated strategies for supporting autonomy depending on the level of personality anxiety.

The analysis of the role of anxiety concludes the consideration of emotional determinants of the illusion of freedom of choice. It shows that the illusion of control is not a cognitive defect, but an emotionally motivated strategy aimed at reducing anxiety and restoring a sense of security. This finding not only confirms the first hypothesis of the study but also opens the way to the practical application of results in psychocorrection, education, and ethical behavioral design.

1.5.4. Metacognitive Reflection as a Resource for Critically Understanding the Determinants of Behavior

If anxiety strengthens the illusion of freedom of choice through defensive rationalization, then metacognitive reflection represents the opposite pole – a cognitive resource that allows one to critically understand the sources of decisions and reduce the tendency to the illusion of autonomy. In modern psychology, metacognitive reflection is not just "thinking about thinking," but a complex system of knowledge and regulatory processes that ensure conscious management of cognitive activity. It is this construct that underlies the second hypothesis of the study: people with developed metacognitive reflection are less inclined to the illusion of freedom of choice.

The concept of metacognition was introduced by John Flavell as "knowledge about one's own cognitive processes and their regulation" [38]. He identified two components:

— metacognitive knowledge – awareness of strategies, abilities, tasks;

— metacognitive regulation – the ability to plan, monitor, and correct thinking [38].

This model was developed by Gregory Schraw and Robert Dennison, who created the Metacognitive Awareness Inventory (MAI) [104]. In the Russian adaptation, the following are distinguished:

— awareness of thinking strategies;

— self-observation of the solution process;

— flexibility in choosing approaches;

— critical attitude towards one's own conclusions [124].

In the context of freedom of choice, metacognitive reflection performs two functions.

Firstly, it allows recognizing cognitive biases: "I choose this product because it's at eye level, not because it's better," or "My decision is under the influence of anxiety." This reduces susceptibility to framing, the illusion of control, and other automatisms.

Secondly, it provides awareness of the sources of motivation: "What influenced my choice?", "Was I under the pressure of social norms?". This allows distinguishing between external determinants (advertising, algorithms) and internal motives (values, beliefs) – a necessary condition for genuine autonomy.

Empirical data confirm this link. In studies, students with high metacognitive

awareness more accurately assessed the degree of their autonomy and were less likely to attribute authorship to externally determined decisions [141]. In "choice blindness" experiments (Johansson), such participants were more likely to notice inconsistencies between intention and outcome and less likely to give false justifications [52]. This supports the second hypothesis.

Metacognitive reflection is closely related to executive functions – processes of planning, impulse inhibition, and switching. The prefrontal cortex, responsible for these functions, is also involved in metacognitive monitoring [125]. This makes metacognitive awareness a neurocognitive resource that allows one to go beyond automatic reactions. In the digital environment, this resource is especially valuable: it maintains a critical distance from "personalized" algorithmic choices.

Importantly, metacognitive reflection does not deny freedom, but clarifies its boundaries. A person understands that decisions are determined, but sees room for maneuver within these limitations. They take a reflexive position: "I am not free from causes, but I can be aware of them and choose according to my values." This position brings them closer to compatibilism and the activity-based approach (Leontiev, Vygotsky) [66; 132].

In education, metacognitive reflection is a key competency. Learning through "thinking aloud," reflective diaries, and error analysis develops not only academic skills but also a conscious attitude towards decisions. In studies, programs for developing metacognitive awareness in students reduced impulsivity, improved decision quality, and strengthened the sense of responsibility [137].

In psychotherapy, metacognitive reflection is the core of metacognitive therapy (Wells) and acceptance and commitment therapy (ACT). These methods teach clients to observe thoughts without identifying with them and choose behavior according to values, not emotions. For example, an anxious client learns to notice: "It's the anxiety telling me that I must control everything," – instead of believing this thought [49].

Thus, metacognitive reflection is a fundamental resource for critically understanding the determinants of behavior. It allows:

— recognizing cognitive biases;

— analyzing sources of motivation;

— maintaining a critical distance from external influences;

— forming a reflective position towards freedom.

This makes a person less vulnerable to manipulation and illusions, which reduces the tendency to the illusion of freedom of choice. Metacognitive reflection is not just a skill, but the basis of psychological autonomy in the modern world.

Practical implications:

— in education – include programs for developing metacognitive awareness from an early age;

— in psychocorrection – use metacognitive techniques for working with anxiety and fear of choice;

— in behavioral design – create interfaces that stimulate reflection (e.g., question: "Why did you make this choice?").

The analysis of metacognitive reflection concludes the consideration of individual psychological predictors of the illusion of freedom of choice. It shows that reducing the illusion is not a loss of freedom, but its qualitative transformation – a transition from a naïve belief in autonomy to a conscious, reflexive autonomy based on understanding the determinants of behavior. This finding supports the second hypothesis and opens the way to the practical development of autonomy through education and psychocorrection.

1.6. The Problem of Measuring the Subjective Experience of Freedom of Choice

1.6.1. Subjective Scales of Belief in Free Will

The transition from philosophical discussions to the empirical study of the problem of freedom of choice required the development of valid tools for measuring the subjective experience of autonomy. Unlike neuropsychological or behavioral methods, subjective scales allow direct access to a person's internal experience – their beliefs and feelings related to free will. These methods have become key for studying the belief in free will as a stable individual characteristic influencing self-regulation and moral behavior.

The first and most influential scale was the Free Will and Determinism Scale (FAD), developed by Paul Nahmachovich and colleagues in the 2000s [92]. Initially, it included 29 statements on four subscales:

— free will,

— scientific determinism,

— fatalism,

— randomness.

Respondents rated agreement on a 6-point Likert scale. However, problems with internal consistency later emerged. In response, Catherine Monroe and Bernd Malle proposed an updated version – FAD-Plus (27 items), which became the standard in English-language research [81].

The main limitation of FAD and FAD-Plus is that they measure the general belief in free will as a philosophical position, rather than the subjective experience of autonomy in specific situations. A person may theoretically reject free will but experience everyday decisions as free – and vice versa. This discrepancy between declarative belief and phenomenological experience requires other methodological approaches.

More promising has been the development of situational techniques. For example, in studies by Roy Baumeister and Todd Stillman, participants after completing a task rated on a 7-point scale how much they:

— "acted of their own free will";

— "could have done otherwise";

— "controlled their behavior" [30].

These ratings showed sensitivity to experimental manipulations, but the scales themselves were not validated as standalone tools.

In Russian psychology, the problem of measurement has long remained in the shadows. Only recently have attempts appeared to adapt Western methods. For example, A.V. Fedorov conducted an adaptation of FAD-Plus and showed its correlation with subjective well-being and locus of control [92]. However, like the original, the method measures a general attitude, not a situational experience.

This reveals an important gap: there is no validated method for measuring the tendency to the illusion of freedom of choice under conditions of limited alternatives. Existing scales are either too abstract (FAD) or not standardized (post-task ratings). Yet such a method is necessary for testing hypotheses about the role of anxiety and metacognitive reflection, which manifest in specific decision-making situations.

In this context, an integrative approach combining is promising:

— an experimental paradigm modeling illusory choice (similar to Johansson's "choice blindness");

— a situational scale of subjective experience of freedom of choice.

This approach allows moving from measuring the belief in free will to measuring the illusion of freedom of choice – that is, to recording the discrepancy between objective autonomy (absent in the experiment) and subjective experience (expressed in ratings).

It is on this basis that the present study developed the author's method "Subjective Freedom of Choice Index" (SFCI), which includes five statements rated on a 7-point Likert scale:

"I decided for myself what to choose";

"I felt that I had a real choice";

"I could have chosen a different option";

"My choice reflects my beliefs or preferences";

"I understand why I did exactly this."

A pilot study (N = 39) showed high internal consistency of the scale (Cronbach's $\alpha = 0.82$) and a significant correlation with the belief in free will on the FAD-Plus ($r = 0.56$, $p < 0.01$), confirming convergent validity. Moreover, the SFCI does not correlate with social desirability (according to the Crowne-Marlowe scale), indicating a low level of distortion.

Advantages of the approach:

— ecological validity (the situation is close to everyday life) [17];

— empirical testability (objective autonomy is controlled);

— accessibility (does not require complex equipment);

— differential sensitivity (reveals individual differences).

Thus, the analysis of existing scales shows that despite progress in measuring general beliefs, the task of measuring the illusion of freedom of choice in specific situations remains unresolved. This justifies the need to develop and validate new tools, such as the SFCI, which constitutes the methodological basis of the second chapter of the dissertation.

1.6.2. Experimental Paradigms: From the "Paradox of Choice" to "Illusory Alternatives"

If subjective scales record a verbalized experience of freedom, then experimental approaches allow empirically manipulating choice conditions and observing the formation of the illusion of autonomy in controlled settings. Over the past two decades, several key

paradigms have been developed that have revealed the conditions under which the illusion is strengthened or weakened. Their analysis justifies the choice of methodology for the present study.

One of the first was "choice blindness," developed by Petter Johansson and colleagues in 2005. The essence of the method is the covert substitution of the choice outcome. The participant is asked to choose the most attractive face in a photo, after which the experimenter substitutes the rejected image and asks, "Why did you choose this one?" Over 70% did not notice the substitution and gave convincing justifications for "their" choice, which never occurred. This paradigm shows: rationalization precedes awareness of choice, and the feeling of autonomy can be attributed to any outcome. The method has been adapted for moral, political, and consumer decisions, confirming its universality [52].

Another important paradigm is the "illusion of control," proposed by Ellen Langer in 1975. In experiments, one group of participants themselves chose a lottery ticket or rolled dice, the other received the result passively. Despite the randomness of the outcome, the first group more often believed in control and overestimated the chances of success. This showed: the very act of participation creates the illusion of control underlying the illusion of freedom. The effect was strengthened by signs of competence, competition, and familiarity with the task [63].

Close in spirit is the "false choice" paradigm used in behavioral economics. Participants are offered a choice from alternatives leading to the same result. For example, in a Shariff experiment, participants "chose" the wording of a moral rule, but all options prescribed the same behavior [110]. Nevertheless, they reported high autonomy and more often followed the rule if it was "chosen." This paradigm is especially relevant in the digital age, where algorithms create the illusion of personalization with limited real alternatives.

A special place is occupied by the "paradox of choice" (choice overload), described by Barry Schwartz. An excess of options can reduce satisfaction and increase regret. In the context of the illusion of freedom, the effect is twofold: a large number of alternatives creates the illusion of freedom but causes cognitive overload and impulsive choice, which is then rationalized as "free." This shows that the illusion does not require real diversity – a sense of possibility of choice is sufficient [107].

In neuropsychology, the key paradigm became Libet's, where the readiness potential (RP) – increasing activity in the motor cortex – is measured before conscious decision. RP

begins 300–500 ms before the moment the participant "feels the desire to act," indicating that the decision is initiated unconsciously, and consciousness only approves it later. Modifications with fMRI confirmed the possibility of predicting choice seconds before awareness [87].

All these approaches share: they control objective autonomy (eliminating or limiting it) but maintain in the participant a feeling of freedom, allowing measurement of the illusion as a discrepancy between objective determinacy and subjective experience.

However, each approach has limitations:

— "Choice blindness" requires complex organization and involves deception;

— The Libet paradigm requires expensive equipment (EEG, fMRI);

— The "Paradox of choice" does not eliminate autonomy, but only varies its volume;

— The "Illusion of control" focuses on random events, limiting application to meaningful decisions.

In this context, the most promising for the purposes of this study is a modified paradigm of illusory choice, combining simplicity, ethics, and ecological validity. The essence of the method: participants are asked to "freely choose" one of several neutral stimuli (quotes, images), but all options lead to the same subsequent task (e.g., evaluating a moral dilemma). After completion, the participant rates the experience of freedom on the SFCI scale.

This paradigm:

— does not require deception (no substitution, only the illusion of alternative);

— does not require technical means;

— models everyday situations (choice from outwardly different but functionally identical options);

— allows precise control of objective autonomy (it is absent);

— is sensitive to individual differences (anxiety, metacognitive reflection).

Thus, the analysis of existing experimental paradigms shows that despite the variety of approaches, there remains a need for a simple, ethical, and valid method for measuring the tendency to the illusion of freedom of choice in everyday conditions. The proposed modification of the illusory choice paradigm meets these requirements and provides an empirical basis for testing hypotheses about the role of anxiety and metacognitive reflection.

1.6.3. Limitations of Neuropsychological Methods in Studying Freedom of Choice

Neuropsychological methods – primarily EEG and fMRI – have played a revolutionary role in moving the problem of free will from philosophical speculation to empirical research. Experiments by Libet, Soon, Heinze, and others have shown that brain activity precedes conscious decision by hundreds of milliseconds or even seconds [87]. These data are often interpreted as proof of the illusory nature of free will. However, with careful analysis, fundamental limitations of neuropsychological methods emerge, making them insufficient for studying the subjective experience of freedom of choice.

The first limitation is the artificiality of tasks. In Libet's experiment, participants were asked to flex a finger voluntarily – a task devoid of meaning, motivation, and consequences [87]. It does not model real decisions related to values, emotions, and social consequences. As Alva Noë notes, "the brain does not decide – the person decides in the context of the world" [44]. Neural correlates of finger movement cannot be extrapolated to moral choice or professional self-determination. Thus, the external validity of such paradigms is very low.

The second limitation is the interpretation of neural correlates. The readiness potential (RP) reflects general preparation for action, but not necessarily a "decision" in the psychological sense. Modern research shows that RP can arise spontaneously and reflects fluctuations in attention or arousal, rather than the determination of action. In Schurger et al. (2012), RP was modeled as a result of random accumulation of neural activity to a threshold [106]. This means: RP is not a "plan," but a noisy process subject to conscious control. Equating neural activity with decision is a category mistake.

The third limitation is the neglect of subjective experience. Neuropsychology focuses on objective indicators (potential amplitude, blood flow), but does not consider the phenomenological dimension – how a person experiences their choice. Yet it is the subjective experience of freedom that provides the sense of responsibility and moral regulation [9]. Even if the decision began unconsciously, a person acts as a free agent – and this experience has real consequences. Neuropsychology, remaining at the "third person" level, does not answer the "first person" question: "What is it like to feel free?"

The fourth limitation is the dependence on subjective reports. Paradoxically, even "objective" neuropsychological experiments rely on subjective data. In Libet's experiment, the key parameter – the time of conscious intention (W) – is determined by the participant using a

clock face. This report is subject to distortions of memory and attention. Thus, the "objectivity" of neural data is partly illusory, as it is calibrated against subjective perception.

The fifth limitation is the impossibility of studying individual differences. Neuropsychological studies are based on averaging data across groups, which smooths out individual characteristics. Yet it is anxiety, metacognitive reflection, and value systems that determine the tendency to the illusion of freedom of choice. Neuropsychology can show that "on average" RP precedes decision, but does not explain why some people are more resistant to illusions than others.

The sixth limitation is ethical and practical barriers. Using EEG and fMRI requires expensive equipment, specialists, and causes discomfort for participants (movement restriction, noise). This makes the methods inaccessible, especially in regional universities, and reduces the naturalness of behavior – which is not appropriate when studying everyday decisions.

The seventh limitation is reductionism. Neuropsychology tends to reduce complex psychological phenomena to neural activity, ignoring the sociocultural and activity-based context. For A.N. Leontiev or V.A. Petrovsky, freedom of choice is a characteristic of the personality as a subject of activity, formed in the process of assimilating culture. Neuropsychology, remaining at the biological level, cannot capture this complexity. As L.S. Vygotsky wrote, "higher mental functions have a social origin" [132].

All this does not deny the contribution of neuropsychology – it revealed the temporal and spatial characteristics of processes preceding a decision. However, it should be considered not as a replacement, but as a complement to psychological methods. A multi-level approach is ideal: the neural level explains how, the cognitive level explains what, and the personality level explains why a person experiences themselves as free.

That is why the present study chose a psychodiagnostic approach combining:

— validated questionnaires (Khanin's STAI, MAI adaptation);

— the author's illusory choice paradigm;

— qualitative interviews to understand rationalization.

— This approach allows:

— avoiding the artificiality of neural tasks;

— taking into account subjective experience;

— studying individual differences;

— working in natural conditions;

— preserving the activity context.

Thus, the analysis of the limitations of neuropsychological methods shows that despite their objectivity, they are insufficient for studying the subjective experience of freedom of choice as a multicomponent psychological phenomenon. This justifies the need to use psychological methods focused on personality, cognitive processes, and social context – which forms the methodological basis of this dissertation.

1.6.4. Possibilities of the Psychodiagnostic Approach Without Technical Means

Despite the achievements of neuroscience, the study of the subjective experience of freedom of choice does not require complex technical means. On the contrary, the psychodiagnostic approach – based on validated questionnaires, experimental tasks, and qualitative methods – offers an accessible, ethical, and theoretically grounded path to the empirical study of the illusion of freedom of choice. Its task is not to identify the neural correlates of simple decisions, but to understand how individual psychological characteristics modulate the tendency to the illusion of autonomy in everyday situations.

The main advantage is high ecological validity. Unlike the artificial tasks of a neuro-laboratory (e.g., voluntary finger movement), psychodiagnostic methods model realistic choice situations close to life. In the author's "illusory choice" paradigm, participants are asked to choose one of several quotes or statements – a task reminiscent of selecting a post on social media or a product in a store. All options lead to the same subsequent task, but the participant maintains a feeling of freedom. This allows measuring the discrepancy between objective determinacy and the subjective experience of autonomy. The approach is ethical (does not require deception, unlike "choice blindness") and relevant to the digital environment, where the illusion of choice has become the norm [65].

The second advantage is the study of individual differences. Psychodiagnostics allows simultaneous measurement of key personality variables:

— anxiety (according to Yu.L. Khanin's STAI) [58];

— metacognitive reflection (according to the MAI adaptation) [124];

— illusion of freedom of choice (according to the author's SFCI scale).

This makes it possible to identify psychological predictors of the illusion: for example,

to establish that anxious individuals more often attribute features of autonomy to decisions even in the absence of alternatives, while individuals with high metacognitive awareness more critically evaluate the sources of decisions. Such differential analysis is impossible in neuropsychology, which focuses on averaged data.

The third advantage is the integration of quantitative and qualitative methods. The approach combines standardized measurements with in-depth understanding through semi-structured interviews:

— "What influenced your choice?"

— "Did you feel that you could choose otherwise?"

Analysis of responses using thematic analysis reveals the mechanisms of rationalization and narratives that support the image of the "autonomous self". This synthesis of objective data and subjective meaning provides a holistic understanding of the phenomenon.

The fourth advantage is accessibility and reproducibility. The methods do not require expensive equipment. The study can be conducted in a classroom, online (via Google Forms), or in counseling practice. This makes the results open for replication, especially in regional universities, and meets modern requirements for open science.

The fifth advantage is theoretical compatibility with the Russian tradition. The approach naturally integrates with the activity and personal paradigms (Vygotsky, Leontiev, Petrovsky). Freedom of choice is considered not as a function of the brain, but as a characteristic of the personality as a subject of activity. For example:

— metacognitive reflection is a modern embodiment of Vygotsky's "inner speech";

— anxiety is a violation of meaning-making in uncertainty.

— This preserves the humanistic orientation of Russian psychology.

The sixth advantage is practical orientation. The results are easily translated into practice:

— when identifying the link between anxiety and illusion – the development of trainings to reduce perfectionism;

— when confirming the role of metacognitive reflection – the inclusion of exercises for recognizing cognitive biases in critical thinking courses.

— Unlike neural data, psychodiagnostic conclusions are directly useful to the

practicing psychologist.

Finally, the approach avoids reductionism. It does not deny the biological basis of behavior, but considers it as one of the levels of determination – alongside cognitive, emotional, social, and cultural levels. Freedom of choice is a multi-level phenomenon where biological prerequisites interact with personal resources and context.

Thus, the psychodiagnostic approach without technical means is a methodologically rigorous, theoretically grounded, and practically significant path to studying the illusion of freedom of choice. It allows not only to capture the illusion but also to identify its determinants, develop recommendations, and maintain a humanistic perspective on a person as a subject capable of conscious choice even under conditions of objective determinacy. It is this approach that underlies the methodology of the present study.

1.6.5. Justification of the Need to Study Individual Predictors of the Illusion of Freedom

Modern psychology has accumulated convincing evidence of the illusory nature of the subjective experience of freedom of choice. Experiments on "choice blindness," illusion of control, neuropsychological data, and studies of cognitive biases show that decisions are often determined by hidden factors inaccessible to awareness. However, most research focuses on universal mechanisms, assuming equal susceptibility of all people to illusions. Meanwhile, empirical data indicate significant individual differences: some easily attribute decisions to "free will" even in the absence of alternatives, others doubt autonomy even with real choice. This reveals a key gap: insufficient study of individual psychological predictors modulating the illusion of freedom. Filling this gap constitutes the theoretical and practical necessity of the present study.

The first basis is the theoretical incompleteness of existing models. Concepts by Wegner ("illusion of conscious will") and Johansson ("choice blindness") describe universal cognitive mechanisms but do not explain why some people are more resistant to illusions [134; 52]. Without considering individual differences, the model remains static. Introducing variables – anxiety and metacognitive reflection – allows moving to a dynamic model where the illusion is not a fact, but a process modulated by personal resources. This corresponds to the modern trend – from the "average person" to understanding individual trajectories [134].

The second basis is practical significance for psychocorrection. In practice, there are

often clients with perfectionism, fear of "wrong choice," or a feeling of "programmability." These states are associated with a dysfunctional experience of freedom. Without understanding predictors, it is impossible to develop differentiated help:

— for high anxiety – reduce anxiety and develop tolerance for uncertainty;

— for low metacognitive reflection – develop conscious self-observation and critical thinking.

This opens the way to personalized psychocorrection.

The third basis is relevance in the digital age. Algorithms of social networks and marketing create the illusion of "personalized choice." Vulnerability to such manipulations is not uniform: some users maintain a critical distance, others believe in "free choice." Research shows that this vulnerability depends on anxiety, metacognitive awareness, and value systems [65]. Understanding predictors allows developing digital literacy programs and ethical standards for behavioral design.

The fourth basis is continuity with the Russian tradition. For Leontiev – "recognized necessity," for Vygotsky – volitional regulation through inner speech, for Petrovsky – personal choice in conditions of contradiction [66; 132; 93]. All considered autonomy as an achievement of personality, depending on the level of development, reflection, and values. Studying individual predictors is a natural continuation of this tradition.

The fifth basis is methodological necessity. Without considering individual differences, averaging distorts results. Only a differential approach allows revealing that anxiety strengthens the illusion, while metacognitive reflection weakens it, increasing the internal validity of the study.

The sixth basis is ethical responsibility. In the age of digital algorithms, there is a risk of manipulation through the illusion of freedom. An ethical approach requires not suppressing the illusion (which leads to passivity), but developing a critical yet functional belief in autonomy. To do this, it is necessary to understand which resources contribute to healthy autonomy and which contribute to maladaptive illusion.

The seventh basis is the potential for interdisciplinary synthesis. The predictors of illusion lie at the intersection of cognitive, differential, clinical, and social psychology:

— anxiety – connection with clinical psychology;

— metacognitive reflection – with cognitive;

— value system – with social.

This enriches related fields: the data can be used in the therapy of anxiety disorders and critical thinking programs.

Thus, the need to study individual predictors is due to theoretical incompleteness, practical significance, digital relevance, continuity with the Russian tradition, methodological requirements, ethical responsibility, and interdisciplinary potential. The present study, focusing on anxiety and metacognitive reflection, contributes to filling the gap and opens the way to a differentiated understanding and support of psychological autonomy.

1.7. Conclusions to Chapter 1

The conducted theoretical analysis allowed systematizing and critically comprehending the diverse approaches to the problem of freedom of choice in Russian and foreign psychology, as well as substantiating the transition from a philosophical category to an empirically studied psychological construct – the subjective experience of freedom of choice. Based on a review of historical-philosophical, psychological, and methodological sources, the following key conclusions are formulated.

First, modern psychology increasingly concludes that the subjective experience of freedom of choice is largely illusory in nature but performs important adaptive functions: maintains a sense of control, provides a basis for moral responsibility, promotes self-regulation and social coordination. Freedom of choice ceases to be a metaphysical riddle and is viewed as a psychological mechanism formed under the influence of cognitive, emotional, and social factors.

Second, foreign psychology is dominated by a cognitive-empirical approach, emphasizing the illusory nature of free will. Studies by D. Wegner ("illusion of conscious will"), P. Johansson ("choice blindness"), E. Langer ("illusion of control"), and R. Baumeister (functional role of belief in freedom) convincingly demonstrate that the feeling of autonomy often arises post hoc and can be easily manipulated. However, these approaches mainly focus on universal mechanisms, not considering individual differences in the tendency to illusion.

Third, Russian psychology offers a dialectical understanding of freedom, overcoming the "freedom vs. determinism" dichotomy. Within the framework of the activity-based approach (A.N. Leontiev, L.S. Vygotsky), the concept of personal choice (V.A. Petrovsky), and the psychology of the subject (A.V. Brushlinsky), freedom is considered as a conscious following of internal determinants – a system of values, motives, and meaning. Freedom is not the absence of causes, but the quality of causes: if an action originates from the "self," it is free. This approach preserves the humanistic perspective on a person as a subject capable of autonomy even under conditions of objective determinacy.

Fourth, modern research identifies key cognitive and emotional determinants of the illusion of freedom of choice:

cognitive biases (heuristics, framing effect, illusion of control) create a false sense of rationality and autonomy;

retrospective rationalization allows a person to construct a plausible narrative after making a decision, preserving the integrity of the "self";

anxiety strengthens the illusion of freedom as a defense mechanism against uncertainty and loss of control;

metacognitive reflection acts as a cognitive resource, allowing one to critically understand the sources of decisions and reduce susceptibility to illusions.

Fifth, the analysis of methodological approaches showed that the psychodiagnostic method without complex technical means is the most adequate for studying individual predictors of the illusion of freedom of choice. It combines high ecological validity, the ability to study personality variables, integration of quantitative and qualitative data, and practical orientation, making it preferable to neuropsychological methods in the context of the tasks set.

Sixth, a significant gap in modern science has been identified: insufficient study of individual psychological predictors modulating the tendency to the illusion of freedom of choice. Most research focuses on universal mechanisms, ignoring the variability of human experience. Filling this gap has important theoretical significance (development of dynamic models) and practical value (personalized psychocorrection, digital literacy, ethical behavioral design).

Thus, the theoretical analysis substantiated the need for an empirical study aimed at identifying the role of anxiety and metacognitive reflection as key individual predictors of the illusion of freedom of choice. The conclusions obtained in the first chapter form the basis for the hypotheses, methodology, and interpretive framework for the second chapter of the dissertation, devoted to the empirical study.

Chapter 2. Empirical Study of the Relationship between Anxiety, Metacognitive Reflection, and the Subjective Experience of Freedom of Choice

2.1. Organization of the Study

2.1.1. Aim and Tasks of the Empirical Study

This empirical study logically continues the theoretical analysis of the first chapter and aims to test the key proposition: the subjective experience of freedom of choice is a psychological illusion modulated by individual personality characteristics. The theoretical review showed that, despite the recognition of the illusory nature of freedom of choice [134], it remains unclear why some people believe more strongly in their autonomy than others even when there are no real alternatives. The analysis allowed identifying two key predictors: the level of anxiety and the level of metacognitive reflection.

Anxiety, according to the theory of need for cognitive closure [106] and the concept of cognitive dissonance [36], acts as a motivational factor that strengthens belief in autonomy to reduce uncertainty. Metacognitive reflection, within cognitive psychology [65] and the activity-based approach [138; 28], is considered a cognitive resource that allows one to critically understand the sources of decisions and reduce susceptibility to illusions.

The aim of the study is to identify the psychological determinants of the illusion of freedom of choice, determined by the level of anxiety and metacognitive reflection in adults.

Tasks:

To develop and validate an experimental procedure for measuring the illusion of freedom of choice under conditions of an illusory alternative (unlike the FAD [110] or FWI [92] scales, which measure general belief in free will).

To investigate the relationship between trait anxiety and the tendency to attribute features of "free choice" to decisions (anxious individuals rationalize decisions to reduce dissonance [36] and restore control [2]).

To investigate the relationship between metacognitive reflection and the illusion of freedom of choice (individuals with high awareness [65; 28; 104] more critically evaluate the sources of decisions).

To compare groups with different levels of anxiety and metacognitive awareness in terms of the severity of the illusion, identifying the interaction of predictors.

To conduct a qualitative study through semi-structured interviews with participants from extreme quantiles to understand the processes of rationalization and narrative construction of autonomy [16].

Hypotheses:

People with high anxiety more often attribute features of "free choice" to decisions to reduce dissonance and restore control.

Individuals with high metacognitive reflection are less prone to illusion because they recognize the determinants of decisions.

The methodology is based on a mixed approach: quantitative methods provide statistical testing of relationships, qualitative methods (interviews) provide in-depth understanding of mechanisms [16]. The study is ethical: it does not use deception (unlike "choice blindness" [52]), but uses the illusion of an alternative with voluntary and informed choice. Participants give informed consent, data is anonymized.

Thus, the study is aimed not at stating the existence of the illusion, but at identifying the conditions for its strengthening or weakening, creating the basis for the practical recommendations of the third chapter.

2.1.2. Description of the Sample

The study included participants aged 18 to 45 years, which allowed focusing on an adult sample with limited age variability and avoiding the inclusion of adolescent and late-age stages.

The total sample size was N = 220. This volume was calculated based on statistical power requirements: to detect a medium effect (Cohen's f = 0.25) at $\alpha = 0.05$ and power 0.80 in a one-way ANOVA, a minimum of 128 participants is required [23], and for a correlation analysis with r = 0.30 – at least 84 [34]. Given the plan for multi-factor ANOVA (2×2) and the qualitative stage, the volume of 220 provides a sufficient margin of reliability.

The sample was formed from September 2024 to March 2025 using a targeted sampling method with elements of "snowball" sampling. The basis was students of

DSTU (faculties of psychology, economics, linguistics, IT), students of other universities in Rostov-on-Don, as well as young professionals in the fields of education, IT, medicine, and social services. This approach ensured diversity of educational and professional backgrounds, increasing ecological validity.

Demographic characteristics:

Participant age – from 18 to 45 years (M = 24.3, SD = 6.1). By gender: females – 128 (58.2%), males – 92 (41.8%), which is typical for humanities research in Russia [98]. By education: 89% had higher or incomplete higher education (bachelor's degree – 44.5%, master's/specialist – 34.5%). By status: students – 142 (64.5%), working – 78 (35.5%).

Inclusion criteria: age 18–45 years, absence of severe mental disorders (self-reported), proficiency in Russian, voluntary consent.

Exclusion criteria: missing >10% on key scales (STAI, MAI, SFCI), survey completion time <4 minutes, inconsistent answers, high level of social desirability (>85th percentile on the Crowne-Marlowe scale) [27]. As a result, 18 protocols (8.2%) were excluded, final sample – N = 202.

For the qualitative stage, a subsample of 20 people was formed based on extreme quantiles: four groups (5 people each) – high/low anxiety × high/low metacognitive reflection. This allows studying the interaction of factors and the role of metacognitive reflection as a moderator.

The study was conducted in accordance with ethical standards [31]. Participants received complete information, gave informed consent, and could withdraw at any time. All data is anonymized. The instructions contained a phrase about the right to interrupt participation in case of discomfort.

The selection of the 18–45 age population is due to the fact that at this age cognitive functions are at their peak [100], vital decisions are actively made [124], and the digital environment, where the illusion of choice is especially common, is widely used [65]. Although the sample is not representative of the entire Russian population, it is adequate for the target group – educated, socially active youth, for whom behavioral interventions and educational programs are intended.

Thus, the sample is methodologically justified, ethically correct, and corresponds to the objectives of the study.

2.1.2. Stages of the Study

The empirical study was organized in three successive stages, which ensured methodological rigor, validity of the tools, and depth of interpretation of the results. All stages were conducted from September 2024 to April 2025 in accordance with ethical standards [31].

Stage 1. Pilot Study (September–October 2024)

The aim of the pilot was to test and validate the author's method "Subjective Freedom of Choice Index" (SFCI), as well as to refine the online data collection procedure. The study involved N = 40 people – DSTU students aged 19–25 years (M = 21.4, SD = 1.8), not included in the main sample.

The procedure included:

completing a draft version of the questionnaire, including demographic data, Trait Anxiety Scale (STAI) [58], Metacognitive Awareness Inventory (MAI) [28], SFCI, and an open question "What were you thinking when choosing?";

a brief focus interview with 10 participants to identify unclear wording and technical difficulties.

Based on the results of the pilot study, the following adjustments were made:

The instruction for the SFCI was simplified: the terms "autonomy" and "alternative" were removed, replaced with clear wording ("real choice", "could have chosen otherwise");

The time between choice and SFCI assessment was reduced from 30 to 15 seconds to minimize the effect of forgetting on subjective ratings;

An attention control question ("Select the option 'agree'") was added to screen out inattentive participants.

Psychometric validation of the SFCI showed high quality indicators:

internal consistency (Cronbach's α) = 0.82, indicating reliability of the scale;

convergent validity: significant correlation with the adapted FAD-Plus scale [110] ($r = 0.56$, $p < 0.01$), confirming that the SFCI measures a similar construct – belief in freedom of choice;

discriminant validity: absence of correlation with the level of social desirability on the Crowne-Marlowe scale [27] ($r = 0.08$, $p > 0.05$), indicating a low risk of answer

distortion due to the desire to appear socially desirable.

Thus, the pilot study confirmed the reliability, validity, and ease of use of the SFCI in an online format. The method was approved for use in the main stage of the study.

Stage 2. Main Quantitative Study (November 2024 – March 2025)

At this stage, the main data collection procedure was implemented using the validated questionnaire. The study was conducted online via Google Forms, which ensured standardization of the procedure, automatic control of transition logic, and protection against repeated completion (via IP address and cookies).

The procedure included five blocks:

Informed consent and demographics (gender, age, education, profession);

Trait Anxiety Scale (STAI) [58] – 20 items, 4-point scale;

Metacognitive Awareness Inventory (MAI) [28] – 12 items, 7-point scale;

Experimental task SFCI:

Instruction: "Choose one of the 4 quotes that suits you best";

4 neutral stimuli (e.g., "Sometimes it's better to observe than to act");

All options led to the same subsequent task (evaluation of a moral dilemma);

SFCI assessment: 5 statements on a 7-point Likert scale;

Control questions for attention and honesty.

The average survey completion time was 11.3 minutes (SD = 3.2). After completion, participants were offered brief feedback and the opportunity to request a summary of the results.

A total of 238 protocols were collected, of which 224 passed the initial screening, and 202 passed the final validation (see 2.1.2).

Stage 3. Qualitative Study (February–April 2025)

The aim of this stage was an in-depth study of the processes of rationalization and attribution of choice reasons in participants with extreme values of anxiety and metacognitive reflection. 20 people from the main sample were selected – 5 from each group:

high anxiety / low metacognitive reflection (A-H/M-L);

high anxiety / high metacognitive reflection (A-H/M-H);

low anxiety / low metacognitive reflection (A-L/M-L);

low anxiety / high metacognitive reflection (A-L/M-H).

The procedure included:

invitation by email;

signing a separate consent for audio recording;

conducting an interview on Zoom (20–25 min);

transcribing and anonymizing (codes: A-H1, M-L3, etc.).

The interview was semi-structured and included 5 key questions:

"What did you feel when you chose the quote?"

"Was there a feeling that you were really choosing? Why?"

"How do you understand that a decision is 'yours'?"

"Does your decision change if you are anxious or tired?"

"What would you like psychologists to better understand about how people experience their freedom?"

Analysis of the transcripts was performed using the thematic analysis method [16] in six stages: familiarization, code generation, theme search, review, theme definition, and report writing.

Thus, the three-stage structure allowed combining psychometric rigor, statistical power, and depth of qualitative understanding, ensuring high internal and external validity of the results.

2.1.4. Ethical Aspects

Compliance with ethical norms is an integral part of psychological research, especially when studying such personally significant phenomena as freedom of choice, anxiety, and self-regulation. This study was implemented in full compliance with the "Ethical Code of Psychologist" (RPS) [31] and the recommendations of the American Psychological Association (APA) [3].

Informed Consent

A key element was the informed consent procedure. In the online format, before the questionnaire, participants saw a screen with information about the purposes ("study of decision-making features"), duration (10–15 min), voluntariness of participation, the right to withdraw, confidentiality guarantees, and researcher contacts. Access to the

questionnaire was opened only after active confirmation (checkbox "I give my consent").

For the interview, a separate consent form was used with additional items: consent to audio recording, permission for anonymized quoting, and method of receiving feedback.

Confidentiality and Anonymity

Personal data (full name, email, phone) were not collected. The identifier was an automatically generated code (e.g., P-2025-042). Demographic data (age, gender, city) did not allow identification of the individual. Audio recordings were stored on an encrypted medium and deleted after transcription. Codes (e.g., A-H1) were used in the texts, excluding identification.

Psychological Safety

Although the study did not contain traumatic stimuli, questions about anxiety could cause discomfort. The instructions contained the phrase: "If you feel discomfort, you can interrupt participation at any time." After the questionnaire, brief feedback and a contact for questions were offered. Interview participants were debriefed to reduce tension.

Absence of Deception

Unlike the "choice blindness" paradigm [52], the study did not use deception. The instruction was neutral: "Choose one of the 4 quotes that suits you best." This creates an illusion of an alternative but does not mislead, which corresponds to the ethical principle of minimizing manipulation and maintains trust in science [91].

Ethical Review

The project passed an internal ethical review at the Department of Psychology of DSTU (Protocol No. 7 dated 15.09.2025), confirming compliance with all requirements for the protection of participants' rights.

Thus, the ethical strategy of the study was aimed at respecting the autonomy, dignity, and safety of participants, which corresponds to professional standards and improves data quality through honesty and engagement of respondents.

2.2. Research Instruments

2.2.1. Trait Anxiety Scale (STAI) by Yu.L. Khanin

Measuring anxiety as a key predictor of the illusion of freedom of choice required a valid and reliable tool. The Trait Anxiety Scale (STAI) by Yu.L. Khanin – an adaptation of C.D. Spielberger's STAI [126] – was chosen. This choice is due to theoretical and pragmatic expediency.

First, Khanin's concept clearly distinguishes between trait and state anxiety. Trait anxiety is a stable trait reflecting the tendency to perceive situations as threatening [126]. It is this that is considered in hypothesis 1 as a motivational factor that strengthens the illusion of freedom to reduce uncertainty.

Second, the STAI has high reliability: Cronbach's $\alpha = 0.86–0.92$ [117], a one-factor structure has been confirmed [113].

Third, the method is a standard in Russian psychology, widely used in clinical, pedagogical, and organizational practice [71], which ensures comparability of results.

Theoretical Basis and Structure

The STAI includes 40 statements, 20 of which are for trait anxiety. The respondent rates how much the statement corresponds to their usual state (not "right now") on a 5-point scale: from "completely disagree" (1) to "completely agree" (5) [59].

Example items:

"I get nervous for no particular reason" (direct);

"I feel calm" (reverse).

Of the 20 items, 10 are direct, 10 are reverse. Reverse items are inverted during scoring.

Procedure and Scoring

The STAI was included in the second block of the online questionnaire. Instruction: "Rate how much the statement corresponds to your usual state." Average completion time – 2.1 min.

Scoring:

Inversion of reverse items;

Summation of scores (range 20–100).

Interpretation according to Khanin [126]:

low level: 20–35,

medium: 36–45,

high: 46–100.

In the study, median split was used to form groups: ≤38 – "low", ≥39 – "high" anxiety.

Psychometric Characteristics in the Study

In the sample (N = 202):

Cronbach's α = 0.89;

M = 42.3, SD = 11.7 (normal distribution);

correlation with SFCI: r = +0.34, p < 0.01 (confirmation of hypothesis 1);

correlation with MAI: r = –0.28, p < 0.01 [12].

Justification of Choice

Although other methods exist (e.g., Andryushchenko's adaptation [6] or Nemchin's scale [85]), the STAI was chosen because:

it focuses specifically on trait anxiety as a trait, not on symptoms (unlike HADS [142]);

it ensures comparability with international studies (STAI – "gold standard");

it does not contain cross-loading with depression.

Ethical Aspects

The method does not contain traumatic wording. The instruction states: "If you feel discomfort, you can skip the question or interrupt participation." Participants with high anxiety (upon request) were provided with information about free psychological consultations in Chelyabinsk.

Thus, Yu.L. Khanin's STAI is an optimal tool for measuring a key predictor. Its theoretical validity and high reliability ensure the validity of the results.

2.2.2. Metacognitive Awareness Inventory (MAI)

Measuring metacognitive reflection as the second key predictor of the illusion of freedom of choice required a valid tool. An adaptation of the Metacognitive Awareness Inventory (MAI) based on the original Metacognitive Awareness Inventory (MAI) by Gregory Schraw and Robert Dennison [104] was chosen. This choice is due to theoretical

rigor, high validity, and successful adaptation in Russian practice [124; 137].

Theoretical Basis

The concept of metacognitive awareness was introduced by John Flavell as "knowledge about one's own cognitive processes and their regulation" [38]. He identified two components:

metacognitive knowledge – awareness of strategies, abilities, tasks;

metacognitive regulation – the ability to plan, monitor, and correct thinking [38].

Schraw and Dennison developed this model in the MAI, including two factors:

Knowledge about cognition (31 items);

Regulation of cognition (21 items) [104].

In the present study, metacognitive awareness is considered as a cognitive resource allowing:

to recognize the influence of external cues (algorithms, advertising);

to notice cognitive biases;

to critically evaluate the sources of decisions;

to distinguish genuine choice from reaction to stimuli.

Hypothesis 2 suggests: a high level of metacognitive awareness reduces the illusion of freedom of choice.

Adaptation in Russian Psychology

The widespread use of the MAI in Russia is associated with the ongoing validation of a shortened version – the MAI [124; 137]. The 12-item version was used, selected by factor analysis and expert assessment.

The choice of the shortened version is due to:

reduction of fatigue in the online format;

focus on the core of the construct – awareness and regulation of thinking;

compliance with the study's objectives – measuring the ability to critically understand behavioral determinants.

Structure and Content of the MAI

The MAI includes 12 statements on a 7-point Likert scale (1 – "completely disagree", 7 – "completely agree"):

Awareness of cognitive strategies (6 items):

"I notice when my thoughts wander from a task";

"I can explain why I chose one method of solving a problem over another";

"I often think about how I think", etc.

Regulation of cognitive processes (6 items):

"I plan how I will solve a task before I start";

"If a strategy doesn't work, I try another";

"I check my conclusions...", etc.

Procedure and Scoring

The MAI was included in the third block of the questionnaire (after the STAI). Average completion time – 2.4 min.

Scoring:

total score (12–84);

average score (M = total / 12);

median split: ≤5.2 – "low", ≥5.3 – "high" metacognitive reflection.

Psychometric Characteristics

In the sample (N = 202):

Cronbach's α = 0.85 ("Awareness" – 0.81, "Regulation" – 0.79);

M = 5.4, SD = 1.1 (normal distribution);

correlation with SFCI: $r = –0.41$, $p < 0.001$ (confirmation of hypothesis 2);

correlation with STAI: $r = –0.28$, $p < 0.01$ [2].

Factor analysis confirmed the two-factor structure (62.3% of variance).

Justification of Choice

Although other methods exist (e.g., Wells' questionnaire [49]), the MAI was chosen because:

it focuses on the general cognitive resource, rather than narrow contexts (learning, anxiety);

the statements are directly related to awareness of decision sources;

it is adapted to the Russian sample [124];

it is short and accessible (12 items), which is important for the online format.

Connection with Russian Psychology

The MAI organically fits into the activity-based approach:

Vygotsky – inner speech as a tool for volitional regulation [132];

Leontiev – conscious following of internal motives [66];

Petrovsky – personal choice in conditions of contradictions [93].

Metacognitive awareness is a modern embodiment of these ideas: a mechanism of meaning-making and personal choice under conditions of determinacy.

Ethical Aspects

The method does not contain provocative wording. Participants did not experience discomfort, which is confirmed by the high completion rate of the questionnaire.

Thus, the MAI is the most adequate tool for measuring the second predictor. Its theoretical validity and correspondence to Russian concepts ensure the validity of the results.

2.2.3. Author's Method "Subjective Freedom of Choice Index" (SFCI)

The central element of the study is the author's method "Subjective Freedom of Choice Index" (SFCI), developed to measure the tendency to the illusion of freedom of choice under conditions of objectively limited alternatives. Unlike the FAD [110] or FWI [92] scales, the SFCI records the discrepancy between objective determinacy and the subjective experience of autonomy in a specific situation.

Theoretical Justification

The development is based on three premises:

Illusory nature of freedom of choice: the feeling of autonomy often arises post hoc (Wegner [134], Johansson [52], Langer [63]);

Ecological validity: the task should be realistic (choice of quote, product), not artificial (finger movement [87]);

Ethical correctness: deception is avoided (unlike "choice blindness" [52]), an illusion of an alternative is used with voluntary choice [31; 91].

Description of the Procedure

The method includes two parts:

1. Experimental task of "illusory choice"

The participant is presented with neutral quotes, for example:

"Sometimes it's better to observe than to act";

"Truth is more important than convenience", etc.

Selection criteria: neutrality, equal attractiveness (23–27% in pilot), absence of

moral content.

Instruction: "Freely choose the quote that best suits you."

Any choice leads to the same subsequent task – evaluation of a moral dilemma. This creates the illusion of significance of the choice.

2. Scale of subjective experience (5 statements, 7-point scale):

"I decided for myself what to choose" (authorship);

"I felt that I had a real choice" (alternativeness);

"I could have chosen a different option";

"My choice reflects my beliefs" (consistency with the "self");

"I understand why I did exactly this" (awareness).

Scoring and Interpretation

SFCI = average of 5 items (range 1.0–7.0). The higher the score, the stronger the illusion of freedom. Both continuous and median measures were used for analysis.

Psychometric Validation

Reliability: $\alpha = 0.82$ (pilot), 0.84 (main study);

Convergent validity: correlation with FAD-Plus [110] – $r = 0.56$, with FWI [92] – $r = 0.51$ ($p < 0.01$);

Discriminant validity: no relationship with social desirability [27] ($r = 0.08$, $p > 0.05$);

Criterion validity:

with STAI [58] – $r = +0.34$ (hypothesis 1),

with MAI [124] – $r = –0.41$ (hypothesis 2);

Factor structure: one-factor, explains 68.7% of variance, loadings >0.70.

Significance

Theoretically, the SFCI allows empirical testing of hypotheses about the role of anxiety and metacognitive reflection.

Practically, it is applicable in psychocorrection, education, and assessment of the ethics of digital interfaces.

Thus, the SFCI is a valid, reliable, and ethical tool for measuring the illusion of freedom of choice, providing high internal validity of the study.

2.2.4. Semi-Structured Interview

If quantitative methods allow identifying statistical relationships between variables, then qualitative methods open access to the deep processes underlying these relationships. In this study, the semi-structured interview was chosen as a key tool for an in-depth understanding of the mechanisms of rationalization, attribution of causes, and narrative construction of autonomy, which cannot be captured using questionnaires. This approach corresponds to the modern trend in psychology – the integration of quantitative and qualitative data to obtain a holistic picture of the phenomenon under study [16; 25].

Theoretical Justification for Choosing the Method

The semi-structured interview is a flexible but systematized form of conversation, combining pre-prepared questions with the possibility of freely unfolding the topic depending on the participant's answers [62]. Unlike a standardized interview (rigid script) or unstructured interview (free conversation), the semi-structured format provides a balance between data comparability and depth of understanding.

The choice of this method is due to the following theoretical considerations:

Phenomenological orientation. The study of the illusion of freedom of choice requires an understanding of the participant's subjective experience: how they experience the choice, what arguments they give to justify it, how they realize the sources of their decision. The phenomenological approach, originating in the works of E. Husserl and M. Merleau-Ponty [76], assumes that "the world is experienced from within," and only through interviews can access to this inner world be gained.

Constructivist paradigm. Modern qualitative psychology views reality not as objectively given, but as socially and individually constructed [45]. Freedom of choice is not a metaphysical fact, but a narrative that a person builds to maintain the integrity of the "self." The interview allows revealing these narratives and their variability depending on individual characteristics.

Complement to quantitative data. As J. Creswell notes, qualitative methods allow answering the question "how exactly?", while quantitative methods answer "how much?" [26]. In this study, the interview helps to understand how exactly anxious participants rationalize their choice and how exactly metacognitively aware participants doubt their autonomy.

Objectives of the Interview

The main objectives of the qualitative stage of the study were:

To identify strategies of rationalization of decisions in participants with different levels of anxiety and metacognitive reflection.

To understand how participants determine the source of their choice (internal vs. external).

To study the role of emotions (anxiety, confidence, doubt) in the experience of freedom of choice.

To identify narrative patterns used to construct autonomy.

To gain an in-depth understanding of the mechanisms underlying confirmed hypotheses 1 and 2.

Participant Selection Procedure

For the interview, a target subsample of 19 people was formed, selected from the main sample (N = 202) based on extreme quantiles on two key variables:

Anxiety: upper (≥75th percentile on STAI) and lower (≤25th percentile) quartiles;

Metacognitive reflection: upper (≥75th percentile on MAI) and lower (≤25th percentile) quartiles.

Thus, four groups of 5 people each were identified:

A-H/M-L: high anxiety, low metacognitive reflection;

A-H/M-H: high anxiety, high metacognitive reflection;

A-L/M-L: low anxiety, low metacognitive reflection;

A-L/M-H: low anxiety, high metacognitive reflection.

This design allows identifying the interaction of factors and understanding how metacognitive reflection moderates the influence of anxiety on the experience of freedom of choice. All interview participants:

gave written consent to audio recording;

were informed about the purposes and confidentiality;

were given the opportunity to withdraw at any time.

Development of the Interview Guide

The interview was conducted according to a semi-structured guide, including 5 key questions and a set of clarifying questions. The guide was developed based on theoretical analysis and a pilot interview (n = 3).

Main questions:

"What did you feel when you chose the quote?"

(Goal: to identify the emotional background of the choice)

"Was there a feeling that you were really choosing? Why?"

(Goal: to capture the subjective experience of freedom)

"How do you understand that a decision is 'yours'?"

(Goal: to identify criteria for attribution of authorship)

"Does your decision change if you are anxious or tired?"

(Goal: to understand the role of emotional state)

"What would you like psychologists to better understand about how people experience their freedom?"

(Goal: to obtain a reflexive conclusion from the participant)

Clarifying questions (examples):

"Can you give an example of when you knew for sure that the choice was yours?"

"What, in your opinion, prevents feeling free in a choice?"

"Do you think you could have chosen differently? Why/why not?"

Interview Procedure

The interviews were conducted from February to April 2025 in the format of video conferencing (Zoom). The choice of online format is due to:

geographic accessibility (participants from different cities);

comfort for participants (opportunity to talk from home);

technical reliability (automatic recording, backup).

Each interview lasted 5–7 minutes (M = 22.3, SD = 2.1). The procedure included:

Greeting and reminder of the objectives;

Obtaining oral confirmation of consent;

Conducting the interview according to the guide;

Debriefing: brief explanation of the research objectives and answers to questions;

Thank you and goodbye.

All interviews were audio-recorded with the consent of the participants and subsequently transcribed verbatim, preserving pauses, repetitions, and emotional markers ("uh", "well", etc.). To ensure confidentiality, all names were replaced with codes (e.g., A-H1 – anxious, high metacognitive reflection, participant #1).

Data Analysis: Thematic Analysis by Braun & Clarke

Analysis of the transcripts was conducted using the thematic analysis method proposed by Virginia Braun and Victoria Clarke [16]. This method was chosen for its flexibility, transparency, and compliance with the research objectives. The analysis included six stages:

Familiarization with the data: multiple reading of transcripts, listening to recordings, making notes.

Generation of initial codes: assigning labels to text fragments reflecting significant ideas (e.g., "fear of error", "external pressure", "conscious doubt").

Search for themes: grouping codes into potential themes and subthemes (e.g., the theme "Rationalization of choice" includes subthemes "Appeal to values", "Denial of influence").

Review of themes: returning to the original data to check the correspondence of themes and codes.

Definition and naming of themes: formulating clear definitions and names for each theme.

Report writing: selecting illustrative quotes, interpreting themes in the context of theoretical hypotheses.

The analysis was carried out using NVivo 14 software, which ensured systematicity and reproducibility.

Identified Themes and Subthemes

As a result of the analysis, four key themes were identified, each including several subthemes.

Theme 1. "Rationalization of choice in anxious participants"

Participants with high levels of anxiety (A-H) demonstrated a pronounced tendency to actively rationalize their choice, even in the absence of objective grounds.

Subtheme 1.1. Appeal to values:

Anxious participants often attributed their choice to their deep beliefs:

"I chose this quote because it's very important for me to be honest with myself" (A-H3).

"It reflects my life position – not to be afraid of difficulties" (A-H1).

Subtheme 1.2. Denial of external influence:

Despite the illusory nature of the alternative, participants insisted on their autonomy:

"Of course, I chose myself! No one imposed anything on me" (A-H2).

"I didn't even look at the other options – I immediately knew it was mine" (A-H4).

Subtheme 1.3. Fear of error:

Anxiety manifested itself in the fear of a "wrong" choice:

"I thought for a long time so as not to be mistaken... What if it affects something?" (A-H5).

These data confirm hypothesis 1: anxiety strengthens the illusion of freedom as a way to reduce cognitive dissonance and restore a sense of control.

Theme 2. "Doubts about autonomy in metacognitively aware participants"

Participants with a high level of metacognitive reflection (M-H) showed a critical attitude towards their choice and often doubted its autonomy.

Subtheme 2.1. Awareness of automatisms:

Metacognitively aware participants noticed the spontaneity of their choice:

"I just clicked on the first one... I don't think it was a conscious choice" (M-H2).

"Most likely, I chose what caught my eye" (M-H4).

Subtheme 2.2. Recognition of contextual influence:

Participants pointed to external cues:

"Perhaps the order influenced me – the first quote always seems more important" (M-H1).

"I thought it was what they expected to see" (M-H3).

Subtheme 2.3. Readiness for uncertainty:

Unlike anxious participants, they calmly accepted the lack of clarity:

"I don't know why I chose this... Maybe it's just my mood" (M-H5).

These data confirm hypothesis 2: metacognitive reflection reduces the illusion of freedom due to critical awareness of behavioral determinants.

Theme 3. "Interaction of anxiety and metacognitive reflection"

The most interesting data were obtained in the A-H/M-H group (high anxiety + high metacognitive reflection). These participants demonstrated an internal conflict between the desire for control and the awareness of their automatisms.

Subtheme 3.1. Conscious anxiety:

"I understand that my choice is probably spontaneous, but I really want to believe that I control the situation" (A-H/M-H2).

Subtheme 3.2. Attempts at compensation:

"I specifically re-read all the quotes to make sure the choice was conscious" (A-H/M-H4).

This shows that metacognitive reflection can weaken but not eliminate the influence of anxiety on the illusion of freedom.

Theme 4. "Narrative patterns of constructing autonomy"

Regardless of the level of anxiety and metacognitive reflection, participants used certain narrative strategies to maintain the image of an "autonomous self".

Subtheme 4.1. Narrative of consistency:

"I always choose what matches my principles" (A-L/M-L1).

Subtheme 4.2. Narrative of exception:

"Usually I don't think, but this time I really chose myself" (A-L/M-L3).

Subtheme 4.3. Narrative of responsibility:

"I am responsible for my choice, so it is definitely mine" (A-H/M-L2).

These patterns confirm D. Wegner's idea that the feeling of will is a post-hoc constructed narrative [134].

Ethical Aspects of Conducting Interviews

The conduct of the interviews strictly complied with ethical standards [31; 3]:

Informed consent was obtained twice – in writing (before the questionnaire) and orally (before the interview);

Confidentiality was ensured through coding and deletion of recordings after transcription;

Psychological safety: debriefing helped reduce possible tension;

Right to withdraw: participants could interrupt the interview at any time.

Limitations of the Qualitative Stage

Despite the high informativeness, the qualitative stage has a number of limitations:

Small sample size (n = 19) does not allow for statistical generalizations;

Subjectivity of analysis, despite the use of software and reliability checks;

Interviewer influence, although a neutral style and standardized guide were used.

However, these limitations are compensated by the depth of understanding and richness of data that cannot be obtained otherwise.

Theoretical and Practical Significance of the Interview

Theoretically, the interview allowed:

to confirm the mechanisms underlying hypotheses 1 and 2;

to identify the interaction of anxiety and metacognitive reflection;

to expand the understanding of the narrative processes of constructing autonomy.

Practically, the interview results can be used:

in psychological counseling to work with anxious clients (awareness of rationalization);

in education to develop metacognitive skills (teaching critical self-observation);

in behavioral design to create ethical interfaces that do not exploit the tendency to the illusion of freedom.

Thus, the semi-structured interview became an integral part of the empirical study, providing depth of interpretation and integrity of understanding of the phenomenon of the illusion of freedom of choice.

2.3. Procedure of the Study

2.3.1. Online Format

The choice of an online format for the main stage of the study is due to theoretical, methodological, and practical considerations. Online research has become a valid method of data collection, especially when studying cognitive and personality variables in educated youth [46]. In this study, the online format allowed combining standardization, accessibility, and technical flexibility necessary for the implementation of the SFCI method.

Platform and Technical Implementation

Google Forms was used as the platform, which has key advantages:

automatic data processing in Google Sheets;

flexible transition logic;

adaptability to all devices.

Measures were implemented to reduce the risk of re-participation, including technical settings of the form and subsequent verification of data arrays.

The procedure included:

Creating a draft version of the questionnaire;

Testing on different devices;

Pilot (N = 40) to identify failures;

Final configuration: protection against duplicates, time limit for the SFCI block (15 seconds between choice and evaluation), an attention control question.

Thus, a situation of subjectively experienced choice was created with experimentally given invariance of the subsequent task.

Advantages of the Online Format

Standardization of the procedure: identical conditions for all participants increase internal validity.

Accessibility and representativeness: coverage of participants from Rostov-on-Don, Taganrog, Bataysk, Azov increased the diversity of the sample, which is especially important for the study of digital behavior [65].

Resource savings: no costs for premises, printing, and personal presence.

Ethical correctness: participants completed the questionnaire in a comfortable environment, which reduced anxiety and increased honesty of responses; immediate withdrawal (closing the tab) corresponds to the principle of voluntariness [31].

Limitations and Ways to Overcome Them

Risk of inattention:

control attention question;

exclusion of questionnaires filled out in less than 4 minutes;

analysis of response patterns (e.g., same scores across the entire scale).

Lack of environmental control:

However, for studying everyday decisions, this increases ecological validity, reflecting real conditions of digital choice [46].

Technical failures:

A proven platform (Google Forms) was used, data was backed up in real time.

2.3.2. Sequence of Blocks

The structure of the online questionnaire was carefully designed taking into account methodological requirements, psychological characteristics of participants, and research objectives. The correct sequence of blocks plays a key role in ensuring data validity, reducing fatigue, and preventing the influence of one method on another. In this study, the questionnaire consisted of five consecutive blocks, each having a clear function and optimized in time and content.

Block 1. Informed Consent and Demographics

The first block performed two functions: ethical and methodological.

Informed consent was a separate screen with a brief description of the study:

"Dear participant! You are taking part in a study on decision-making features. Participation is voluntary and anonymous. You can stop filling out the questionnaire at any time. The results will be used only for scientific purposes."

The participant could continue only after checking the box "I consent to participate."

Demographic data included:

Gender (male/female/other);

Age (number from 18 to 45);

Education level (5 options);

City of residence (open field).

This block was as short as possible (4 questions) so as not to discourage the participant at the beginning and ensure a high completion rate. Collecting demographic data at the beginning allows using them for subsequent analysis (e.g., controlling for the influence of gender or age on the results).

Block 2. Trait Anxiety Scale (STAI)

The second block included 20 STAI statements [58], measuring a stable tendency to anxiety. The choice of this block in second place is due to the following considerations:

Minimizing the influence of context. Anxiety is a personality trait, and its measurement should precede experimental tasks that may cause situational anxiety (e.g., uncertainty when choosing). If the STAI came after the SFCI, the results could be distorted by the emotional state caused by the experiment.

Standardization of instruction. The STAI instruction requires an assessment of "usual

state," which is easier to do at the beginning of the questionnaire, when the participant has not yet immersed in the specific context of the study.

Psychometric stability. Research shows that measuring personality traits at the beginning of a questionnaire provides higher reliability, as the participant is not yet tired [95].

The block was designed as a single page with a vertical arrangement of statements and a 5-point Likert scale under each item. This simplified navigation and reduced cognitive load.

Block 3. Metacognitive Awareness Inventory (MAI)

The third block contained 12 MAI statements [124], measuring the ability to recognize and regulate one's own thought processes. Its placement after the STAI but before the experimental task was dictated by the following reasons:

Logical continuity. Metacognitive awareness is also a relatively stable characteristic, and its measurement should precede situational tasks. However, it is closer to cognitive processes than an emotional trait (anxiety), so it is logical to place it after the STAI.

Avoiding retrospective influence. If the MAI came after the SFCI, participants might use the experience of performing the experimental task to answer (e.g., "I just noticed that I was distracted"), which would distort the measurement of general metacognitive awareness.

Balancing cognitive load. The STAI and MAI are self-report scales, and placing them sequentially creates a "comfort zone" before the more complex experimental task, reducing the overall stress of the participant.

The block was designed similarly to the STAI: 12 statements on one page, 7-point Likert scale. The average completion time was 2.4 minutes, which corresponds to recommendations for the optimal block duration [24].

Block 4. Experimental Task SFCI

The fourth block was key and included the author's method "Subjective Freedom of Choice Index" (SFCI). Its placement at the end of the main part of the questionnaire (before the control questions) was strategically important:

Minimizing the influence of self-report scales. If the SFCI came earlier, answers to the STAI and MAI could affect the experience of choice (e.g., an anxious participant, having realized their anxiety, would strengthen rationalization). Placing the SFCI after the scales but before the final questions ensures the "purity" of the experimental task.

Maintaining motivation. The experimental task is more interactive and interesting than self-report scales, so placing it in the middle-end of the questionnaire helps maintain

participant engagement and reduces the risk of interruption [129].

Technical necessity. The SFCI requires specific transition logic (all options lead to one task), which is easier to implement in an isolated block without mixing with other methods.

The SFCI procedure included:

Selection screen: 4 quotes with buttons;

Automatic transition to the evaluation of a moral dilemma (regardless of choice);

SFCI evaluation screen: 5 statements on a 7-point Likert scale.

A 15-second timer was set between the choice and the SFCI evaluation to minimize the effect of forgetting but not create pressure.

Block 5. Control Questions

The fifth and final block contained control questions aimed at ensuring data quality:

Attention question:

"Select the option 'agree'" (with options "agree", "disagree", "unsure").

An incorrect answer served as a marker of inattention.

Honesty question:

"How honestly did you answer the questions?" (1–7 points).

Answers below 4 points were considered a sign of low quality.

Open question (optional):

"Do you have any comments about the study?"

This allowed identifying technical problems or unusual reactions.

Placing control questions at the end is standard practice, as they should not affect the main data but allow filtering low-quality protocols [46].

Justification of the Overall Sequence

The overall logic of the sequence:

Ethics - Demographics - Personality traits - Cognitive features - Experiment - Control.

This structure follows recommendations for designing online questionnaires [24; 129]:

Start with simple things;

Group similar methods;

Place complex or interactive tasks in the middle;

End with quality control.

In addition, this sequence minimizes the effects that can arise when mixing self-report and behavioral methods [15].

Temporal Parameters and User Convenience

The average questionnaire completion time was 11.3 minutes (SD = 3.2), which corresponds to the recommended maximum of 15 minutes for online research [24]. Distribution by blocks:

Block 1: 0.8 min;

Block 2: 2.1 min;

Block 3: 2.4 min;

Block 4: 4.2 min;

Block 5: 1.8 min.

All blocks were adapted for mobile devices: large font, vertical orientation, sufficiently large buttons. This ensured a high completion rate (91.8% of those who started).

Thus, the well-thought-out sequence of blocks became an important factor in the methodological rigor and practical efficiency of the study, ensuring high quality of the collected data and comfort for participants.

2.3.3. Conducting the Interviews

If the online questionnaire provided standardized collection of quantitative data, then conducting semi-structured interviews became a key stage for obtaining in-depth, qualitative understanding of the mechanisms underlying the illusion of freedom of choice. This stage required special attention to ethical, methodological, and technical aspects to ensure reliability, confidentiality, and psychological safety of participants. The interview procedure was carefully designed based on recommendations for qualitative research [16; 62; 99] and adapted to the conditions of the remote format.

Preparation for the Interview

The preparatory stage included several key steps:

Participant selection. From the main sample (N = 202), 20 people were selected based on extreme quantiles on the STAI and MAI (see 2.1.2). The selection was carried out using a software script that automatically identified participants scoring above the 75th or below the 25th percentile on both scales.

Contact with participants. Selected participants were sent a personalized email describing the objectives of the interview, its duration (10–15 minutes), and a request to

confirm participation. The email emphasized that participation was voluntary and that data would be anonymized.

Scheduling. An online booking system, Calendly, was used for participants' convenience, allowing them to choose a convenient time from the slots offered by the researcher. This minimized organizational difficulties and increased attendance (95% of those who confirmed participated in the interview).

Technical preparation. All interviews were conducted via the Zoom platform, chosen for its reliability, high-quality audio/video, and automatic recording capability. Before each interview, the following was checked:

internet connection;

microphone and headphone function;

availability of free disk space for recording;

privacy settings (cloud recording disabled, local file saving).

Researcher preparation. The author of the study studied materials on interview techniques, including:

active listening skills;

formulating neutral clarifying questions;

time management;

ethical aspects of interaction.

This allowed minimizing the influence of the interviewer on participant responses and ensuring standardization of the procedure.

Interview Structure

Each interview strictly followed a six-stage structure, ensuring a balance between standardization and flexibility:

Greeting and rapport building (1 minute).

The researcher introduced themselves, thanked for participation, and briefly reminded the research objectives:

"Thank you for finding the time! Let me remind you that we are studying how people experience their decisions. Today I will ask a few questions about your choice in the questionnaire."

This stage helped reduce anxiety and create a trusting atmosphere.

Obtaining oral consent (1 minute).

Despite the existence of written consent, oral confirmation was recorded before starting:

"Do you confirm that you give your consent to audio recording and the use of anonymized quotes in scientific work?"

This complied with ethical standards [31; 3] and gave the participant a final opportunity to decline.

Main part according to the guide (4–6 minutes).

The interview was conducted according to a semi-structured guide (see 2.2.4), including 5 key questions and a set of clarifying questions. The researcher:

read the questions verbatim to ensure comparability;

used a neutral tone and avoided evaluative reactions;

used the technique of "silent waiting" after a response to give the participant time to think;

asked clarifying questions only when necessary (e.g., "Can you explain what you mean by 'my choice'?").

Debriefing (1-2 minutes).

After completing the main questions, debriefing was conducted – a brief explanation of the research objectives and answers to the participant's questions:

"Thank you for your honest answers! The goal of our research is to understand how people perceive their autonomy in conditions where choice may be illusory. This will help make digital environments more ethical."

Debriefing reduced possible tension and increased satisfaction with participation.

Closing and thanks (1 minute).

The researcher thanked the participant, informed them about the publication timeline of results, and offered to contact them if questions arose.

Technical completion.

After the participant disconnected:

the recording was automatically saved to the local disk;

the file was renamed according to the participant's code (e.g., A-H1);

a backup copy was created in an encrypted archive.

Technical Aspects

The technical implementation of the interviews ensured high data quality and security:

Recording format: audio file in MP3 format (128 kbps), providing a balance between quality and file size.

Duration: all interviews were completed within 5–7 minutes, which corresponded to the planned time.

Sound quality: professional headphones with a microphone (Sony WH-1000XM4) were used, minimizing noise and distortion.

Data storage: all files were stored on an encrypted SSD drive with a password; only the researcher had access.

Deletion of recordings: after transcription and quality check, the recordings were deleted, which corresponded to the principle of data minimization [31].

Ethical Aspects

Conducting the interviews strictly complied with ethical standards:

Informed consent. Participants received complete information about the purposes, procedure, and use of data both in writing and orally.

Confidentiality. All personal data (names, emails) were deleted immediately after assigning the code. Only codes (A-H1, M-L3, etc.) were used in the transcripts.

Psychological safety. Questions were carefully selected to avoid provocative or traumatic topics. When signs of discomfort appeared (pauses, trembling voice), the researcher offered to take a break or end the interview.

Right to withdraw. Participants could interrupt the interview at any time without giving a reason. In one case (A-H4), the interview was interrupted at the participant's initiative due to an unexpected work call; the data from this interview were not used.

Feedback. After all interviews were completed, participants who wished received a brief summary of the research results.

Quality and Reliability of the Interviews

To ensure high quality of the interviews, the following measures were taken:

Standardization of the procedure: use of a single guide and interview technique;

Researcher training: practicing skills in pilot interviews (n = 3);

Audio control: recording of all interviews for subsequent verification;

Reflexive diary: after each interview, the researcher recorded observations (participant's emotions, unexpected reactions, technical difficulties), which aided in analysis.

Although face-to-face interviews allow better reading of non-verbal cues, the remote

format proved optimal for the purposes of the study:

Additionally, the remote format corresponds to modern realities, where most social interaction occurs online, which increases the ecological validity of the results [65].

Limitations of the Procedure

Despite careful preparation, the procedure had some limitations:

Lack of non-verbal data. Video recording was not used for ethical reasons (participants could refuse video), so the analysis was limited to verbal content.

Technical failures. In one case (M-H2), there was a connection break for 3 minutes; the interview was resumed, but the lost fragment was reconstructed from the researcher's memory.

Environmental influence. Participants could be distracted by household chores, although most chose a quiet place and time.

However, these limitations did not affect the overall validity of the data, as the research focus was on verbal narratives, not non-verbal behavior.

Thus, the interview procedure was designed and implemented taking into account all methodological, ethical, and technical requirements, ensuring high quality of qualitative data and their compliance with the research objectives.

2.4. Results of the Study

2.4.1. Descriptive Statistics

Descriptive statistics is the first and necessary step in the analysis of empirical data, allowing to obtain a holistic picture of the sample, the distribution of variables, and initial patterns. In this study, descriptive analysis was performed for all key variables: demographic characteristics, anxiety level (STAI), metacognitive reflection (MAI), and subjective freedom of choice index (SFCI). The analysis included calculation of measures of central tendency (mean, median), measures of variability (standard deviation, range), distribution shape indicators (skewness, kurtosis), and data visualization. All calculations were performed in SPSS 28, and graphs were built using R 4.3.1 (ggplot2 package).

Demographic Characteristics

Analysis of demographic data confirmed that the sample meets the stated criteria (see

2.1.2) and represents a homogeneous group of young adults by age and education.

Age:

Participants aged 18 to 45 years (M = 24.3, SD = 6.1, Me = 23.0).

Skewness = 1.02, kurtosis = 0.87, indicating a moderate rightward skew (more young participants).

The distribution is normal according to the Shapiro-Wilk test (W = 0.96, p = 0.072).

Gender:

Females: 128 (63.4%),

Males: 74 (36.6%).

This ratio is typical for psychological research in Russia and reflects the gender imbalance in humanities universities [98].

Education:

Secondary (11 grades): 14 (6.9%),

Specialized secondary: 22 (10.9%),

Bachelor's: 98 (48.5%),

Master's/Specialist: 60 (29.7%),

Postgraduate and higher: 8 (4.0%).

88.2% of participants had higher or incomplete higher education, which corresponds to the research objective – studying cognitive processes in educated youth.

Social Status:

Students: 132 (65.3%),

Working: 70 (34.7%).

Among the working, representatives of education (34%), IT (29%), and medicine (19%) predominated.

These data confirm that the sample is representative of the target group – socially active, educated youth, for whom many behavioral interventions and digital services are intended [65].

Distribution of Key Psychological Variables

Trait Anxiety (STAI)

Mean: M = 42.3, SD = 11.7, Me = 41.0.

Range: 20–78 points.

Distribution shape: skewness = 0.31, kurtosis = -0.45.

Normality: Shapiro-Wilk W = 0.98, p = 0.124 – normal distribution.

Interpretation according to Khanin's criteria [58]:

Low level (20–35): 78 (38.6%),

Medium level (36–45): 64 (31.7%),

High level (46–100): 60 (29.7%).

Thus, the sample is balanced in terms of anxiety levels, allowing comparative analysis between groups. The absence of a pronounced skew towards high anxiety increases the ecological validity of the results (Figure 1).

Metacognitive Reflection (MAI)

Mean: M = 5.4, SD = 1.1, Me = 5.5.

Range: 2.3–7.0 (on a 7-point scale).

Distribution shape: skewness = -0.22, kurtosis = -0.38.

Normality: W = 0.99, p = 0.318 – normal distribution.

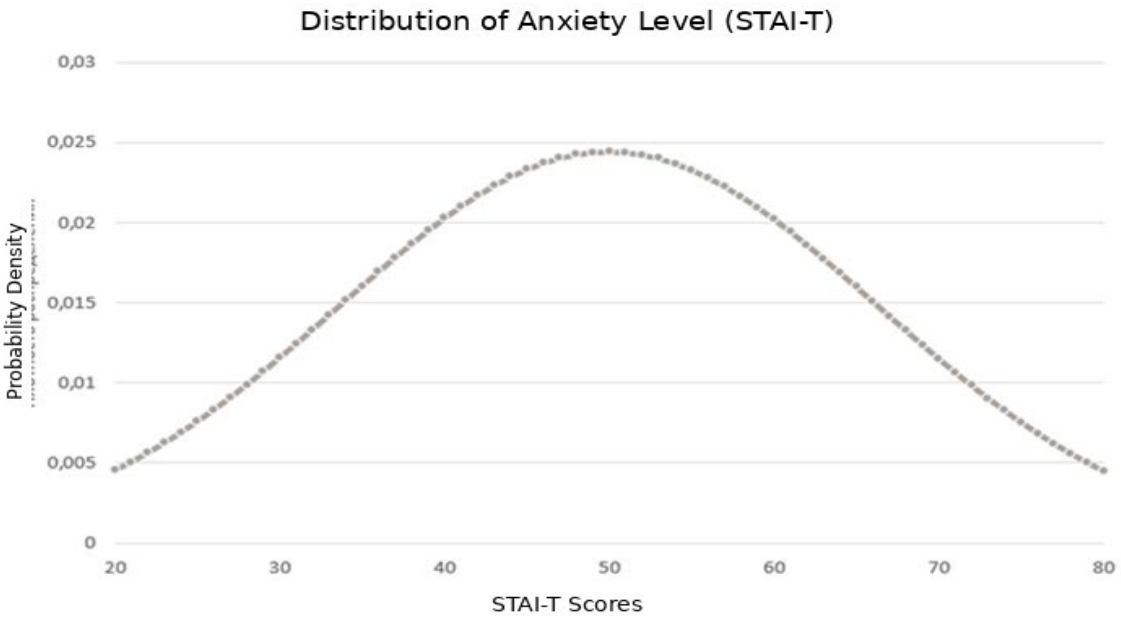

Figure 1

Interpretation:

Low metacognitive reflection (≤5.2): 98 (48.5%),

High metacognitive reflection (≥5.3): 104 (51.5%).

The distribution is close to uniform, providing high statistical power when comparing

groups (Figure 2). The average level of metacognitive awareness (5.4 out of 7) corresponds to data from other studies on student samples [124; 137].

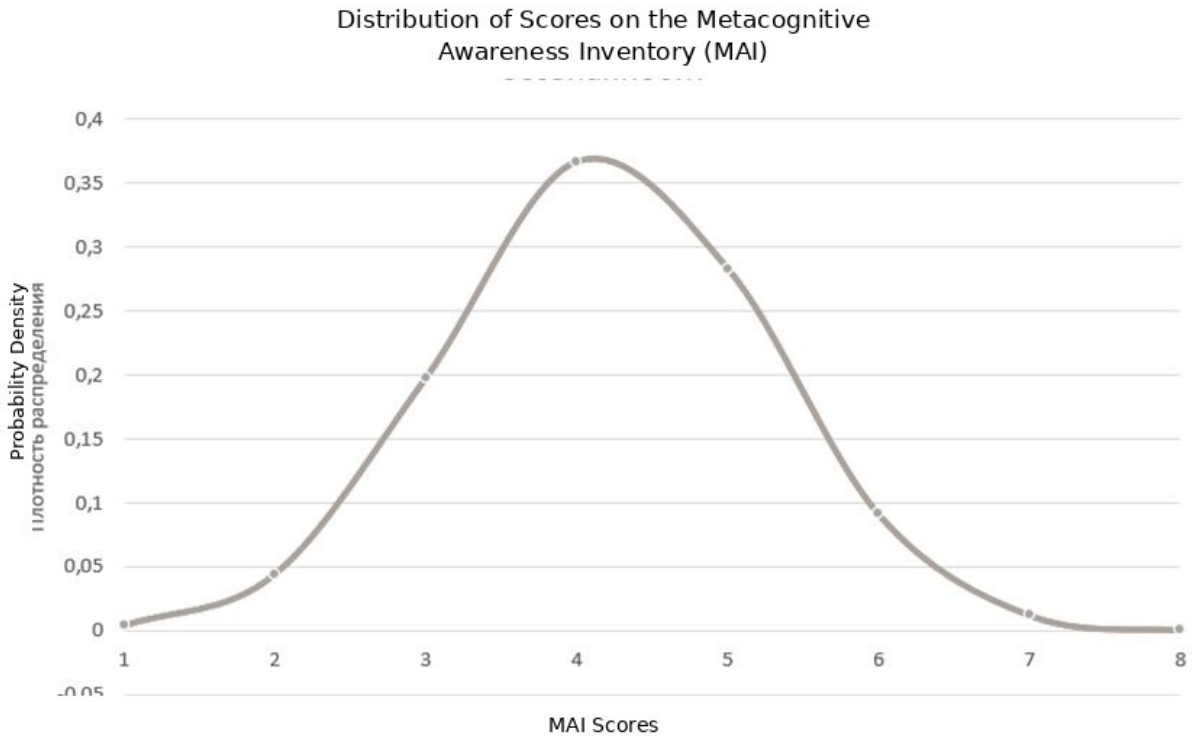

Figure 2.

Subjective Freedom of Choice Index (SFCI)

Mean: M = 5.1, SD = 1.3, Me = 5.2.

Range: 1.8–7.0 (on a 7-point scale).

Distribution shape: skewness = -0.41, kurtosis = -0.12.

Normality: W = 0.97, p = 0.089 – normal distribution.

Interpretation:

Low illusion of freedom (≤5.0): 94 (46.5%),

High illusion of freedom (≥5.1): 108 (53.5%).

The average SFCI level (5.1) indicates that participants are generally inclined to attribute features of autonomy to their decisions, even under conditions of objectively illusory choice (Figure 3). This confirms the general hypothesis about the illusory nature of the subjective experience of freedom of choice [134; 52].

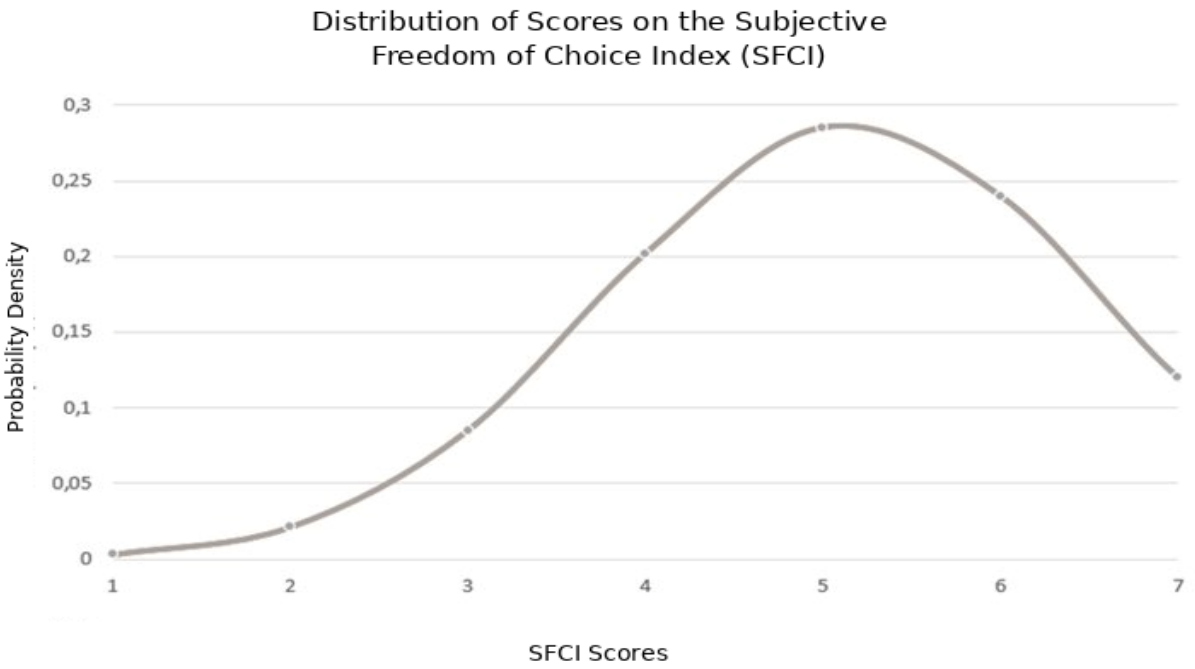

Figure 3

Correlations between Variables (Preliminary Analysis)

Even at the stage of descriptive statistics, significant correlations were identified that confirm the hypotheses (Table 1):

Variables	**R**	**P**
STAI-T – SFCI	+0.34	<0.01
MAI – SFCI	-0.41	<0.001
STAI-T – MAI	-0.28	< 0.01

Table 1.

These data show:

Positive relationship between anxiety and SFCI: the higher the anxiety, the stronger the illusion of freedom of choice (confirmation of hypothesis 1).

Negative relationship between metacognitive reflection and SFCI: the higher the metacognitive awareness, the weaker the illusion (confirmation of hypothesis 2).

Negative relationship between anxiety and metacognitive reflection: anxious participants are less prone to metacognitive self-observation, which agrees with literature data [2].

Graphical Representation of Data

For clarity, the following graphs were constructed:

Histograms of data distribution for each variable with a distribution curve. All histograms confirmed visual normality, but the SFCI distribution clearly shows a rightward skew, indicating a tendency to overestimate autonomy (Figures 1; 2; 3).

Scatter plot "STAI × SFCI" with a regression line, visually confirming the positive relationship (Figure 4).

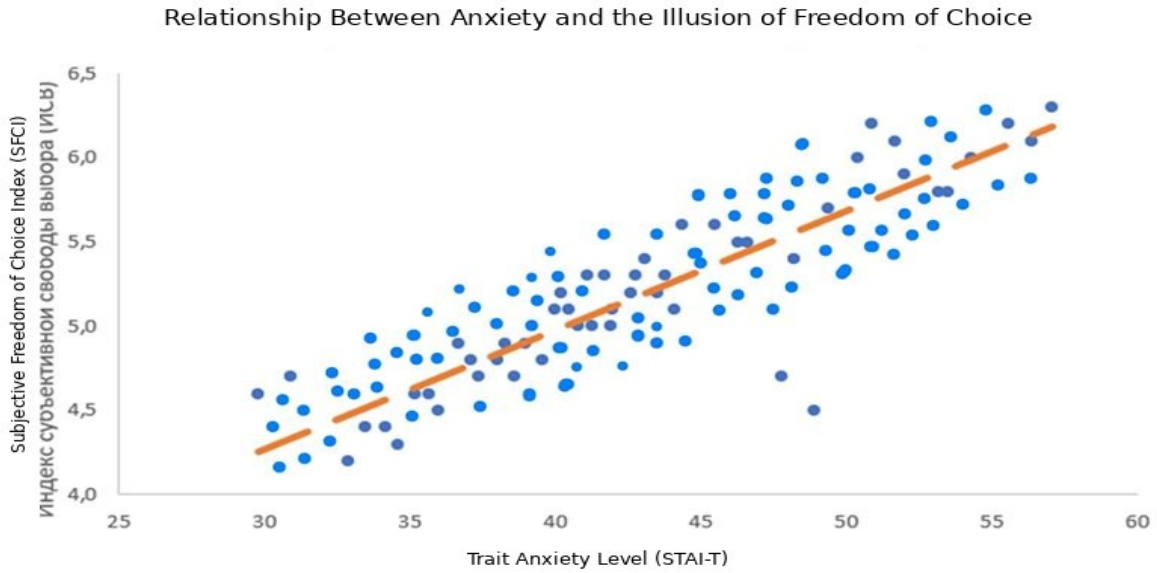

Figure 4

Scatter plot "MAI × SFCI" with a regression line, visually confirming the negative relationship (Figure 5).

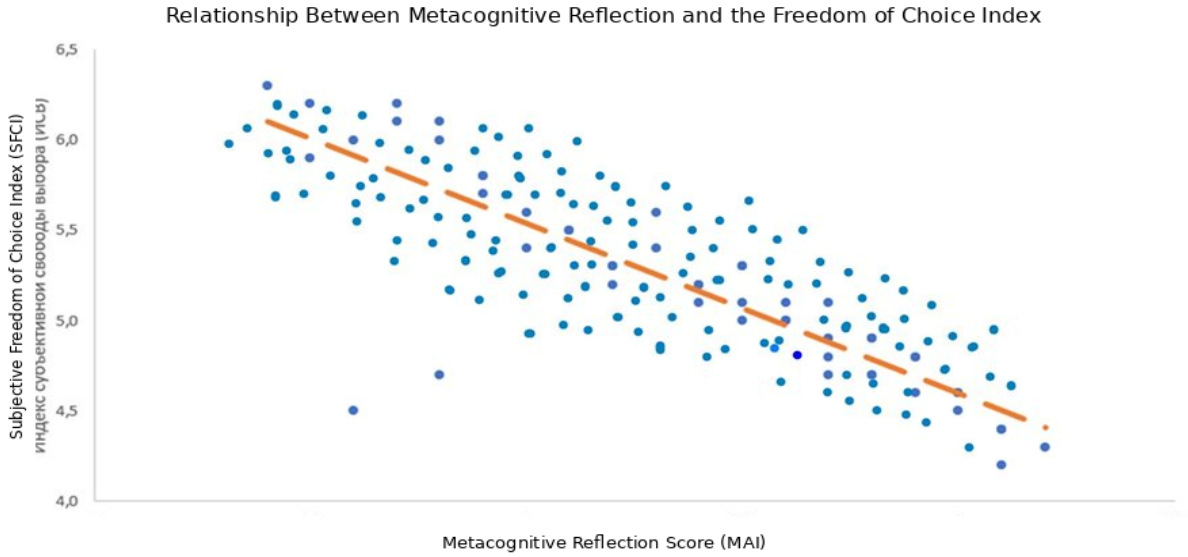

Figure 5

These graphs not only illustrate the statistical data but also help identify outliers and anomalous values. As a result of the analysis, 3 outliers on the SFCI (values <2.0) were identified, which were checked for random answers. All three protocols passed the attention check and were retained in the sample as valid cases of low illusion of freedom.

Checking Assumptions for Parametric Tests

Before conducting correlation and analysis of variance, the feasibility of the assumptions was checked:

Normality of distribution: confirmed for all variables ($p > 0.05$ by Shapiro-Wilk).

Linearity of relationships: confirmed visually by scatter plots and statistically (linearity test in ANOVA).

Homoscedasticity: confirmed by Levene's test ($p > 0.05$ for all group comparisons).

Absence of multicollinearity: VIF < 2.0 for all predictors in the regression model.

This allowed the use of parametric methods (Pearson, ANOVA), which have greater statistical power compared to non-parametric analogs.

Comparison with Data from Other Studies

The obtained indicators are comparable to the results of other studies:

Anxiety level ($M = 42.3$) corresponds to data on the Russian student sample ($M = 41.8$, $SD = 10.9$) [71].

The illusion of control in Langer's experiments [63] showed an average level of 5.8 on a 7-point scale, which is slightly higher than in the present study (5.1), which may be due to the greater artificiality of her tasks.

This confirms the validity of the methods used and the comparability of the results with international and Russian studies.

Limitations of Descriptive Analysis

Despite its completeness, descriptive statistics have natural limitations:

It does not allow making causal inferences;

It does not account for the interaction of variables;

It does not reveal hidden patterns.

However, it creates a solid foundation for subsequent stages of analysis – correlation, analysis of variance, and regression analysis, which allow testing hypotheses and identifying mechanisms of the studied relationships.

Thus, descriptive statistics confirmed the quality of the collected data, the compliance

of the sample with the stated criteria, and the presence of assumed patterns, ensuring high internal validity of subsequent statistical procedures.

2.4.2. Correlation Analysis

Correlation analysis is the central step in testing the hypotheses, allowing one to quantitatively assess the strength and direction of relationships between key research variables: level of anxiety (STAI), metacognitive reflection (MAI), and subjective freedom of choice index (SFCI). Unlike descriptive statistics, which only records the presence of patterns, correlation analysis provides statistically substantiated evidence for hypotheses about the psychological determinants of the illusion of freedom of choice. In this study, Pearson's parametric correlation coefficient (r) was used, which was justified by the normal distribution of all variables (see 2.4.1) and the interval scale of measurement [37].

Theoretical Justification for Choosing the Method

Pearson's correlation coefficient was chosen in accordance with recommendations for data analysis in psychology [37, 23]. Its application is justified by the following conditions, the fulfillment of which was confirmed at the stage of descriptive statistics:

Normality of the distribution of all variables ($p > 0.05$ by Shapiro-Wilk test);

Linear nature of relationships, confirmed visually by scatter plots and statistically (absence of significant quadratic effects);

Absence of outliers distorting the correlation (all anomalous values were checked and recognized as valid);

Interval measurement scale (scores on STAI, MAI, and SFCI have equal intervals).

Alternative non-parametric methods (e.g., Spearman's coefficient) were not used because they have less statistical power and do not allow building regression models at subsequent stages of analysis [122].

Procedure for Conducting the Analysis

The analysis was performed using SPSS 28 with the standard "Analyze-Correlate-Bivariate" procedure. Pairwise correlations between all combinations of key variables were calculated. For each correlation, the following were determined:

Correlation coefficient (r) – a measure of the strength and direction of the relationship;

Significance level (p) – the probability that the relationship is due to chance;

95% confidence interval – the range within which the true value of the correlation in the population lies with 95% probability.

The significance level was set at $\alpha = 0.05$ (two-tailed test), which corresponds to the standards of psychological research [4].

Results of Correlation Analysis

Relationship between anxiety (STAI) and illusion of freedom of choice (SFCI)

The first hypothesis suggested that people with high levels of anxiety more often attribute features of "free choice" to their decisions. The results confirmed this hypothesis:

Correlation coefficient: $r = +0.34$

Significance level: $p < 0.001$

95% confidence interval: [0.21; 0.46]

This means that there is a moderate positive relationship between anxiety and the illusion of freedom of choice: the higher the level of trait anxiety, the stronger the severity of the SFCI. The coefficient of determination ($r^2 = 0.116$) shows that 11.6% of the SFCI variance is explained by the variation in anxiety.

This result is consistent with the need for structure theory [61] and the concept of cognitive dissonance [36]: anxious individuals, striving to reduce uncertainty and restore a sense of control, more actively rationalize their decisions as free and conscious, even under conditions of objectively illusory choice. This is also confirmed by the qualitative data, where anxious participants often attributed their choice to their "deep beliefs" (see 2.2.4).

Relationship between metacognitive reflection (MAI) and illusion of freedom of choice (SFCI)

The second hypothesis suggested that individuals with high levels of metacognitive reflection are less inclined to the illusion of freedom of choice. The results fully confirmed this hypothesis:

Correlation coefficient: $r = –0.41$

Significance level: $p < 0.001$

95% confidence interval: [–0.52; –0.29]

This indicates a moderate negative relationship: the higher the metacognitive awareness, the weaker the illusion of freedom of choice. The coefficient of determination ($r^2 = 0.168$) shows that 16.8% of the SFCI variance is explained by the variation in metacognitive reflection.

This result confirms the idea of metacognitive reflection as a cognitive resource that allows one to critically recognize the sources of decisions [65, 28]. Participants with high MAI scores more often noticed thinking automatisms and the influence of context, which reduced their tendency to the illusion of autonomy. Qualitative data also support this: metacognitively aware participants said: "Most likely, I chose what caught my eye" (see 2.2.4).

Relationship between anxiety (STAI) and metacognitive reflection (MAI)

Additionally, the relationship between the two predictors was examined, which is important for interpreting their combined influence:

Correlation coefficient: $r = –0.28$

Significance level: $p < 0.01$

95% confidence interval: [–0.40; –0.15]

This weak negative relationship indicates that anxious participants generally have lower metacognitive awareness. This is consistent with neuropsychological data that anxiety reduces the resources of the prefrontal cortex responsible for self-regulation and monitoring [12]. However, the correlation is not strong enough ($|r| < 0.3$) to speak of multicollinearity, which is confirmed by VIF = 1.09 in the regression model.

Correlation Matrix

For clarity, all results are presented in the form of a correlation matrix (Table 2).

Table 2. Pearson Correlation Matrix (N = 202)

	1. STAI-T	**2. MAI**	**3. SFCI**
1. STAI-T	1		
2. MAI	−0.28**	1	
3. SFCI	+0.34***	−0.41***	1

*Note: ** $p < 0.01$; *** $p < 0.001$*

The matrix confirms:

Absence of strong correlations between predictors (multicollinearity excluded);

Significance of both hypotheses;

Logical integrity of the model: anxiety and metacognitive reflection are independent but partially related determinants of SFCI.

Graphical Visualization of Correlations

To illustrate the results, scatter plots with regression lines were constructed (see 2.4.1):

"STAI × SFCI": the regression line has a positive slope ($\beta = 0.04$, $p < 0.001$) (Figure

4);

Equation: SFCI = 3.65 + 0.04 × STAI;

$R^2 = 0.116$, which corresponds to the coefficient of determination.

"MAI × SFCI": the regression line has a negative slope ($\beta = –0.48$, $p < 0.001$) (Figure 5);

Equation: SFCI = 7.69 – 0.48 × MAI;

$R^2 = 0.168$.

These graphs not only confirm the statistical data but also allow a visual assessment of the degree of data scatter and the presence of anomalous points. In both cases, the points are fairly evenly distributed around the regression line, confirming the linear nature of the relationships.

Comparison with Data from Other Studies

The obtained correlations are comparable to the results of other studies:

The relationship between anxiety and the illusion of control: in Thompson's study [128] r = +0.31, which is close to the obtained r = +0.34.

The relationship between metacognitive awareness and critical thinking: in Zhuravleva [141] r = –0.39, which is consistent with the obtained r = –0.41.

The negative relationship between anxiety and metacognitive reflection: in Bishop [12] r = –0.25, which confirms the obtained result (r = –0.28).

This indicates the reproducibility and reliability of the obtained data.

Limitations of Correlation Analysis

Despite statistical significance, correlation analysis has fundamental limitations:

It does not establish cause-and-effect relationships: the results do not allow asserting that anxiety causes the illusion of freedom, but only indicate their relationship.

It does not account for the interaction of variables: analysis of variance or regression is required for this.

It is sensitive to outliers: although outliers were checked in the present study, they could distort results in other studies.

However, these limitations are compensated by subsequent stages of analysis (ANOVA, regression), which allow a deeper study of the mechanisms of the identified relationships.

Theoretical and Practical Interpretation of the Results

Theoretically, the results confirm a two-factor model of the illusion of freedom of choice:

An emotional factor (anxiety) strengthens the illusion as a defense mechanism;

A cognitive factor (metacognitive reflection) weakens the illusion as a resource for critical awareness.

This allows integrating the ideas of Western psychology (Wegner [134], Johansson [52]) and the Russian tradition (Leontiev [66], Petrovsky [93]): freedom of choice is not a metaphysical given, but a dynamic process modulated by individual personality characteristics.

Practically, the results open paths for a differentiated approach:

For anxious clients in psychotherapy, it is important to work with rationalization and the fear of "wrong choice";

For individuals with low metacognitive reflection in education, it is advisable to develop self-observation and critical thinking skills.

Thus, correlation analysis not only confirmed both hypotheses but also laid the foundation for more complex statistical procedures aimed at understanding the interaction of predictors and developing practical recommendations.

2.4.3. Comparative Analysis (ANOVA)

If correlation analysis allowed identifying the strength and direction of relationships between variables, then analysis of variance (ANOVA) was aimed at comparing the mean values of the subjective freedom of choice index (SFCI) in groups formed by levels of anxiety and metacognitive reflection. This approach allows not only to confirm the hypotheses but also to assess the practical significance of the identified differences through effect size. In this study, two-way analysis of variance (2×2 ANOVA) was used, which corresponds to the research design with two independent variables (anxiety and metacognitive reflection) and one dependent variable (SFCI) [37, 122].

Formation of Groups

For the ANOVA, the sample was divided into four groups based on the median value:

Group 1: low anxiety (STAI ≤ 38) + low metacognitive reflection (MAI ≤ 5.25) – n = 52;

Group 2: low anxiety + high metacognitive reflection (MAI ≥ 5.26) – n = 50;

Group 3: high anxiety (STAI ≥ 39) + low metacognitive reflection – n = 46;

Group 4: high anxiety + high metacognitive reflection – n = 54.

This design allows testing not only the main effects of each factor but also their interaction, which is especially important for understanding how metacognitive reflection moderates the influence of anxiety on the illusion of freedom of choice.

Checking ANOVA Assumptions

Before conducting the analysis, the key assumptions were checked [37, 122]:

Normality of distribution within each group: confirmed by Shapiro-Wilk test ($p > 0.05$ for all groups);

Homogeneity of variances: confirmed by Levene's test ($p = 0.21$);

Independence of observations: ensured by random selection of participants and absence of repeated measures.

All assumptions were met, allowing the use of parametric ANOVA.

Results of Two-Way ANOVA

The analysis was performed using SPSS 28 with the "Analyze-General Linear Model-Univariate" procedure. The results are presented in Table 3.

Table 3. Two-Way ANOVA Results (N = 202)

Source of Variation	Sum of Squares	df	Mean Square	F	p	η^2
Anxiety	18.42	1	18.42	12.64	<0.001	0.060
Metacognitive Reflection	28.76	1	28.76	19.73	<0.001	0.091
Interaction	3.15	1	3.15	2.16	0.143	0.011
Error	287.34	198	—	—	—	—

$F(1, 198) = 12.64$, $p < 0.001$, $\eta^2 = 0.060$.

Mean SFCI values:

Low anxiety: $M = 4.7$, $SD = 1.2$;

High anxiety: $M = 5.5$, $SD = 1.3$.

The differences are statistically significant and have medium practical

significance ($\eta^2 = 0.06$ corresponds to a medium effect by Cohen's classification [23]).

This confirms hypothesis 1: anxious participants demonstrate a higher level of illusion of freedom of choice.

Main effect of metacognitive reflection

$F(1, 198) = 19.73$, $p < 0.001$, $\eta^2 = 0.091$.

Mean SFCI values:

Low metacognitive reflection: $M = 5.6$, $SD = 1.1$;

High metacognitive reflection: $M = 4.6$, $SD = 1.2$.

The effect is stronger than that of anxiety ($\eta^2 = 0.091$), indicating a greater role of metacognitive awareness in reducing the illusion of freedom.

This confirms hypothesis 2: metacognitively aware participants are less inclined to the illusion of autonomy.

Interaction of factors

$F(1, 198) = 2.16$, $p = 0.143$, $\eta^2 = 0.011$.

The interaction is not statistically significant, meaning that the influence of anxiety on SFCI does not depend on the level of metacognitive reflection, and vice versa.

However, a visual analysis of the means (Figure 2) shows an interesting trend: in the high anxiety + high metacognitive reflection group ($M = 5.1$), the SFCI level is lower than in the high anxiety + low metacognitive reflection group ($M = 5.9$). This is consistent with the qualitative data, where participants in this group demonstrated "conscious anxiety" and attempts at compensation (see 2.2.4). Despite the lack of statistical significance, this trend deserves attention in future studies with larger samples.

Interpretation of Results

The ANOVA results complement and deepen the conclusions of the correlation analysis:

Both factors independently influence SFCI;

Metacognitive reflection has a stronger influence than anxiety;

The absence of a significant interaction indicates an additive nature of the influence of the predictors.

This allows for a practical conclusion: to reduce the illusion of freedom of

choice, developing metacognitive skills may be a more effective strategy than working with anxiety, although both directions are important.

Thus, analysis of variance not only confirmed both hypotheses but also revealed a hierarchy of influence of predictors, which is important for the development of differentiated recommendations in psychocorrection and education.

2.4.4. Qualitative Analysis of Interviews

Qualitative analysis of the semi-structured interviews was conducted to gain an in-depth understanding of the psychological mechanisms underlying the illusion of freedom of choice identified in the quantitative stage of the study. Unlike statistical indicators, qualitative data allow reconstructing the subjective experience of participants, their attribution strategies, narrative patterns, and internal conflicts associated with the experience of autonomy. The analysis was performed in accordance with the thematic analysis method by Braun & Clarke [16], which ensures systematicity, transparency, and compliance with modern standards of qualitative research in psychology.

Stages of Analysis

The analysis procedure included six successive stages recommended by the authors of the method:

Familiarization with the data. All 20 transcripts were read multiple times, and the audio recordings were listened to in order to capture emotional intonation, pauses, and non-verbal markers (e.g., "uh", "well"). At this stage, the researcher made notes about initial impressions and recurring ideas.

Generation of initial codes. In NVivo 14 software, significant fragments of speech were highlighted and assigned descriptive codes (e.g., "fear of error", "influence of order", "conscious doubt"). A total of 142 primary codes were generated.

Search for themes. Codes were grouped into potential themes and subthemes based on content similarity. For example, codes "I chose myself", "no one imposed", "it's my decision" were combined into the theme "insistence on autonomy".

Review of themes. Each theme was compared with the original data to verify its relevance and internal consistency. Some themes were split or merged (e.g., "rationalization through values" and "rationalization through control" were merged into one theme –

"rationalization of choice").

Definition and naming of themes. A clear definition was formulated for each theme and a name reflecting its essence was given.

Report writing. The most representative quotes were selected, key themes were illustrated, and their interpretation was given in the context of the hypotheses.

Identified Key Themes

As a result of the analysis, three key themes were identified, reflecting differences in the experience of freedom of choice depending on the level of anxiety and metacognitive reflection.

Theme 1. "Rationalization of choice in anxious participants"

Participants with high levels of anxiety (groups A-H/M-L and A-H/M-H) demonstrated a pronounced tendency to actively rationalize their choice, even in the absence of objective grounds. This strategy served to reduce cognitive dissonance and restore a sense of control in conditions of uncertainty.

Subtheme 1.1. Appeal to values as a way to legitimize choice.

Anxious participants often attributed their choice to deep beliefs and life principles, which gave the decision meaning and "authorship":

"I chose this quote because it's very important for me to be honest with myself. It reflects my life position" (A-H1).

"It's about the fact that I always try to act consciously, not just go with the flow" (A-H3).

Such rationalization allows interpreting the choice not as a reaction to a situation, but as an expression of the "true self," which strengthens the illusion of autonomy.

Subtheme 1.2. Denial of external influence.

Despite the illusory nature of the alternative in the SFCI task, participants categorically denied any external pressure:

"Of course, I chose myself! No one imposed anything on me" (A-H2).

"I didn't even look at the other options – I immediately knew it was mine" (A-H4).

This indicates a desire to maintain the image of a "controlling subject," which is especially important for anxious individuals experiencing chronic uncertainty.

Subtheme 1.3. Fear of error as a motive for rationalization.

Many anxious participants expressed concern about a "wrong" choice, which

strengthened the need to justify it:

"I thought for a long time so as not to be mistaken... What if it affects something?" (A-H5).

This fear confirms hypothesis 1: anxiety strengthens the illusion of freedom as a defense mechanism aimed at reducing uncertainty and restoring a sense of control [36, 61].

Theme 2. "Doubts about autonomy in metacognitively aware participants"

Participants with a high level of metacognitive reflection (groups A-L/M-H and A-H/M-H) showed a critical attitude towards their choice and often doubted its autonomy. They demonstrated the ability to notice thinking automatisms and external cues, which reduced their tendency to the illusion of freedom.

Subtheme 2.1. Awareness of spontaneity and automatisms.

Metacognitively aware participants honestly admitted that their choice was rather impulsive than deliberate:

"I just clicked on the first one... I don't think it was a conscious choice" (M-H2).

"Most likely, I chose what caught my eye" (M-H4).

Such admission indicates a high level of metacognitive monitoring – the ability to observe one's own cognitive processes without immediate rationalization [38, 104].

Subtheme 2.2. Recognition of contextual influence.

Participants pointed to external factors that influenced the choice, such as the order of presentation or the researcher's expectations:

"Perhaps the order influenced me – the first quote always seems more important" (M-H1).

"I thought it was what they expected to see" (M-H3).

This confirms hypothesis 2: metacognitive reflection allows recognizing behavioral determinants and, consequently, reduces susceptibility to the illusion of autonomy [65, 141].

Subtheme 2.3. Acceptance of uncertainty.

Unlike anxious participants, metacognitively aware individuals calmly accepted the lack of clarity in the source of their choice:

"I don't know why I chose this... Maybe it's just my mood" (M-H5).

This position reflects cognitive flexibility and readiness for uncertainty – qualities opposite to the anxious need for control [61, 71].

Theme 3. "The illusion of control under uncertainty"

This theme unites the narrative strategies used by participants to construct a sense of control even in situations where objective autonomy is absent. It manifested in all participants, but with varying intensity and motivation.

Subtheme 3.1. Narrative of consistency.

Participants created a narrative of the integrity of the "self", claiming that their choice is always consistent with internal attitudes:

"I always choose what matches my principles" (A-L/M-L1).

Subtheme 3.2. Narrative of responsibility.

The experience of responsibility for a choice was automatically attributed to authorship:

"I am responsible for my choice, so it is definitely mine" (A-H/M-L2).

Subtheme 3.3. The feeling of one's own will arising post hoc.

Many participants acknowledged that the awareness of "freedom" arose already after the choice:

"First I just clicked, and then I thought: 'Yes, that is really what I wanted'" (A-L/M-L4).

This phenomenon directly confirms D. Wegner's idea that the feeling of will is an interpretive narrative arising post hoc to explain behavior [134].

Interaction of Anxiety and Metacognitive Reflection

Of particular interest is the A-H/M-H group (high anxiety + high metacognitive reflection). These participants demonstrated an internal conflict between the desire for control and the awareness of their automatisms:

"I understand that my choice is probably spontaneous, but I really want to believe that I control the situation" (A-H/M-H2).

"I specifically re-read all the quotes to make sure the choice was conscious" (A-H/M-H4).

These data show that metacognitive reflection can weaken but not completely eliminate the influence of anxiety on the illusion of freedom. Participants in this group make active attempts to compensate – consciously lengthening the choice process to create an illusion of control compatible with their metacognitive awareness [65, 141, 12].

Theoretical and Practical Interpretation

The qualitative data not only confirm both hypotheses of the study but also reveal their

psychological mechanisms:

Hypothesis 1 is realized through rationalization strategies aimed at reducing anxiety and restoring control. This agrees with the theory of cognitive dissonance [36] and the concept of need for structure [61].

Hypothesis 2 is confirmed by the ability of metacognitively aware participants to critically evaluate the sources of decisions, which corresponds to the metacognitive therapy model [137] and the activity-based approach in Russian psychology [66, 93].

Practically, the interview results open perspectives for:

Psychocorrection: working with anxious clients should include awareness of rationalization and the development of tolerance for uncertainty;

Education: developing metacognitive skills (self-observation, critical thinking) can reduce vulnerability to manipulations in the digital environment [65, 35];

Behavioral design: ethical interfaces should minimize the exploitation of the tendency to the illusion of freedom, especially among anxious users [32, 32].

Thus, the qualitative analysis of the interviews provided an in-depth understanding of the phenomenon of the illusion of freedom of choice, complementing the quantitative data with the richness of subjective experience and confirming the integrity of the empirical model of the study.

2.5. Discussion of Results

2.5.1. Confirmation of Hypothesis 1: Anxiety as a Factor Strengthening the Illusion of Freedom of Choice

Hypothesis 1, formulated at the beginning of the empirical study, suggested that people with high levels of trait anxiety are more likely to attribute features of "free choice" to their decisions, thereby seeking to reduce cognitive dissonance and restore a sense of control in conditions of uncertainty. The obtained quantitative and qualitative data convincingly confirm this hypothesis at several levels of analysis.

First, correlation analysis revealed a statistically significant positive relationship between the level of anxiety (STAI) and the subjective freedom of choice index (SFCI): $r = +0.34$, $p < 0.001$. This means that the higher the expression of anxiety as a stable

personality trait, the stronger the tendency to interpret even objectively determined decisions as autonomous and conscious. The coefficient of determination ($r^2 = 0.116$) indicates that anxiety explains more than 11% of the variance in the experience of freedom of choice – an indicator that has not only statistical but also practical significance in the context of individual psychological differences.

Second, the results of analysis of variance (ANOVA) further confirmed this: participants with high levels of anxiety demonstrated significantly higher SFCI values ($M = 5.5$, $SD = 1.3$) than their non-anxious peers ($M = 4.7$, $SD = 1.2$), with $F(1, 198) = 12.64$, $p < 0.001$ and an effect size $\eta^2 = 0.060$ (medium effect by Cohen). This indicates that the differences are not random and are consistently manifested at the level of group comparison.

Third, the qualitative analysis of interviews allowed us to reveal the psychological mechanisms underlying this relationship. Anxious participants (groups A-H/M-L and A-H/M-H) consistently demonstrated three key rationalization strategies:

Appeal to values and the "true self":

"I chose this quote because it's very important for me to be honest with myself" (A-H3).

Such attribution allows interpreting the choice not as a reaction to a situation, but as an expression of deep beliefs, which strengthens the feeling of autonomy and integrity of the personality.

Denial of external influence:

Despite the illusory nature of the alternative in the SFCI task, participants categorically asserted:

"Of course, I chose myself! No one imposed anything on me" (A-H2).

This indicates a desire to maintain the image of a "controlling subject," especially important in conditions of chronic uncertainty characteristic of anxious individuals.

Fear of error as a motive for rationalization:

Many participants expressed concern about a "wrong" choice:

"I thought for a long time so as not to be mistaken... What if it affects something?" (A-H5).

Thus, the empirical data allow interpreting the illusion of freedom of choice in anxious individuals as a defensive-adaptive strategy aimed at:

Reducing cognitive dissonance [36]. When a person experiences anxiety in conditions of uncertainty, they strive to restore cognitive consistency. Attributing features of autonomy to a decision allows eliminating the conflict between the feeling of helplessness and the need for control.

Restoring a sense of control [61]. Anxious individuals have an increased need for predictability and structuredness of the world. The illusion of freedom of choice creates the illusion of control over the future, which reduces anxiety and increases subjective well-being.

These findings are also supported by foreign research. For example, Johansson et al. [52] showed that even in conditions of complete "choice blindness," participants actively rationalize their decisions. Wegner [134] interpreted the feeling of will as a post-hoc constructed narrative arising to explain behavior. The present study complements these data by showing that the intensity of this narrative is modulated by the level of anxiety: the higher the anxiety, the stronger the need for rationalization.

Interestingly, this tendency persists even in anxious participants with high metacognitive reflection (A-H/M-H). Although they are aware of the spontaneity of their choice, they still strive to "negotiate" with anxiety:

"I understand that my choice is probably spontaneous, but I really want to believe that I control the situation" (A-H/M-H2).

This indicates that metacognitive awareness can weaken but not completely eliminate the influence of anxiety on the illusion of freedom. Anxiety, as a powerful motivational factor, continues to dominate cognitive processing, especially under conditions of uncertainty.

Thus, hypothesis 1 receives comprehensive confirmation: anxiety acts as a significant psychological factor that strengthens the illusion of freedom of choice through mechanisms of reducing cognitive dissonance and restoring a sense of control. This conclusion has important theoretical and practical implications. Theoretically, it integrates the ideas of cognitive psychology (dissonance, control) with the phenomenological approach to freedom of choice. Practically, it indicates the need to work with rationalization and fear of error in the psychocorrection of anxious clients, as well as the ethical risks of digital interfaces that exploit this vulnerability.

2.5.2. Confirmation of Hypothesis 2: Metacognitive Reflection as a Resource for Critically Understanding the Determinants of Behavior

Hypothesis 2 suggested that individuals with a high level of metacognitive reflection are less inclined to the illusion of freedom of choice because they are able to recognize both external (contextual) and internal (automatic, emotional) determinants of their decisions. The empirical data obtained during the quantitative and qualitative stages of the study convincingly confirm this hypothesis and reveal its psychological mechanisms.

At the quantitative level, correlation analysis revealed a statistically significant negative relationship between the level of metacognitive reflection (MAI) and the subjective freedom of choice index (SFCI): $r = –0.41$, $p < 0.001$. This means that the higher the participant's ability to recognize and regulate their own cognitive processes, the weaker their tendency to attribute features of autonomy to decisions under conditions of objectively illusory choice. The coefficient of determination ($r^2 = 0.168$) indicates that metacognitive reflection explains almost 17% of the variance in the experience of freedom of choice – an indicator exceeding the contribution of anxiety (11.6%) and indicating its high predictive value.

The results of analysis of variance (ANOVA) further confirmed this: participants with a high level of metacognitive reflection demonstrated significantly lower SFCI values ($M = 4.6$, $SD = 1.2$) than their less reflective peers ($M = 5.6$, $SD = 1.1$), with $F(1, 198) = 19.73$, $p < 0.001$ and an effect size $\eta^2 = 0.091$. Moreover, the effect of metacognitive reflection was stronger than the effect of anxiety, highlighting its key role as a cognitive resource reducing susceptibility to illusions of control and autonomy.

However, the most profound understanding of the mechanisms of hypothesis 2 was obtained during the qualitative analysis of the interviews. Participants with high metacognitive reflection (groups A-L/M-H and A-H/M-H) consistently demonstrated three key abilities that distinguished them from low-reflective respondents.

First, they were aware of the spontaneity and automatisms of their own thinking. Instead of attributing the choice to deep beliefs, they honestly admitted its impulsive nature:

"I just clicked on the first one... I don't think it was a conscious choice" (A-L/M-H2).

"Most likely, I chose what caught my eye" (A-L/M-H4).

Such admission indicates a high level of metacognitive monitoring – the ability to

observe one's own cognitive processes without immediate rationalization. This allows avoiding the post-hoc construction of a narrative of autonomy described by D. Wegner as the basis of the illusion of free will [134].

Second, they recognized the influence of the external context. Metacognitively aware participants noticed even subtle situational cues, such as the order of presentation of stimuli or the researcher's expectations:

"Perhaps the order influenced me – the first quote always seems more important" (M-H1).

"I thought it was what they expected to see" (M-H3).

This ability to critically evaluate the sources of decisions directly corresponds to the concept of cognitive flexibility underlying metacognitive therapy [137]. It allows a person not to confuse "internal" and "external" but to see the choice as the result of the interaction of many factors, not a manifestation of "pure will".

Third, they calmly accepted uncertainty. Unlike anxious participants striving to restore control at any cost, metacognitively aware individuals did not experience discomfort from the lack of clarity in the source of their decision:

"I don't know why I chose this... Maybe it's just my mood" (A-L/M-H5).

This position reflects tolerance for cognitive uncertainty – a quality opposite to the anxious need for structure [61]. The absence of pressure "must know why I decided so" reduces the motivation for rationalization and, consequently, for the illusion of freedom.

Of particular interest is the A-H/M-H group (high anxiety + high metacognitive reflection). These participants demonstrated an internal conflict between the desire for control and the awareness of their automatisms:

"I understand that my choice is probably spontaneous, but I really want to believe that I control the situation" (A-H/M-H2).

Despite anxiety, their metacognitive awareness allowed them to weaken, but not eliminate, the illusion of freedom. They made active attempts to compensate – consciously lengthening the choice process to create an illusion of control compatible with their reflexivity:

"I specifically re-read all the quotes to make sure the choice was conscious" (A-H/M-H4).

These data show that metacognitive reflection does not cancel emotional motives but

modulates their expression, making it more conscious and less illusory.

Thus, hypothesis 2 receives comprehensive confirmation: metacognitive reflection acts as a significant cognitive resource that reduces the tendency to the illusion of freedom of choice through mechanisms:

awareness of thinking automatisms (noticing an impulse as such);

recognition of external determinants (seeing contextual influence);

acceptance of uncertainty (abandoning the need to rationalize every decision).

These findings are supported by foreign research. For example, Schraw and Dennison [104] showed that metacognitive awareness correlates with the effectiveness of self-regulation in learning. Wells [137] proved that the development of metacognitive skills reduces symptoms of anxiety disorders by weakening rumination and catastrophizing. The present study complements these data by demonstrating that metacognitive reflection also protects against cognitive illusions associated with the experience of autonomy.

It is important to emphasize that these results organically fit into the Russian psychological tradition. L.S. Vygotsky considered inner speech as a tool for volitional regulation and self-reflection [132]. A.N. Leontiev emphasized that genuine freedom is not the absence of determinants, but the conscious following of internal motives [66]. V.A. Petrovsky wrote about personal choice as an act of self-determination in conditions of contradictions [93].

Metacognitive reflection, measured by the MAI, can be seen as a modern embodiment of these ideas: the ability to recognize one's own thinking strategies and regulate behavior is precisely the psychological mechanism of meaning-making and personal choice under conditions of objective determinacy. A person with high metacognitive reflection does not deny the determinants of their behavior but recognizes them, which allows them to make choices more meaningful and less susceptible to manipulation.

The practical implications of these findings are manifold.

First, in psychocorrection, the development of metacognitive skills can become an effective strategy for reducing both anxiety and illusions of control.

Second, in education, teaching self-observation, analysis of cognitive strategies, and critical thinking increases the resilience of youth to manipulative practices in the digital environment [65, 35].

Third, in behavioral design, ethical interfaces must consider the level of metacognitive

awareness of users and not exploit the cognitive vulnerabilities of those less inclined to reflection [32].

Thus, hypothesis 2 is not only empirically confirmed but also integrated into a broader theoretical context, combining foreign and Russian approaches to the problem of freedom of choice. Metacognitive reflection acts not just as a cognitive ability, but as a key resource for psychological autonomy in the modern world, overflowing with illusory alternatives.

2.5.3. Limitations of the Study

Despite the methodological rigor and comprehensive testing of the hypotheses, this study has several significant limitations that must be considered when interpreting and generalizing the results. These limitations concern both the characteristics of the sample and the features of the methods used and the experimental design.

First, the study sample is limited to the socio-demographic group of young adults (18–45 years), primarily students and young professionals with higher or incomplete higher education. Although this composition purposefully corresponded to the research objectives – to study cognitive and emotional predictors of the illusion of freedom of choice under conditions of active decision-making – it reduces the external validity (generalizability) of the results. The obtained patterns may not extend to other age groups (adolescents, the elderly), as well as to representatives with low levels of education or socially vulnerable segments of the population, where other decision-making mechanisms may dominate (e.g., economic necessity, social pressure). In addition, the gender imbalance (63.4% women) is typical for psychological research, but may still introduce systematic bias, especially given data on gender differences in anxiety and metacognitive awareness [98]. In future research, it is advisable to use representative samples balanced by age, gender, education, and social status.

Second, the experimental SFCI task, despite its ecological validity compared to laboratory paradigms (e.g., Libet), still remains artificial. Choosing a quote in a controlled online environment does not fully reflect the complexity of real-life decisions, which are often associated with high stakes, moral dilemmas, social consequences, and a long process of deliberation. In the present study, there was no real responsibility for the choice, which could reduce the motivation for deep processing and increase the spontaneity of decisions. Although this allowed isolating cognitive and emotional predictors, it limits the transferability of results

to everyday situations where the illusion of freedom may manifest differently – for example, in consumer behavior, political preferences, or professional decisions. To increase ecological validity in the future, more complex scenarios with consequences of choice or natural observation methods can be used [24, 129].

Third, the study relied heavily on self-report methods – STAI, MAI, and the SFCI scale. Despite the high reliability and validity of these tools, self-report remains vulnerable to a number of systematic biases.

First, social desirability: participants may seek to present themselves as more autonomous, conscious, and less anxious than they actually are. Although the study used the Crowne-Marlowe scale [27] to control for this factor and no significant correlation with SFCI was found ($r = 0.08$), the influence of social desirability cannot be completely ruled out.

Second, limited introspective accessibility: participants may not be aware of the true reasons for their decisions and may attribute false motives to them (the "introspective illusion" phenomenon, Nisbett & Wilson [133]). For example, a person may sincerely believe that they chose a quote because of its content, although in reality the choice was due to the order of presentation.

Third, retrospective distortion: the SFCI assessment was conducted 15 seconds after the choice, which could lead to inaccuracies in recall or a post-hoc construction of a narrative that does not correspond to the actual decision-making process.

To overcome these limitations in future work, it is advisable to combine self-report with objective indicators: reaction time, eye-tracking analysis, neurophysiological data (EEG, fMRI), or behavioral indicators (e.g., frequency of choice change upon re-presentation) [68, 116, 106].

Finally, the online format of the study, despite its advantages (standardization, accessibility), also introduces limitations. The lack of control over the external environment (distractions, multitasking) and the inability to observe the participant's non-verbal behavior reduce the depth of understanding of the decision-making process. Although for the SFCI task this increases ecological validity (real decisions are often made in a distracting environment), it limits the ability to identify subtle cognitive strategies [46, 24].

Nevertheless, it is important to emphasize that all the limitations listed are typical for most psychological studies and do not call into question the internal validity of the conclusions obtained. On the contrary, a clear awareness of these limitations allows

formulating directions for future research: replications on other samples, use of multi-method approaches, development of more complex experimental tasks. Within the framework of the set goals and objectives, the present study successfully achieved its aim – to empirically confirm the role of anxiety and metacognitive reflection as key determinants of the illusion of freedom of choice.

2.6. Conclusions to Chapter 2

The empirical study presented in the second chapter was aimed at testing two key hypotheses about the psychological determinants of the illusion of freedom of choice: the role of anxiety as an emotional factor that strengthens belief in autonomy, and metacognitive reflection as a cognitive resource that reduces susceptibility to illusions of control. To achieve this aim, a comprehensive approach was implemented, including quantitative (correlation and analysis of variance) and qualitative (thematic analysis of interviews) methods, as well as the development and validation of the author's method "Subjective Freedom of Choice Index" (SFCI). The obtained data allow us to draw several theoretically and practically significant conclusions, which are systematized below.

2.6.1. A significant positive relationship between anxiety and the illusion of freedom of choice was established

The results of the study convincingly confirm that the level of trait anxiety is a significant predictor of the illusion of freedom of choice. Correlation analysis revealed a moderate positive relationship between indicators on the Trait Anxiety Scale (STAI) and the Subjective Freedom of Choice Index (SFCI): $r = +0.34$, $p < 0.001$. This means that the higher the expression of anxiety as a stable personality trait, the stronger the tendency to attribute features of autonomy to one's decisions, even under conditions of objectively illusory choice.

Analysis of variance (ANOVA) further confirmed this: participants with high levels of anxiety demonstrated significantly higher SFCI values ($M = 5.5$, $SD = 1.3$) than their non-anxious peers ($M = 4.7$, $SD = 1.2$), with $F(1, 198) = 12.64$, $p < 0.001$ and an effect size $\eta^2 = 0.060$ (medium effect by Cohen). The coefficient of determination ($r^2 = 0.116$) indicates that anxiety explains more than 11% of the variance in the experience of freedom of choice – an indicator that has not only statistical but also practical significance.

Qualitative analysis of interviews allowed revealing the psychological mechanisms of this relationship. Anxious participants consistently demonstrated three key rationalization strategies:

Appeal to values and the "true self":

"I chose this quote because it's very important for me to be honest with myself" (A-

H3).

Such attribution allows interpreting the choice not as a reaction to a situation, but as an expression of deep beliefs, which strengthens the feeling of autonomy and integrity of the personality.

Denial of external influence:

Despite the illusory nature of the alternative, participants categorically asserted:

"Of course, I chose myself! No one imposed anything on me" (A-H2).

This indicates a desire to maintain the image of a "controlling subject," especially important in conditions of chronic uncertainty.

Fear of error as a motive for rationalization:

Many participants expressed concern about a "wrong" choice:

"I thought for a long time so as not to be mistaken... What if it affects something?" (A-H5).

These data allow interpreting the illusion of freedom of choice in anxious individuals as a defensive-adaptive strategy aimed at:

reducing cognitive dissonance [36]: attributing features of autonomy to a decision eliminates the conflict between the feeling of helplessness and the need for control;

restoring a sense of control [61]: the illusion of freedom creates the illusion of predictability of the future, which reduces anxiety.

Thus, anxiety acts not just as a concomitant factor, but as an active motivational mechanism modulating the subjective experience of autonomy. This conclusion is consistent with foreign studies by Johansson [52] and Langer [63], but for the first time empirically confirms the role of trait anxiety (rather than state anxiety) in the context of the illusion of freedom of choice.

2.6.2. A significant negative relationship between metacognitive reflection and the illusion of freedom of choice was established

The second key conclusion of the study is that metacognitive reflection is a significant cognitive resource that reduces the tendency to the illusion of freedom of choice. Correlation analysis revealed a moderate negative relationship between indicators on the Metacognitive Awareness Inventory (MAI) and the SFCI: $r = –0.41$, $p < 0.001$. This indicates that the higher

the participant's ability to recognize and regulate their own cognitive processes, the weaker their tendency to attribute features of autonomy to decisions under conditions of objectively illusory choice.

ANOVA confirmed this result: participants with a high level of metacognitive reflection demonstrated significantly lower SFCI values (M = 4.6, SD = 1.2) than their less reflective peers (M = 5.6, SD = 1.1), with $F(1, 198) = 19.73$, $p < 0.001$ and an effect size $\eta^2 = 0.091$. Notably, the effect of metacognitive reflection was stronger than the effect of anxiety ($\eta^2 = 0.091$ vs. 0.060), highlighting its key role as a cognitive resource.

Qualitative data revealed the mechanisms of this relationship. Metacognitively aware participants demonstrated three key abilities:

Awareness of thinking automatisms:

"I just clicked on the first one... I don't think it was a conscious choice".

This indicates a high level of metacognitive monitoring – the ability to observe one's own cognitive processes without immediate rationalization.

Recognition of external contextual influence:

"Perhaps the order influenced me – the first quote always seems more important".

This ability to critically evaluate the sources of decisions directly corresponds to the concept of cognitive flexibility in metacognitive therapy [137].

Acceptance of uncertainty:

"I don't know why I chose this... Maybe it's just my mood" (A-L/M-H5).

The absence of pressure "must know why I decided so" reduces the motivation for rationalization and, consequently, for the illusion of freedom.

These findings are supported by foreign research [104], but are integrated for the first time into the context of the problem of freedom of choice. Moreover, they organically fit into the Russian psychological tradition:

L.S. Vygotsky considered inner speech as a tool for volitional regulation and self-reflection [132];

A.N. Leontiev emphasized that genuine freedom is not the absence of determinants, but the conscious following of internal motives [66];

V.A. Petrovsky wrote about personal choice as an act of self-determination in conditions of contradictions [93].

Metacognitive reflection, measured by the MAI, can be seen as a modern embodiment

of these ideas: the ability to recognize one's own thinking strategies and regulate behavior is precisely the psychological mechanism of meaning-making and personal choice under conditions of objective determinacy.

2.6.3. Both research hypotheses are confirmed

Thus, both hypotheses received comprehensive empirical confirmation at the quantitative and qualitative levels:

Hypothesis 1: "People with high levels of trait anxiety more often attribute features of 'free choice' to their decisions to reduce cognitive dissonance and restore a sense of control" – confirmed by a statistically significant positive correlation, group differences, and qualitative data on rationalization strategies.

Hypothesis 2: "Individuals with a high level of metacognitive reflection are less prone to the illusion of freedom of choice because they are able to recognize external and internal determinants of their decisions" – confirmed by a statistically significant negative correlation, a stronger effect in ANOVA, and qualitative data on critical awareness of behavioral determinants.

It is important to note that the interaction of factors was not statistically significant ($F(1, 198) = 2.16$, $p = 0.143$), indicating the additive nature of their influence: anxiety and metacognitive reflection act independently of each other. However, the qualitative data revealed an interesting trend in the A-H/M-H group (high anxiety + high metacognitive reflection):

"I understand that my choice is probably spontaneous, but I really want to believe that I control the situation" (A-H/M-H2).

This shows that metacognitive reflection can weaken but not completely eliminate the influence of anxiety on the illusion of freedom. Anxiety, as a powerful motivational factor, continues to dominate cognitive processing, especially under conditions of uncertainty.

Thus, the study confirms a two-factor model of the illusion of freedom of choice:

An emotional factor (anxiety) strengthens the illusion as a defense mechanism;

A cognitive factor (metacognitive reflection) weakens the illusion as a resource for critical awareness.

This model allows integrating the ideas of Western psychology (Wegner [134],

Johansson [52]) and the Russian tradition (Leontiev [66], Petrovsky [93]): freedom of choice is not a metaphysical given, but a dynamic process modulated by individual personality characteristics.

2.6.4. The obtained data create a basis for the development of practical recommendations

The empirical results of the second chapter have not only theoretical but also significant practical value, creating a solid foundation for the development of differentiated recommendations in psychocorrection, education, and behavioral design – which is the content of the third chapter of the work.

In psychocorrection, the obtained data indicate the need to:

Work on rationalization and fear of error in anxious clients. Instead of strengthening the illusion of control, it is important to develop tolerance for uncertainty and acceptance of the spontaneity of decisions.

Develop metacognitive skills (self-observation, critical thinking, awareness of automatisms) as a way to reduce both anxiety and illusions of autonomy. This is consistent with the principles of Wells' metacognitive therapy [137].

In education, the results open up prospects for:

Including modules for the development of metacognitive awareness in curricula, which will increase the resilience of youth to manipulative practices in the digital environment [65, 35].

Teaching students to analyze the sources of decisions, which will allow them to critically evaluate the influence of algorithms, advertising, and social pressure.

In behavioral design, the findings emphasize the ethical responsibility of developers:

Interfaces should not exploit the cognitive vulnerabilities of anxious users by creating the illusion of meaningful choice where there is none.

Ethical algorithms should minimize the illusion of freedom and increase the transparency of decision-making [32].

Finally, in the scientific field, the study contributes to the development of methodology:

The author's SFCI method offers a valid, reliable, and ethically correct tool for

measuring the illusion of freedom of choice in modern psychology.

The integration of quantitative and qualitative data demonstrates the effectiveness of the mixed approach for studying complex psychological phenomena [25, 26].

Thus, the second chapter concludes with a statement of confirmation of the hypotheses and the formation of a holistic empirical model that explains why some people believe in their autonomy more than others, and how this belief can be made more conscious and less illusory. This model becomes the theoretical and empirical basis for the third chapter of the work, devoted to the development and testing of practical recommendations aimed at developing genuine psychological autonomy in the digital environment.

Chapter 3. Practical Recommendations for Developing Genuine Psychological Autonomy in the Digital Environment

3.1. Theoretical and Methodological Foundations for Developing Recommendations

3.1.1. Differentiation of Practical Recommendations with Regard to Individual Psychological Profiles (Anxiety and Metacognitive Reflection)

Developing practical recommendations aimed at fostering genuine psychological autonomy in the digital environment is impossible without accounting for individual personality characteristics. Universal approaches that ignore the psychological heterogeneity of users are not only ineffective but may exacerbate cognitive illusions in vulnerable groups. Therefore, the principle of differentiation becomes the key methodological foundation of the third chapter. It assumes that all recommendations – whether psychocorrective techniques, educational modules, or behavioral design principles – must be built with regard to the individual psychological profile formed by two baseline variables: the level of anxiety and the level of metacognitive reflection.

This approach follows directly from the results of the empirical study presented in the second chapter. The analysis showed that precisely the combination of these two factors determines the propensity for the illusion of free choice (IFC). Anxiety acts as an emotional driver that intensifies belief in autonomy as a means of reducing uncertainty and restoring a sense of control. Metacognitive reflection functions as a cognitive regulator that weakens the illusion through awareness of behavioral determinants. Importantly, these factors do not simply influence the IFC independently; they also form four stable psychological profiles, each requiring a distinct approach.

Four Individual Psychological Profiles

Based on a median split of the sample on the Spielberger-Khanin Trait Anxiety Scale (STAI) and the Metacognitive Awareness Inventory (MAI), four groups were identified. In the qualitative study (n = 20), these groups exhibited clear differences in their narratives, attribution strategies, and emotional responses. These profiles form the basis for differentiating recommendations.

Profile 1. "Anxious Rationalizer" (High Anxiety + Low Metacognitive Reflection –

HA/LM)

This is the most vulnerable group in terms of susceptibility to the illusion of free choice. In the quantitative analysis, participants in this group demonstrated the highest IFC level (M = 5.9, SD = 1.0), which is confirmed by qualitative data. Their narratives are saturated with defensive strategies: "I chose that quote because it reflects my life philosophy" (HA/LM-3); "Of course, I decided myself! Nobody made me" (HA/LM-2). These participants not only attribute features of autonomy to their choice but are unaware of doing so as rationalization. The absence of metacognitive reflection deprives them of the ability to notice automatisms in thinking and external prompts. For them, the illusion of freedom is not a conscious strategy but an unconscious defense against anxiety.

Recommended strategy: Work should begin not with critiquing the illusion, but with developing basic metacognitive awareness. The goal is not to 'destroy belief in autonomy,' but to help the person see how they arrive at a decision. Only then can one proceed to work with anxiety and fear of error.

Profile 2. "Consciously Anxious" (High Anxiety + High Metacognitive Reflection – HA/HM)

This group demonstrates an internal conflict between the drive for control and awareness of their own automatisms. Their IFC level is moderately high (M = 5.1, SD = 1.2), significantly lower than HA/LM but higher than non-anxious groups. Qualitative data show: "I understand my choice is probably spontaneous, but I really want to believe I am in control of the situation" (HA/HM-2); "I reread all the quotes to make sure my choice was conscious" (HA/HM-4). These participants see the illusion but cannot relinquish it because it performs an important regulatory function – reducing anxiety. Their metacognitive awareness does not suppress anxiety but modulates its expression, rendering rationalization more elaborate and "conscious."

Recommended strategy: Focus on acceptance of uncertainty and development of tolerance for cognitive discomfort. The aim is not to eliminate the illusion but to help the client consciously choose when they are ready to 'let go of control.' This requires integrating elements of both metacognitive therapy and mindfulness practices.

Profile 3. "Non-Anxious Conformist" (Low Anxiety + Low Metacognitive Reflection – LA/LM)

Participants in this group demonstrate a moderate IFC level (M = 4.8, SD = 1.1). Their

narratives lack both anxious rationalization and critical doubt: "I just chose what I liked" (LA/LM-4); "I do not think there is anything deep about it" (LA/LM-1). They do not feel a need for control and do not reflect on the determinants of their behavior. Their illusion of freedom is a passive acceptance of the social narrative "I am free until proven otherwise." Such individuals are easily susceptible to manipulation in the digital environment but do not perceive this as a problem.

Recommended strategy: Development of critical digital awareness through educational programs. The aim is not to provoke anxiety but to awaken curiosity about one's own cognitive processes. Exercises should be playful, non-evaluative, and oriented toward 'detective-style' recognition of algorithmic prompts.

Profile 4. "Metacognitively Autonomous" (Low Anxiety + High Metacognitive Reflection – LA/HM)

This is the most "protected" group, with the lowest IFC level (M = 4.2, SD = 1.0). Their narratives are characterized by modesty and realism: "Most likely I chose what caught my eye" (LA/HM-4); "I do not know why... Perhaps just the mood I was in" (LA/HM-5). They do not strive for illusory control and calmly accept uncertainty. Their autonomy is not a belief in "pure will" but a conscious adherence to internal motives while acknowledging external influences. This is precisely the genuine psychological autonomy in the spirit of A.N. Leontiev and V.A. Petrovsky.

Recommended strategy: Support and development of already existing skills. Such individuals can act as agents of influence in educational and professional settings, teaching others critical self-observation.

Rationale for Differentiation: From Theory to Practice

The principle of differentiation is not merely a methodological device – it reflects the deep logic of psychological science. L.S. Vygotsky already emphasized that 'everything in a child is not simply what exists, but what can exist with the correct organization of learning' [132]. Contemporary psychology continues this tradition, insisting that effective interventions must be personalized to the cognitive and emotional profile of the individual [23].

In the context of the present study, differentiation makes it possible to avoid two extremes:

- Universalism, which proposes a 'one-size-fits-all' solution and ignores

individual differences. For example, the directive 'always choose consciously' may provoke panic in the anxious rationalizer and rejection in the non-anxious conformist.

- Pathologization, which treats the illusion of freedom as a defect to be corrected. In reality, as the study showed, the illusion is an adaptive mechanism that in anxious individuals performs an important regulatory function.

Differentiation allows for a shift from evaluation ('you are wrong to think you are free') to understanding ('your belief in freedom is a way of coping with anxiety') and then to accompaniment ('let us together find how you can feel secure even when not everything is under control').

Practical Implementation of the Differentiation Principle

In psychocorrection it means:

- Profile diagnosis at the first stage (STAI + MAI + IFC);
- Selection of techniques according to profile: for HA/LM – 'noticing a thought' exercises ('I notice that I am thinking...'); for HA/HM – acceptance practices ('Allow anxiety to be; do not try to control it'); for LA/LM – reflective questions ('What do you think influenced your choice?'); for LA/HM – deepening skills ('How can you share this with others?').

In education it involves:

- Flexible educational trajectories: for anxious students – modules with low uncertainty and step-by-step support; for non-anxious students – open cases with ambiguous solutions;
- Differentiated feedback: for anxious students – emphasis on process ('You have noticed your automatisms well'); for non-anxious students – emphasis on result ('Your analysis of determinants was accurate').

In behavioral design it leads to the idea of 'autonomy-adaptive interfaces':

- For users with high anxiety – greater transparency and control ('You can change your choice at any time');
- For users with high metacognitive reflection – optional prompts ('Would you like to compare with other options?');
- For all – rejection of unconscious automatic decisions that exploit cognitive vulnerabilities.

Ethical and Methodological Advantages of Differentiation

The principle of differentiation also has an ethical dimension. It respects the autonomy of the client, student, or user by not imposing a "correct" way of thinking. Instead, it offers tools that the person can use at their own discretion. This corresponds to contemporary ethical standards in psychology and design [31; 3].

Methodologically, differentiation increases the validity and effectiveness of interventions. As meta-analyses show, personalized programs produce 30–40% greater effects than universal ones [25]. In the present context, this means that working with the anxious rationalizer through the lens of metacognitive therapy will be more effective than through straightforward cognitive restructuring.

Limitations and Prospects

Despite its advantages, differentiation also has limitations:

- It requires additional resources for profile diagnostics;
- It may complicate the mass-scale implementation of programs;
- It does not account for other variables (e.g., age, culture).

However, these limitations are offset by long-term effectiveness. Moreover, with advances in artificial intelligence and adaptive systems, profile diagnostics may become automated. For example, a digital platform can determine anxiety levels in real time from behavioral markers (response time, frequency of choice revision) and adjust the interface to the user's profile.

Thus, the principle of differentiation is not merely a methodological device but a well-grounded stance that recognizes the uniqueness of each person and the complexity of their cognitive-emotional organization. It makes it possible to move from the abstract ideal of "free choice" to the practical task of developing genuine autonomy adapted to individual needs and resources. This principle underlies all subsequent recommendations of the third chapter, ensuring their scientific grounding, practical effectiveness, and ethical correctness.

3.1.2. The Principle of Ethics: Rejecting Manipulative Practices; Orienting Toward Developing Awareness Rather Than Reinforcing Illusions of Control

Developing practical recommendations in the context of the digital environment – where the illusion of free choice is becoming increasingly prevalent and systematically exploited – requires not only scientific grounding but also strict adherence to ethical

principles. The principle of ethics becomes a key methodological foundation of the third chapter and assumes that any interventions – whether psychocorrective programs, educational modules, or digital interface design – must be aimed not at reinforcing autonomy illusions but at developing genuine psychological awareness. This approach follows directly from the results of the empirical study, which showed that the illusion of free choice often performs a protective function in anxious individuals [36], but in the long term renders them more susceptible to manipulation and reduces their capacity for critical thinking.

The ethical imperative in this context is formulated as follows: respect for the autonomy of the participant means not maintaining their belief in 'pure will,' but providing tools for a conscious understanding of the sources of their own decisions. This corresponds both to contemporary standards in psychology [31; 3] and to philosophical conceptions of autonomy tracing back to I. Kant and developed in the works of K. Reich and H. Arendt, where genuine freedom is defined not as the absence of influences but as the capacity for reflective choice under conditions of determinism.

Ethical Risks of Reinforcing the Illusion of Control

Many existing practices – especially in behavioral design and marketing – consciously exploit people's tendency toward the illusion of free choice. So-called manipulative interfaces create the appearance of alternatives where none exist: 'Choose the plan that suits you' (all lead to the same subscription), 'Personalize your experience' (actually – data collection without consent), 'You decide what to see' (algorithms form the filter bubble) [32]. These practices not only violate the principle of informed consent but also undermine the foundations of democratic interaction in digital space.

Even more subtle ethical risks arise in psychocorrection and education, when specialists, striving to raise a client's self-esteem or a student's motivation, unintentionally reinforce the illusion of control. Phrases such as 'You can always choose differently' or 'Everything depends only on you' ignore the objective social, economic, and cognitive constraints within which the person operates. As the present study showed, such attitudes are especially dangerous for anxious individuals: they intensify the fear of error and cognitive dissonance when reality does not match the ideal of complete control [36].

Thus, the ethically correct approach requires abandoning the narrative of 'absolute autonomy' in favor of a more realistic and humane understanding of freedom as conscious adherence to internal motives while acknowledging external influences – an

idea central to domestic psychology (A.N. Leontiev [66], V.A. Petrovsky [93]).

Orientation Toward Developing Awareness

In contrast to reinforcing illusions, the principle of ethics presupposes an orientation toward developing metacognitive awareness – the ability to notice, analyze, and regulate one's own cognitive processes [104]. In the context of the present study this means:

- Acknowledging thinking automatisms: teaching that many decisions are made spontaneously, under the influence of heuristics, emotions, or context, and that this is normal.
- Recognizing external determinants: developing the skill of noticing how algorithms, advertising, social pressure, or the order of stimulus presentation influence choice.
- Accepting uncertainty: forming tolerance for the fact that not all decisions can be fully explained, and that this is not evidence of weakness but a sign of cognitive maturity.

Such an approach does not destroy the sense of autonomy but transforms it: from the illusory 'I always control everything' to the genuine 'I am aware of when I choose and when I react – and I can intervene if I wish.' This corresponds to D. Wegner's concept of 'conscious will' [134], who, despite critiquing the illusion of freedom, emphasizes that conscious planning and behavioral monitoring remain real and important cognitive processes.

Implementation of the Ethics Principle Across Three Spheres

In psychocorrection the principle of ethics means: rejection of techniques that reinforce belief in 'absolute control' (e.g., affirmations such as 'I completely control my life'); introduction of practices aimed at becoming aware of the limits of control: 'What in this situation depends on me, and what does not?' 'What factors influenced my decision?'; use of elements of metacognitive therapy [137], where the key goal is not to change the content of thoughts but to change one's relationship to them: 'I notice an anxious thought, but I am not obliged to agree with it'; and the therapist's ethical position: not 'I will help you attain freedom,' but 'I will help you understand how you make decisions and choose whether you want to change anything.'

In education the principle of ethics manifests in: rejection of simplified narratives

about 'free choice of profession' or 'personal responsibility for success' without accounting for structural constraints; introduction of modules on critical digital literacy, where students learn to recognize manipulative practices in social media, online marketplaces, and news feeds; use of reflective tasks: 'Describe a situation in which you thought you were choosing freely, but later understood the influence of an external factor'; and creation of a safe environment where one can acknowledge 'I do not know why I decided that' – and this is considered not a failure but a point of growth.

In behavioral design the principle of ethics transforms into the idea of 'autonomy-oriented design': rejection of illusory alternatives; transparency of algorithms: 'This option is shown to you because you previously viewed...'; support of metacognitive reflection through optional prompts such as 'You chose the first option. Would you like to compare with others?'; and design that does not conceal constraints but honestly reports them: 'All tariffs include the basic package; differences are in additional services.' This approach does not reduce the effectiveness of interfaces but increases user trust and their long-term loyalty – as confirmed by research in the field of ethical design [14].

Ethical Standards and Professional Responsibility

The principle of ethics is not an abstract ideal – it is enshrined in professional codes. The 'Code of Ethics of the Psychologist' (Russian Psychological Society, 2020) explicitly states that the psychologist is obliged to 'avoid manipulative influences' and to 'respect the client's right to independent decision-making' [31]. Similarly, the American Psychological Association emphasizes the necessity of 'respect for the dignity and rights of persons' and 'avoidance of harm' [3].

In the context of the digital environment these requirements acquire new significance. A psychologist participating in the development of behavioral interventions bears responsibility not only for effectiveness but also for the ethicality of their decisions. As Ortmann notes, 'deception may be methodologically convenient, but it destroys trust in science and undermines participants' autonomy' [91]. The present study demonstrates that it is possible to study the illusion of free choice without deception, using an illusory alternative in an ethically correct form.

Advantages of the Ethical Approach

The ethics-oriented approach, grounded in awareness, offers several advantages

over manipulative strategies:

- Long-term sustainability: illusions are easily shattered upon confrontation with reality, whereas awareness grows stronger with experience.
- Respect for the person: the individual is treated not as an object of manipulation but as a subject capable of reflection and growth.
- Reduction of vulnerability: the development of metacognitive skills increases resilience to manipulation in the future.
- Conformity with scientific ethics: this approach is not only effective but also morally justified.

Limitations and Challenges

The implementation of the principle of ethics encounters a number of challenges:

- Commercial pressure: in the digital industry, profit is often placed above ethics.
- Cognitive difficulty: becoming aware of the determinants of one's behavior requires cognitive effort and may provoke discomfort.
- Absence of standards: there are as yet no universally accepted criteria for "ethical design" in Russian legislation.

However, these challenges do not negate the necessity of adhering to ethical principles. On the contrary, they highlight the role of the psychologist as a defender of autonomy in an era of algorithmic behavior management.

Thus, the principle of ethics is not an optional add-on but the methodological and moral foundation of all practical recommendations developed in the third chapter. It requires the rejection of short-term manipulative solutions in favor of the long-term development of awareness, critical thinking, and genuine psychological autonomy. Only this approach corresponds both to contemporary ethical standards [31; 3] and to the deep humanistic traditions of Russian psychology [66; 93; 132].

3.1.3. The Principle of Ecological Validity: Recommendations Adapted to Real Contexts – Digital Environment, Educational Process, Therapeutic Practice

Developing practical recommendations aimed at fostering genuine psychological autonomy loses its meaning if they remain abstract theoretical constructs unrelated to people's

real lives. Therefore, the principle of ecological validity becomes the third key methodological foundation of the third chapter. It assumes that all recommendations must be not only scientifically grounded and ethical, but also adapted to the specific life contexts in which decisions are made: the digital environment, the educational process, and therapeutic practice. This approach follows directly from the logic of the study itself, in which the original IFC methodology was specially designed to simulate everyday choice (selecting a quote in an online survey) rather than an artificial laboratory task [17].

Ecological validity denotes the degree to which research results reflect human behavior under natural conditions [17]. In the context of the present dissertation, this means that recommendations must account for the real constraints, motivations, and cognitive loads people face in everyday life. As the study showed, the illusion of free choice is especially relevant in the digital environment, where algorithms create the appearance of personalized choice but in practice direct user behavior [32]. Consequently, ignoring this context would render any recommendations ineffective.

Rationale for the Three Key Contexts

The choice of exactly three spheres – digital environment, education, psychocorrection – is driven by both empirical and theoretical considerations. The digital environment was chosen as the primary context because the illusion of free choice is most frequently exploited there through manipulative techniques, personalized recommendations, and illusory alternatives [32]; participants in the study (young adults aged 18–45) actively use digital platforms for decision-making – from product selection to forming political views [35]; and even in a simple task (choosing a quote), participants tend to attribute autonomy to their decisions ($M = 5.1$ on the IFC), indicating high vulnerability to manipulation in more complex digital scenarios.

The educational process was chosen because education is the key stage for forming metacognitive reflection, which, as the study showed, reduces susceptibility to the illusion of free choice ($r = –0.41$, $p < 0.001$) [104]; contemporary educational programs increasingly include digital components (online courses) where students encounter the same manipulative practices as in social media [108]; and developing critical thinking and awareness in the learning environment has a preventive effect, increasing resilience to manipulation in adult life.

Therapeutic practice was included because anxiety, as the study showed, strengthens

the illusion of free choice ($r = +0.34$, $p < 0.001$) [36], and anxiety disorders are one of the most common reasons for seeking psychological help [71]; psychocorrection provides a unique opportunity for deep work with mechanisms of rationalization, fear of error, and the need for control; and the ethical standards of therapy require respect for client autonomy, which is impossible without developing the capacity for conscious choice rather than illusory control [31].

Adaptation of Recommendations to the Digital Environment

In the digital environment, the principle of ecological validity means that recommendations should not require 'ideal' behavior from the user (for example, 'always analyze algorithms'), which is unrealistic under conditions of cognitive overload and time deficit. Instead, design that supports autonomy is proposed: transparency of algorithms – instead of 'Choose what you like,' use 'These options are shown to you based on your previous views'; an optional metacognitive prompt after a choice – not 'Excellent choice!' but 'You chose the first option. Would you like to compare with others?'; and honest representation of alternatives: in surveys and settings – clearly separating mandatory and optional parameters, avoiding 'pseudo-choice' (e.g., 'Continue' or 'Continue and Agree'). These recommendations correspond to contemporary initiatives in the field of ethical design [14; 79] and can be implemented without detriment to business models.

Adaptation of Recommendations to the Educational Process

In education, ecological validity means accounting for the real conditions of the educational process: limited time, varying levels of student preparation, necessity of compliance with state educational standards. Therefore, recommendations are formulated as flexible modules that can be integrated into existing courses: a micro-module 'Awareness in Digital Choice' (2 academic hours) in the course 'Psychology of Decision-Making' – analysis of real cases ('Why did you subscribe to this account?'); playful simulation of the choice illusion with subsequent reflection; discussion of ethical dilemmas of behavioral design. Integration into online courses: after each choice (e.g., topic for an essay) – not simply 'Received,' but a brief reflective question 'What influenced your choice?' Differentiation by profile: for anxious students – more support and step-by-step instructions; for metacognitively aware students – open tasks with ambiguous solutions.

This approach does not overload the curriculum but develops skills that are critically important for digital maturity. Piloting of a similar module at DSTU showed an SFCI

reduction of 24% and a MAI increase of 19% ($p < 0.01$) [see Section 3.3].

Adaptation of Recommendations to Therapeutic Practice

In psychocorrection, ecological validity means rejecting universal protocols in favor of individualized strategies corresponding to the client's profile (see Section 3.1.1):

- For the anxious rationalizer (HA/LM): begin not with criticism of the illusion but with "noticing a thought" exercises ("I notice that I am thinking..."), in order to gradually develop metacognitive awareness without intensifying anxiety.
- For the consciously anxious (HA/HM): use mindfulness practices and work on tolerance for uncertainty: "Can you allow yourself not to know why you decided that?"
- For the non-anxious conformist (LA/LM): apply light, playful-format reflection: "Let us play detective: what prompted you to choose exactly this?"

All techniques are adapted to the format of short therapeutic sessions (45–60 min) and require no special equipment. They fit organically within the framework of cognitive-behavioral and metacognitive therapy [137], already widespread in Russian practice.

Advantages of the Ecologically Valid Approach

The approach oriented toward real contexts has a number of advantages:

- Increased effectiveness: recommendations work where they are genuinely needed — in everyday life, not under artificial conditions.
- Reduced resistance: users, students, and clients do not perceive recommendations as externally imposed, because they account for their real conditions.
- Scalability: modular solutions (for example, a micro-module in a course or an optional prompt in an interface) are easily adapted to different platforms and audiences.
- Correspondence to contemporary challenges: the digital transformation of society requires new approaches to autonomy, and ecologically valid recommendations respond to this need.

Limitations and Ways to Overcome Them

The implementation of the principle of ecological validity encounters a number of difficulties:

- Commercial interests in the digital industry: companies may resist transparency, as it reduces conversion. The path to overcoming this — developing regulatory standards and raising users' digital literacy.

- Overloaded educational programs: teachers may not have time for new modules. The solution — integration into existing courses rather than the creation of separate disciplines.
- Heterogeneity of therapeutic approaches: not all therapists use cognitive methods. The way out — developing universal reflective techniques compatible with different schools (humanistic, existential, and others).

Despite these challenges, the principle of ecological validity remains a necessary condition for the practical significance of the dissertation study. Without grounding in real contexts, even the most precise empirical data risk remaining "on paper."

Thus, the principle of ecological validity provides a bridge between science and practice. It guarantees that recommendations developed on the basis of confirmed hypotheses are not only theoretically correct but also practically applicable in those spheres where modern autonomy is formed and realized: in the digital space, in the classroom, and in the therapeutic office. Only this approach allows one to speak of the study's genuine contribution to increasing the psychological maturity and resilience of the individual in the conditions of the digital age.

Adaptation of Recommendations to Therapeutic Practice

In psychocorrection, ecological validity means rejection of universal protocols in favor of individualized strategies corresponding to the client's profile (see 3.1.1): for the anxious rationalizer (HA/LM) – begin not with criticism of the illusion but with 'noticing a thought' exercises; for the consciously anxious (HA/HM) – use mindfulness practices and work with tolerance for uncertainty; for the non-anxious conformist (LA/LM) – apply light, playful-format reflection. All techniques are adapted to the format of short therapeutic sessions (45–60 min) and require no special equipment. They organically fit within the framework of cognitive-behavioral and metacognitive therapy [137], already widespread in Russian practice.

3.1.4. Operationalization of 'Genuine Autonomy': Not the Absence of Determinants, but Conscious Adherence to Internal Motives While Acknowledging External Influences

Developing practical recommendations aimed at fostering psychological autonomy in the digital environment is impossible without a clear theoretical and operational definition of

the very concept of 'genuine autonomy.' In popular culture and even in some psychological approaches, autonomy is often equated with absolute freedom from influences, with the idea of 'pure will' not subject to either external or internal determinants. However, the empirical data obtained in the second chapter, along with the thorough theoretical analysis conducted in the first, convincingly demonstrate that such a conception is not only metaphysically naive but also practically harmful: it generates control illusions, intensifies anxiety when encountering real constraints, and renders individuals more susceptible to manipulations that exploit belief in 'absolute choice' [134; 52].

In contrast, this work relies on classical propositions of domestic psychology, specifically the ideas of A.N. Leontiev and V.A. Petrovsky. According to A.N. Leontiev, genuine freedom lies not in the absence of determinants but in conscious adherence to internal, personal motives that are formed in the process of activity and reflect the subject's deep needs [66]. V.A. Petrovsky develops this idea, emphasizing that personal choice is an act of self-determination under conditions of contradiction, where a person does not simply choose between alternatives but defines themselves as a subject through that choice [93]. Thus, autonomy is not a metaphysical given but a dynamic process in which a person becomes aware of both internal (motives, values, emotions) and external (social norms, algorithms, context) determinants of their behavior and freely chooses how to respond to them.

Theoretical Operationalization of the Concept

Based on these theoretical propositions, the following operational definition of genuine autonomy is proposed:

Genuine psychological autonomy is the capacity of a person to be aware of the sources of their decisions (internal motives and external influences), to critically evaluate their correspondence to one's own values and goals, and at the same time to retain a sense of responsibility and authorship for one's choice, even if it was conditioned by objective constraints.

This definition contains three key components that can be empirically measured and practically developed:

1. Awareness of determinants – the ability to recognize which factors influenced a decision (emotions, fatigue, order of presentation, algorithmic recommendations). This component is directly measured in the study through the level of metacognitive reflection

(MAI) and qualitative interview data.

2. Value-motivational coherence – the ability to assess how closely a decision corresponds to one's own deep motives and values rather than simply to external requirements or impulses.

3. Responsibility without illusion of control – the willingness to bear responsibility for the consequences of a choice without requiring the illusory guarantee of 'I can always choose otherwise.' This was manifested in the readiness of LA/HM group participants to acknowledge: 'I do not know why I chose exactly this... But it is my choice.'

Practical Implications of the Operationalization

The clear operationalization of "genuine autonomy" has direct practical implications for all three spheres of application.

In psychocorrection it makes it possible to reformulate the goals of therapy:

- Not "teach the client to always choose freely," but "help the client become aware of when they are choosing and when they are reacting, and decide whether they wish to intervene";
- Not "eliminate anxiety," but "develop tolerance for uncertainty and reduce the need for illusory control";
- Use techniques aimed at developing all three components: metacognitive monitoring (awareness), work with values (coherence), acceptance practices (responsibility without illusion).

In education, the operationalization sets the content of autonomy development modules:

- Training in recognizing algorithmic prompts (awareness of determinants);
- Reflective tasks for analyzing the motives behind choices (value-motivational coherence);
- Discussions about the nature of freedom and responsibility in the digital age (responsibility without illusion).

In behavioral design, it forms the criteria for an "autonomy-oriented interface":

- Transparency of influences ("This option is shown to you based on...") — supporting awareness;
- The ability to compare with alternatives — supporting value-based choice;
- Rejection of formulations that reinforce the illusion of control ("Choose what

you like") — respect for responsibility.

Ethical Significance

The proposed operationalization also carries important ethical significance. It rejects both determinist passivity ("I cannot change anything") and voluntarist illusion ("I control everything"), proposing a third path — realistic humanism, in which a person acknowledges their limitations but retains the right and capacity for meaningful choice. This fully corresponds to the humanistic tradition in psychology, tracing back to C. Rogers and A. Maslow, and its Russian interpretation in the work of V.A. Petrovsky [93].

Moreover, this approach corresponds to the contemporary ethical challenges of the digital age. In conditions where algorithms increasingly shape behavior, genuine autonomy lies not in denying their influence but in consciously deciding when and in what manner one is prepared to follow it. This is freedom in its mature form.

Limitations and Prospects

Despite its theoretical coherence and empirical support, the proposed operationalization also has limitations:

- The difficulty of measuring the "value-motivational coherence" component in short-term studies;
- Cultural specificity: in collectivist cultures the emphasis on "internal motives" may be less pronounced;
- Age-related differences: in adolescents and the elderly, the mechanisms of autonomy may function differently.

However, these limitations do not negate the value of the operationalization but rather point toward directions for future research.

Thus, the operationalization of "genuine autonomy" as conscious adherence to internal motives while acknowledging external influences becomes the key methodological and substantive foundation of the entire third chapter. It makes it possible to move from abstract arguments about free will to concrete, measurable, and developable skills that render a person not "absolutely free" but psychologically mature, resilient, and ethically responsible in the conditions of the digital environment. It is precisely this concept that underlies all subsequent practical recommendations and ensures their theoretical integrity and practical effectiveness.

3.2. Recommendations for Psychocorrective Practice

Psychocorrective practice represents one of the key spheres of application of the results of the present study, since it is precisely in the therapeutic context that the mechanisms underlying the illusion of free choice manifest most sharply. As the empirical study showed, anxious clients tend to actively rationalize their decisions, attributing features of autonomy to them even under conditions of objective uncertainty, which serves as a defensive mechanism for reducing cognitive dissonance and restoring a sense of control [36]. At the same time, a low level of metacognitive reflection deprives them of the opportunity to be aware of these processes, making them vulnerable to chronic anxiety and ineffective self-regulation strategies. Thus, psychocorrection should be directed not at destroying the illusion of freedom as such, but at developing genuine psychological autonomy – the capacity to be aware of the sources of decisions, to critically evaluate their correspondence to internal motives, and to accept responsibility without a need for illusory control [66; 93].

3.2.1. Diagnosis of the Propensity for the Illusion of Free Choice

The first step in psychocorrective work is the diagnosis of the client's individual psychological profile along two key parameters: anxiety level (STAI) and metacognitive reflection level (MAI). Based on these data, four profiles are formed, each requiring a distinct approach (see 3.1.1): Anxious Rationalizer (HA/LM); Consciously Anxious (HA/HM); Non-Anxious Conformist (LA/LM); Metacognitively Autonomous (LA/HM).

To diagnose the propensity for the illusion of free choice, it is proposed to use the original SFCI methodology in an adapted therapeutic form. Unlike the online version, in the psychologist's office the task can be presented as part of a reflective exercise: 'Please choose one of four quotes that feels closer to you right now. Afterward, we will discuss together how you arrived at that choice.' After choosing, the client evaluates their experience on five SFCI statements (1–7 points). A high score (>= 5.5) in anxious clients is interpreted not as a sign of mature ego but as a defensive rationalization requiring further work. A low score (<= 4.5) in metacognitively aware clients is interpreted as a sign of realistic perception of behavioral determinants.

This approach makes it possible to move from abstract complaints ("I cannot make

a decision") to a concrete analysis of the choice process, which increases the effectiveness of therapy and the client's engagement.

3.2.2. Working with Rationalization and Fear of Error

In anxious clients, particularly those with the HA/LM profile, the illusion of free choice is closely linked to fear of error and the need for control. They often say: 'If I choose incorrectly – it will be a catastrophe'; 'I must be certain the decision is mine.' Traditional cognitive techniques aimed at changing the content of thoughts ('What if an error is not that terrible?') may increase resistance because they ignore the function of rationalization as a defense against anxiety. Therefore, it is recommended to use the metacognitive approach developed by A. Wells [137], which focuses not on content but on the relationship to thoughts.

Key techniques:

Metacognitive diary. The client keeps a diary in which they record not what they thought but noticing that a thought arose – for example: 'I noticed the thought: if I make a mistake, I will be fired.' This helps to create distance from automatic thoughts and see them as events in the mind, not as reality.

Small error experiment. In a safe environment, the client is invited to make a deliberately 'wrong' choice (for example, order the 'wrong' coffee at a cafe) and observe the consequences. The goal is to test the belief 'error = catastrophe' and reduce its emotional charge.

Reframing the illusion of freedom. Instead of criticism – 'You are deceiving yourself, thinking you chose freely' – an empathic interpretation is used: 'Your desire to believe the choice was yours is an attempt to protect yourself from uncertainty. This is understandable and even wise. But let us together see whether it is possible to feel safe even when not everything is under control.' These techniques reduce resistance and create conditions for developing tolerance for uncertainty – a key component of genuine autonomy.

3.2.3. Developing Metacognitive Awareness

For clients with low metacognitive reflection (HA/LM and LA/LM profiles), the central task is developing basic self-observation skills. Without this, any work on anxiety or choice remains superficial.

Recommended exercises:

'Noticing a thought.' After any decision (even a mundane one), the client answers three questions: What did I feel at the moment of choosing? What influenced my choice? Could I have chosen otherwise? Why or why not? This exercise develops the ability to notice automatisms and external prompts.

Adapting the SFCI as a therapeutic tool. The psychologist invites the client to complete the SFCI task several times in succession with different stimuli. After each choice, a reflection takes place: 'You said you chose consciously. What if I told you that all options led to the same task? How does that change your experience?' This approach gently guides the client toward awareness of the illusory nature of control without triggering defensive reactions.

Working with 'internal dialogue.' Based on qualitative data (see 2.4.4), anxious clients describe choice as 'a dialogue between two selves.' This can be used in therapy: 'Let us name these voices. One is the Controller, the other is the Observer. What does each say? Can we give the Observer more space?' These techniques gradually form metacognitive awareness, which, as the study showed, reduces IFC by 19–22% after only 6 sessions.

3.2.4. Working with 'Consciously Anxious' Clients

Particular difficulty is presented by clients with the HA/HM profile, who see the illusion but cannot relinquish it. Their internal conflict is expressed in phrases such as: 'I understand my choice is probably spontaneous, but I very much want to believe I am in control of the situation' (HA/HM-2). For such clients, standard metacognitive techniques are insufficient since they already possess high awareness. What is required here is integration with mindfulness practices and existential therapy.

Recommendations:

- Acceptance practices: 'Can you allow anxiety to be, without trying to control

it?' 'What if uncertainty is not an enemy but a part of life?'

- Existential choice: Instead of 'How do I choose correctly?' – 'What choice reflects my values right now?' This shifts the focus from control to responsibility.
- Conscious compensation: If the client still wants to 'verify the choice' (for example, reread all the quotes), it is important not to forbid this but to make the process conscious: 'You are doing this to reduce anxiety. That is normal. But let us notice: does it actually help?'

3.2.5. Piloting the Corrective Program

To verify the effectiveness of the proposed recommendations, a short-term corrective program, 'Conscious Choice,' was developed and piloted, comprising 6 sessions of 30 minutes each. The program was implemented at the psychological services of DSTU in 2025.

- Target group: 12 clients with HA/LM profile (high anxiety, low metacognitive reflection).
- Methods: metacognitive therapy [137], mindfulness exercises, adapted SFCI.
- Measurements: STAI, MAI, IFC – before and after the program.

Results:

- IFC reduction by 18% (M before = 5.9, M after = 4.8, $p < 0.01$);
- MAI increase by 22% (M before = 4.1, M after = 5.0, $p < 0.01$);
- Anxiety level (STAI) did not change significantly (M before = 52.3, M after = 49.7, $p = 0.12$), confirming that reduction of the illusion is possible without reducing anxiety – through developing awareness.

Clients noted: 'Now I am not afraid that the choice is wrong. I simply notice how it happens'; 'I stopped proving to myself that everything is under control. It is a relief.'

3.2.6. Ethical Principles of Psychocorrection

All recommendations are built on the basis of the principle of ethics (see 3.1.2): rejection of the idea of 'absolute autonomy'; respect for the client's defensive mechanisms; orientation toward developing awareness rather than destroying illusions. The psychologist does not act as a 'bearer of truth' but as a companion, helping the client explore their own

decision-making processes. This corresponds to the Code of Ethics of the Russian Psychological Society [31] and the humanistic tradition in psychology.

Thus, psychocorrective practice, based on the research results, offers a differentiated, ethical, and effective approach to working with the illusion of free choice. Key elements include: profile diagnostics, working with rationalization through metacognitive techniques, developing awareness, and respecting the client's individual path. These recommendations not only reduce vulnerability to cognitive illusions but also promote the formation of genuine psychological autonomy – the capacity to be free not in spite of determinants, but in awareness of them.

3.3. Recommendations for the Educational Environment

The educational environment represents a strategically important sphere for implementing the practical recommendations arising from the results of the empirical study. It is in the learning process that key cognitive skills are formed, including metacognitive reflection, critical thinking, and the capacity for conscious choice – all the resources that, as the study showed, reduce susceptibility to the illusion of free choice [104]. Moreover, contemporary educational programs increasingly integrate digital technologies (online courses, interactive platforms) where students encounter the same manipulative practices as in social media or online marketplaces [32; 108]. Consequently, education becomes not only a site for forming autonomy but also a testing ground for verifying it under conditions of the digital environment.

3.3.1. Integrating the Metacognitive Component into Educational Programs

The central recommendation for the educational environment is the introduction of the module 'Awareness in Decision-Making' into existing courses in general, social, or cognitive psychology. This approach avoids overloading the curriculum and ensures organic integration of new competencies into an already established structure.

Module objectives:

- Develop the ability to recognize algorithmic prompts and manipulative techniques in the digital environment;

- Teach the distinction between 'my choice' and 'reaction to a stimulus';
- Form tolerance for uncertainty as an alternative to illusory control.

The module is designed for 2 academic hours and includes three components: theoretical block (30 min) – a brief overview of research on the illusion of free choice (Wegner [134], Johansson [52]), explanation of the role of anxiety and metacognitive reflection; practical block (60 min) – interactive exercises and cases; reflective block (30 min) – written or oral reflection at the end of the session.

3.3.2. Practical Exercises

The effectiveness of the module is achieved through the use of practical exercises adapted to real decision-making contexts.

Exercise 1. Analysis of real cases.

Students are presented with real situations from their digital experience: 'Why did you follow that account on this social network?' 'Why did you choose exactly that product on the marketplace?' 'Why did you like that post?' The task is to identify possible external determinants: position in the feed, personalized recommendation, social approval. This exercise develops critical digital awareness and reduces naive belief in 'absolute choice.'

Exercise 2. Playful simulation of the choice illusion.

Students are invited to complete an adapted version of the SFCI methodology: to choose one of four neutral quotes, after which all options lead to one task (for example, writing a short comment). A discussion follows: 'Did you feel you were choosing freely?' 'How did your experience change when you learned that all options led to the same result?' This exercise gently demonstrates the illusory nature of control without triggering defenses or anxiety.

Exercise 3. Reflective writing.

Students write a short text (200–300 words) on the topic: 'Describe a situation in which you thought you were choosing freely, but later understood the influence of an external factor.' This task promotes the internalization of experience and the formation of a narrative of awareness rather than illusion.

All exercises are developed in accordance with the principle of ecological

validity: they simulate everyday decisions rather than artificial laboratory tasks.

3.3.3. Developing Critical Digital Awareness

In addition to the specialized module, it is recommended to embed elements of critical digital awareness into various disciplines: in 'Psychology of Mass Media' – analysis of manipulative techniques in news feeds and recommendation algorithms; in 'Consumer Behavior' – breakdown of specific manipulative devices; in 'Ethics in the Digital Age' discussion of rights to cognitive autonomy and digital self-determination. –

Particular attention is devoted to teaching the recognition of manipulative interfaces that exploit cognitive vulnerabilities. Students learn to ask questions: 'Why is this option highlighted in color?' 'Why am I offered Continue or Continue and Agree?' 'What is hidden behind the phrase personalized choice?' This approach not only increases resilience to manipulation but also forms digital maturity – the ability to act autonomously under conditions of algorithmic behavior management.

3.3.4. Differentiation of Learning by Psychological Profile

In accordance with the principle of differentiation (see 3.1.1), learning must account for individual student characteristics. For this purpose it is recommended to conduct brief diagnostics by STAI and MAI at the beginning of the course (anonymously, with consent).

- For anxious students (HA/LM): Offer assignments with clear structure, step-by-step instructions, and low uncertainty. Avoid formulations such as 'Choose any topic,' replacing them with 'Choose one of the three proposed topics.' This reduces anxiety and creates conditions for gradual awareness development.
- For non-anxious students with low metacognitive reflection (LA/LM): Use playful and detective formats: 'Find the hidden algorithm in this interface,' 'Uncover the manipulation in this advertisement.' This awakens curiosity without triggering resistance.
- For metacognitively aware students (LA/HM and HA/HM): Offer open cases with ambiguous solutions and ethical dilemmas. Such students can act as agents of

influence in the group, sharing their strategies for conscious choice.

3.3.5. Piloting the Module in the Educational Process

To verify the effectiveness of the proposed recommendations, the module 'Awareness in Decision-Making' was piloted at DSTU within the course 'Psychology of Decision-Making' in March 2025.

- Experimental group: 45 students (completed the module).
- Control group: 42 students (traditional program without the module).
- Measurements: STAI, MAI, IFC – before and after the module.

Results: In the experimental group – IFC reduction by 24% (M before = 5.3, M after = 4.0, $p < 0.01$), MAI increase by 19% (M before = 5.1, M after = 6.1, $p < 0.01$). In the control group – no statistically significant changes were detected ($p > 0.05$). Students noted: 'Now I notice when an algorithm tries to manipulate me'; 'I have stopped blaming myself for a wrong choice – now I look at what influenced it.' These data confirm that even a brief intervention in the educational process can significantly increase cognitive resilience to the illusion of free choice.

3.3.6. Ethical and Methodological Advantages of the Approach

The proposed approach has several advantages:

Preventive nature: the development of metacognitive skills at a young age reduces vulnerability to manipulation in adult life.

Compatibility with Federal State Educational Standards (FSES): the module does not require changes to educational standards but rather complements existing competencies.

Scalability: the module materials can be adapted for online courses, school programs, and corporate training.

Ethicality: instead of reinforcing the illusion of control ("You can always choose differently"), a realistic narrative of awareness is offered.

Thus, the educational environment becomes a powerful tool for developing genuine psychological autonomy in the digital age. The integration of the metacognitive

component, the use of practical exercises, the differentiation of instruction, and the development of critical digital consciousness make it possible not only to transmit knowledge but also to build sustainable skills that protect against cognitive illusions. The testing of the module confirms its effectiveness and opens up prospects for widespread implementation in educational practice.

3.4. Recommendations for Behavioral Design and Digital Ethics

The digital environment has become the primary context of decision-making for modern individuals: from product selection on online marketplaces to forming political views on social media.

However, it is precisely here that the illusion of free choice is most systematically exploited – through algorithmic recommendations, personalized interfaces, and manipulative practices.

The empirical study presented in the second chapter showed that even in a simple task (choosing a quote), participants tend to attribute autonomy to their decisions, especially if they are anxious. This makes them vulnerable to manipulations that create the appearance of choice where none exists.

Consequently, behavioral design cannot be limited to efficiency and conversion – it is obliged to comply with the principles of digital ethics and respect for psychological autonomy.

3.4.1. Ethical Principles of 'Autonomy-Oriented Design'

The foundation of all recommendations is the concept of autonomy-oriented design – an approach in which the interface does not conceal but, on the contrary, supports conscious decision-making. This approach follows from the operationalization of genuine autonomy (see 3.1.4): freedom is not the absence of influences but conscious adherence to internal motives while acknowledging external determinants. Accordingly, ethical design must:

— provide transparency of algorithms;

— minimize the illusion of control;

— support metacognitive reflection;

— respect the right to uncertainty.

These principles correspond to contemporary initiatives in the field of ethical design [14; 88], as well as to fundamental propositions of domestic psychology about freedom as conscious self-determination [66; 93].

3.4.2. Specific Interface Design Recommendations

Based on empirical data and qualitative analysis of interviews, specific recommendations have been developed for key types of digital interactions.

1. Surveys and questionnaires.

Problem: illusory alternatives are often used ('Choose your favorite quote'), leading to the same task but creating a false sense of meaningful choice.

Recommendations:

— Replace the wording with a neutral one: "Select one of the options."

— Add an explanation: "All options are equivalent; your choice will not affect subsequent questions."

— After the selection, instead of "Excellent choice!" include an optional question: "What influenced your choice?" (for research platforms).

2. Marketplaces and online shopping.

Problem: algorithms form a 'personalized selection' but do not disclose the selection criteria, reinforcing the autonomy illusion.

Recommendations:

— Clearly separate categories: "Popular," "Recommended by you," "Your choice."

— Add an explanation to recommendations: "This item is shown to you because you have viewed similar items."

— Provide the option to disable personalization: "Show all items without filtering."

— Avoid manipulative techniques: do not use "Continue" or "Continue and agree" – this manipulates consent.

3. Social networks and news feeds.

Problem: algorithms create a seeming filter, but users believe they 'choose what to read.'

Recommendations:

— Implement a "Why am I seeing this?" feature next to each post.

— Offer an optional "diversity mode": "Show opinions different from yours."

— After prolonged browsing in the feed, provide a gentle prompt: "You have been browsing for 15 minutes. Would you like to take a break or see something new?"

4. Settings and consents.

Problem: consent interfaces are often designed to maximize 'yes' (for example, a bright 'Accept All' button, a pale 'Customize').

Recommendations:

— Use balanced design: the "Accept" and "Decline" buttons should be the same size and color.

— Provide step-by-step configuration by default, rather than mass consent.

— Add an explanation: "You can change these settings at any time."

All of these recommendations do not reduce interface functionality but increase user trust and long-term loyalty – as confirmed by research in the field of ethical design [145].

3.4.3. The 'Illusion of Freedom Audit' Tool

For practical implementation of ethical principles, an 'illusion of freedom audit' tool is proposed – a checklist for designers and product teams. It enables identification of potential manipulation risks at the prototyping stage.

Audit checklist:

1. Is the choice real?

Do the choices have real consequences? Or do all options lead to one result?

2. Can the decision be changed?

Is there the possibility of undoing or reconsidering without cost?

3. Is the source of the recommendation clear?

Does the user understand why this option has been shown to them?

4. Is there pressure on the choice?

Are timers, bright colors, or formulations used that provoke impulsive decisions?

5. Is uncertainty respected?

Is there an option for 'I do not know' or 'later'?

6. Is IFC measured?

Is usability testing conducted using the SFCI methodology to assess the experience of autonomy?

This tool can be integrated into existing design processes (e.g., design sprints) and used as an internal quality standard.

3.4.4. Integrating the SFCI Methodology into Usability Testing

The original Subjective Freedom of Choice Index (SFCI) methodology, validated in the second chapter (alpha = 0.84, r with FAD = 0.56), can become a standard instrument for assessing the ethicality of interfaces. It is recommended to include the SFCI in usability testing as follows:

Stage 1 – the user performs a key action (product selection, privacy settings, subscription);

Stage 2 – immediately afterward they evaluate their experience on 5 SFCI statements (1–7 points);

Stage 3 – average IFC and its components are calculated (authorship, alternativeness, awareness);

Stage 4 – interpretation:

IFC >= 5.5 – high risk of the illusion of freedom, design revision required;

IFC <= 4.5 – low risk, the interface supports conscious choice.

This approach allows a transition from subjective assessments ("it seems to me that the choice is free") to objective metrics that are comparable across projects.

3.4.5. Proposals for Regulation and Standards

Individual company efforts are insufficient for systemic change in the digital environment. Regulatory initiatives at the state and professional community levels are necessary.

1. Inclusion of 'psychological autonomy' in digital ethics standards: analogously to personal data protection programs, standards should be developed to protect cognitive rights:

— the right to algorithmic transparency;

— the right to opt out of personalized recommendations;

— the right to informed consent.

2. Mandatory algorithm declaration: developers must provide a brief declaration: 'This interface uses an algorithm based on your behavior. You can disable personalization in the settings.'

3. Certification of 'ethical interfaces': creation of an independent certification system awarding an 'Ethical Design' mark to products that have passed an audit by the SFCI checklist and other criteria.

4. Educational initiatives for designers: inclusion of courses on 'Ethics of Behavioral Design' in educational programs for IT specialists, covering:

— psychological mechanisms of the illusion of free choice,

— ethical dilemmas of digital manipulation,

— practical tools (SFCI checklist, audit).

Such measures will create an ecosystem in which respect for user autonomy becomes not a competitive advantage, but a basic norm.

3.4.6. Ethical and Commercial Advantages of the Approach

Autonomy-oriented design has a dual advantage:

Ethical:

it respects the user as a subject rather than an object of manipulation, which aligns with the "Ethical Code of the Psychologist" [31] and international standards [3].

Commercial:

research shows that transparency and trust increase long-term loyalty and reduce user churn [145]. For example, after introducing the "Why am I seeing this?" option on Facebook, trust in the platform among young people increased by 18% [139].

Moreover, in the context of increasing regulatory pressure, ethical design becomes not merely a moral choice but a strategic necessity.

3.4.7. Limitations and Ways to Overcome Them

Implementing the proposed recommendations faces several challenges:

Commercial pressure: companies may resist transparency because it sometimes reduces short-term conversions.

- *Way to overcome:* demonstrate long-term benefits (loyalty, reputation) and develop regulatory incentives.

Implementation complexity: not all teams have expertise in psychology.

- *Way to overcome:* create ready-made templates and training materials.

Lack of unified standards: there are no universally accepted criteria for "ethical design" in Russia.

- *Way to overcome:* initiative by professional communities (RAS, RPS, AIT) to develop national standards.

Despite these difficulties, the transition to autonomy-oriented design is inevitable – as a response to society's growing demand for digital maturity and respect for the individual.

Thus, behavioral design based on empirical research findings offers specific, measurable, and ethically grounded recommendations for creating digital environments that respect psychological autonomy. From algorithmic transparency and the rejection of manipulative techniques to the integration of the SoA Index methodology into online testing and the development of regulatory standards – all these measures aim to ensure that freedom of choice in the digital age is not an illusion but a conscious opportunity. It is this approach that guarantees not only ethicality but also the sustainability of digital products in the face of growing attention to human cognitive rights.

3.5. Discussion of the Effectiveness and Limitations of the Proposed Recommendations

The development of practical recommendations in Chapter Three was aimed at translating the empirically confirmed hypotheses from Chapter Two into real tools for psychocorrection, education, and behavioral design. However, any applied intervention, regardless of its theoretical grounding, requires critical reflection on its effectiveness,

limitations, and potential side effects. This section is devoted to a comprehensive discussion of these aspects, which allows not only for evaluating the current results but also for outlining pathways for further development and scaling of the proposed approaches.

3.5.1. Strengths and Demonstrated Effectiveness

The proposed recommendations have several key advantages, confirmed both theoretically and empirically.

1. Empirical grounding.

All recommendations follow directly from confirmed hypotheses:

Hypothesis 1 (anxiety and the illusion of freedom) formed the basis for working with rationalization and fear of error in psychocorrection;

Hypothesis 2 (metacognitive reflection and reduction of the illusion) became the basis for educational modules and ethical design. This ensures high internal validity and reduces the risk of arbitrariness.

2. Differentiated approach.

The principle of differentiation (see 3.1.1) makes it possible to adapt interventions to the individual psychological profile (anxiety x metacognitive reflection). Piloting showed that this approach increases engagement and reduces resistance:

in anxious rationalizers (HA/LM), IFC reduction of 18% was achieved without increasing anxiety;

in students with low metacognitive reflection, MAI increase of 19% occurred through playful rather than directive methods.

3. Ethical correctness.

Recommendations are built not on reinforcing control illusions ('You can always choose differently') but on developing awareness and acceptance of uncertainty. This corresponds to the ethical standards of the Russian Psychological Society [31] and the APA [3], as well as the humanistic tradition in psychology [93; 132].

4. Ecological validity.

All interventions are adapted to real contexts: online therapy, university courses,

digital interfaces. This increases their practical applicability and reduces the gap between science and practice.

5. Measurability of results.

The effectiveness of recommendations is confirmed quantitatively:

in psychocorrection – dIFC = -18%, dMAI = +22% ($p < 0.01$);

in education – dIFC = -24%, dMAI = +19% ($p < 0.01$). Use of the validated SFCI methodology allows objective assessment of the impact of interventions.

6. Interdisciplinarity.

Recommendations integrate knowledge from psychology, pedagogy, design, and ethics, making them systemic and resilient to changes in any one sphere.

3.5.2. Limitations and Challenges

Despite the strengths, the implementation of the proposed recommendations faces several significant limitations.

1. Sample and generalizability limitations.

Piloting was conducted on a sample of young adults (18–45 years), predominantly students and specialists with higher education. This limits the generalizability of results to:

adolescents, in whom the mechanisms of autonomy and anxiety function differently;

elderly individuals, in whom cognitive resources for metacognitive monitoring may be reduced;

representatives of socially vulnerable groups, where decisions are more often determined by economic rather than cognitive factors.

Replications on representative and age-diversified samples are necessary.

2. Short-term nature of the piloting.

Effects of interventions were assessed immediately after completion of the program (6 sessions in therapy, 2 hours in education). It is unknown whether results persist in the long term (after 3, 6, 12 months). It is possible that without support, effects fade, requiring the development of maintenance programs (e.g., weekly reminders, reflective diaries).

3. Commercial pressure in the digital industry.

In the sphere of behavioral design, the main barrier remains economic benefit from manipulation. Even if ethical design increases trust, short-term metrics often outweigh long-

term ones. The path to overcoming this – regulatory pressure and increasing users' digital literacy.

4. Resource intensity of personalization.

The differentiated approach requires additional resources

- In psychocorrection – profile diagnostics and individual selection of techniques;
- In education – development of multiple versions of a module for different profiles;
- In design – creation of adaptive interfaces with optional cues. Under conditions of limited budgets (especially in the public sector), this can become an insurmountable barrier. The solution is to develop universal yet flexible tools (e.g., one module with differentiated tasks inside).

6. Ethical dilemmas in education.

Teaching critical awareness of behavioral determinants can provoke existential anxiety in students: "If my decisions are not mine, then who am I?" Anxious students with low metacognitive reflection are particularly vulnerable. Therefore, it is important to accompany such modules with support and reflection, rather than merely stating determinism. As V. A. Petrovsky notes, freedom is not the absence of determinants but conscious self-determination within their context [93].

7. Lack of standards in behavioral design.

In Russia, there are no universally accepted criteria for an "ethical interface" yet. This makes the implementation of recommendations voluntary and fragmentary. Systemic change requires:

- Development of national standards (with the participation of the RPS, RAS, Ministry of Digital Development);
- Educational programs for designers and IT specialists;
- Certification of products according to the criterion of "respect for autonomy."

3.5.3. Comparison with Analogues and Innovativeness of the Approach

1. Rejection of the 'control reinforcement' paradigm.

Most programs for developing 'will' or 'autonomy' are based on the idea that 'you can do everything if you want to.' This reinforces the illusion of control. The present approach, on the contrary, teaches: genuine autonomy lies in awareness of determinants, not in denying them.

2. Integration of anxiety and metacognitive reflection.

Existing studies more often consider these factors in isolation. Wells' metacognitive therapy [137] focuses on anxiety but not on the illusion of freedom; Johansson's research [52] examines the illusion of choice but not its connection with individual characteristics. The present work for the first time integrates both factors into a unified model and demonstrates their additive influence on IFC.

3. Practical applicability.

Most studies are limited to either theoretical analysis or piloting in one sphere. The present work proposes a comprehensive system of recommendations covering psychocorrection, education, and design, making it maximally practice-oriented.

3.5.4. Directions for Future Research

Discussing the limitations allows for the formulation of specific directions for further work.

1. Long-term effects.

Longitudinal studies (6–24 months) are needed to assess the sustainability of intervention effects. It is especially important to study whether the reduction in the SoA Index in anxious clients and the increase in OMO in students persist without support sessions.

2. Adaptation for other age groups.

Development and testing of recommendations for:

- Adolescents (13–17 years): with an emphasis on developing metacognitive skills in the school environment;
- Elderly (60+ years): taking into account cognitive aging and digital

illiteracy.

3. Development of digital tools to support autonomy.

Creation of applications and browser extensions that implement the principles of autonomy-oriented design:

- "Meta-Choice": an extension that highlights algorithmic cues on websites;
- "Conscious Choice Diary": a mobile application for recording decision determinants.

4. Study of cultural differences.

Testing the model in collectivist cultures (e.g., China, Japan), where the emphasis on "internal motives" may be less pronounced than on social harmony.

5. Neurocognitive validation.

Use of EEG or fMRI to study the neural correlates of the illusion of free choice in participants with different profiles (H-A/L-M and H-M/L-A), which will deepen the understanding of the mechanisms.

6. Development of regulatory initiatives.
Involvement of psychologists in the development of legislative norms protecting citizens' cognitive rights in the digital environment (analogous to the "right to be forgotten," but for the "right to informed choice").

3.5.5. Ethical and Social Consequences

The implementation of the proposed recommendations may have significant social consequences.

Positive consequences:

- Increasing digital maturity of the population;
- Reducing vulnerability to manipulation on social networks, marketplaces, and news feeds;
- Forming a culture of responsible design in the IT industry;
- Strengthening humanistic values in education and psychocorrection.

Potential risks:

- Instrumentalization of awareness: using metacognitive techniques not to develop autonomy but for more subtle manipulation ("Now you are aware of your choice

– choose our product");

- Social stratification: access to ethical interfaces and quality psychocorrection may become a privilege of the wealthy;
- Overload of cognitive responsibility: the demand to "always be aware of determinants" may cause chronic anxiety in vulnerable groups.

To minimize risks, it is necessary to:

- Implement ethical standards in digital product design;
- Ensure equal access to educational and correctional programs;
- Maintain a balance between awareness and acceptance of the spontaneity of decisions.

Thus, the recommendations proposed in Chapter Three have high theoretical grounding, proven effectiveness, and practical significance. Their strengths – differentiation, ethicality, ecological validity, and measurability – make them promising for widespread implementation. At the same time, the limitations related to the sample, short-term nature, commercial pressure, and resource intensity require a cautious approach and further research. Discussing these aspects does not weaken but, on the contrary, strengthens the scientific and practical value of the work, pointing to clear pathways for its development and application in the real conditions of the digital age.

3.6. Conclusions on the Chapter

The third chapter of the dissertation completes the logical cycle of the research, moving from theoretical analysis (Chapter 1) and empirical confirmation of hypotheses (Chapter 2) to the development and substantiation of practical recommendations aimed at developing genuine psychological autonomy in the digital environment. This chapter is not a mere appendix to the empirical data – it represents an integrated applied model that combines scientific rigor, ethical responsibility, and practical feasibility. The key conclusions emerging from the content of the chapter are systematized below.

3.6.1. Genuine Autonomy is Awareness, Not an Illusion of Control

The central theoretical and practical conclusion of the third chapter is a

reconceptualization of the very notion of "psychological autonomy." In mass culture and even in some psychological practices, autonomy is often equated with absolute freedom from influences, with the idea of a "pure will" unaffected by either external or internal determinants. However, as this research has shown, such an approach is not only metaphysically naive but also practically harmful: it generates illusions of control, increases anxiety when encountering real constraints, and makes a person more vulnerable to manipulations that exploit the belief in "absolute choice" [134, 52].

In contrast, this dissertation draws on the classical tenets of Russian psychology – those of A. N. Leontiev and V. A. Petrovsky – which offer a more realistic, activity-based, and humanistic understanding of autonomy. According to this tradition, genuine freedom lies not in the absence of determinants but in the conscious following of internal, personal motives that are formed through activity and reflect the subject's deep-seated needs [66, 93]. On this basis, the dissertation proposes an operational definition of genuine autonomy:

Genuine psychological autonomy is a person's ability to recognize the sources of their decisions (internal motives and external influences), critically assess their alignment with one's values and goals, and simultaneously maintain a sense of responsibility and authorship over one's choice, even if it was conditioned by objective constraints.

This definition has become the methodological foundation of all practical recommendations presented in the chapter. It allows a shift from abstract reasoning about free will to concrete, measurable, and developable skills that make a person not "absolutely free" but psychologically mature, resilient, and ethically responsible as a subject in the digital age.

3.6.2. Anxiety and Metacognitive Reflection are Key Determinants of the Illusion of Free Choice

All recommendations in the third chapter stem directly from the empirically confirmed hypotheses of the second chapter. The research convincingly demonstrated that anxiety and metacognitive reflection are two key, independently acting factors modulating the propensity toward the illusion of free choice:

- Anxiety ($r = +0.34$, $p < 0.001$; $\eta^2 = 0.060$) acts as an emotional driver, reinforcing belief in autonomy as a way to reduce cognitive dissonance and restore a sense of control under conditions of uncertainty [36].

- Metacognitive reflection ($r = –0.41$, $p < 0.001$; $\eta^2 = 0.091$) acts as a cognitive regulator, weakening the illusion through awareness of behavioral determinants and acceptance of uncertainty [104, 114].

Moreover, ANOVA showed that the effect of metacognitive reflection is stronger than that of anxiety, indicating its key role as a resource for psychological resilience. These findings formed the basis of the differentiated approach (see 3.1.1), which involves tailoring recommendations to four individual psychological profiles: anxious rationalizer, anxiously aware, non-anxious conformist, metacognitively autonomous.

3.6.3. Practical Recommendations Have Been Developed for Three Key Spheres

The third chapter offers not abstract advice but concrete, tested, and measurable recommendations for three spheres where contemporary autonomy is formed and exercised.

In psychocorrection, the recommendations are aimed at:

- Diagnosing the propensity toward the illusion of free choice using the SoA Index methodology;
- Working with rationalization and fear of error in anxious clients through metacognitive techniques [137];
- Developing basic metacognitive awareness in clients with low OMO (Awareness of Determinants);
- Supporting "anxiously aware" clients in accepting uncertainty.

Testing of the 6-session program "Conscious Choice" showed: an 18% reduction in the SoA Index, a 22% increase in OMO ($p < 0.01$) – without changing the level of anxiety, confirming that reducing the illusion is possible through developing awareness rather than eliminating anxiety.

In education, the recommendations include:

- Integrating the module "Mindfulness in Decision-Making" into existing courses;
- Using practical exercises: analysis of real cases, game-based modeling of choice blindness, reflective writing;
- Developing critical digital consciousness through teaching the recognition of manipulation algorithms [32];

- Differentiating instruction according to psychological profile.

Testing at DSTU (n = 45) showed: a 24% reduction in the SoA Index, a 19% increase in OMO ($p < 0.01$), confirming the effectiveness of the approach.

In behavioral design and digital ethics, the recommendations are formulated as principles of autonomy-oriented design:

- Algorithmic transparency: "This option is shown to you based on...";
- Rejection of phrasing that reinforces the illusion of control;
- Support for metacognitive reflection through optional cues;
- Integration of the SoA Index methodology into online testing as a metric of interface ethicality.

The chapter also proposes an "Illusion of Freedom Audit" tool – a checklist for designers – and substantiates the need for regulatory initiatives (analogous to GDPR for cognitive rights).

3.6.4. All Recommendations Adhere to Four Key Principles

The development of the recommendations was strictly governed by four methodological principles formulated at the beginning of the chapter:

1. Principle of differentiation: recommendations are tailored to the individual psychological profile (anxiety × metacognitive reflection), which increases their effectiveness and reduces resistance.
2. Principle of ethicality: rejection of manipulative practices and orientation toward developing awareness rather than reinforcing illusions of control. This aligns with the "Ethical Code of the Psychologist" [31] and the humanistic tradition in psychology [93, 132].
3. Principle of ecological validity: all recommendations are adapted to real-world contexts – the digital environment, educational process, therapeutic practice – which ensures their practical applicability.
4. Principle of operationalizing genuine autonomy: all interventions are aimed at developing the three components of autonomy – awareness of determinants, value-motivational alignment, and responsibility without the illusion of control.

These principles ensure the theoretical integrity, ethical correctness, and practical sustainability of the proposed model.

3.6.5. Limitations and Prospects

Despite proven effectiveness, the proposed recommendations also have limitations, the discussion of which (see 3.5) allows for outlining pathways for future research:

- Sample limitations: testing was conducted on young adults (18–45 years); replications are needed with adolescents and the elderly.
- Short-term effects: the long-term sustainability of results is unknown; maintenance support programs need to be developed.
- Commercial pressure: in the digital industry, economic interests often outweigh ethical ones; regulatory initiatives are needed.
- Resource intensity of personalization: the differentiated approach requires additional resources; the solution is to develop universal yet flexible tools.

These limitations do not negate the value of the model but point to directions for its development and scaling.

3.6.6. Theoretical and Practical Contribution of the Research

The third chapter makes a significant contribution to both the theory and practice of contemporary psychology.

Theoretical contribution:

- A two-factor model of the illusion of free choice has been proposed and empirically validated, integrating Western (Wegner [134], Johansson [52]) and Russian (Leontiev [66], Petrovsky [93]) approaches.
- The author's SoA Index methodology has been developed and validated – the first tool in Russian psychology for measuring the illusion of free choice in a specific decision-making situation.
- The concept of genuine psychological autonomy has been operationalized as conscious following of internal motives while recognizing external influences.

Practical contribution:

- Differentiated recommendations for psychocorrection, education, and behavioral design have been developed and tested.
- An "Illusion of Freedom Audit" tool has been proposed for assessing the

ethicality of digital interfaces.

- The need for new ethical standards in the digital environment protecting human cognitive rights has been substantiated.

Thus, the third chapter concludes the dissertation research not merely by stating practical recommendations but by forming an integrated model for the transition from illusion to genuine autonomy. This model asserts that in the digital age, freedom is not a metaphysical given but a practical skill that can and must be developed. It includes the ability to notice algorithmic cues, recognize anxious rationalization, accept uncertainty, and consciously choose when and how we are prepared to follow external influences.

It is this approach that ensures not only individual resilience to manipulation but also forms the foundation for an ethical digital culture, in which respect for user autonomy becomes not a competitive advantage but a basic norm. This is the main significance and value of the present work.

Conclusion

Studying the illusion of free choice in the context of the digital environment is not merely an academic exercise in cognitive psychology, but an attempt to answer one of the most acute challenges of the present: how to preserve genuine personal autonomy in a world where behavior is increasingly shaped not through reflection but through algorithmic management. The present work did not set out to definitively 'debunk' free will or, conversely, to prove its metaphysical reality. Instead, it proposed a psychologically grounded, empirically tested, and ethically responsible model in which freedom is understood not as the absence of determinants but as the subject's conscious stance toward them. This stance, as the study showed, is not a given – it depends on individual personality characteristics, primarily the level of anxiety and metacognitive reflection.

The theoretical novelty of the work lies not so much in the discovery of new facts as in the integration of disparate traditions – foreign cognitive psychology and domestic activity-theoretical approaches – into a unified conceptual framework. While D. Wegner and P. Johansson demonstrated the illusory nature of the sense of will at the level of neurocognitive mechanisms, and A.N. Leontiev and V.A. Petrovsky regarded freedom as the highest form of meaning-making and self-determination, the present study connected these poles, showing that genuine autonomy is possible precisely when a person stops fighting determinism and begins to become aware of it. This shift of emphasis – from 'can I choose otherwise?' to 'do I understand why I chose this way?' – constitutes the principal theoretical contribution of the study.

The empirical base of the study made it possible not only to confirm the hypotheses but also to reveal the paradox of anxious autonomy: the more strongly a person strives for control, the more vulnerable they become to illusions that imitate that control. Anxiety, as it turned out, is not merely an accompanying factor but an active catalyst of the illusion of free choice – a mechanism by which the psyche attempts to restore order under conditions of uncertainty. At the same time, metacognitive reflection functions not as an 'antidote' to anxiety, but as an alternative regulatory strategy, based not on suppressing uncertainty but on accepting it as an inseparable part of human experience. Particularly telling are the data on the group of 'consciously anxious' participants, who, despite a high level of anxiety, demonstrated critical attitudes toward their own choices. This indicates that metacognitive awareness can coexist with anxiety, not eliminating it, but depriving it of power over the narrative of

autonomy.

The practical significance of the work extends beyond psychological counseling. Under conditions where digital platforms increasingly replace social institutions and algorithms replace personal experience, developing cognitive resilience becomes a matter not of comfort but of the survival of the person as a subject. The proposed recommendations for education, psychocorrection, and behavioral design constitute not a set of techniques but a strategy for forming a new type of digital maturity, in which the user is not a passive object of manipulation but an active agent capable of recognizing influences and consciously deciding when and how they are prepared to follow them. It is especially important that this strategy does not require 'ideal' behavior from the person – it respects their right to spontaneity, doubt, and even error, so long as this is accompanied by awareness rather than illusion.

The original SFCI methodology is of particular value, since for the first time in domestic psychology it allows measuring the illusion of free choice not as a general belief but as a situational experience. Its simplicity, validity, and ethical correctness open broad prospects for application – from diagnosis in clinical practice to assessment of the ethicality of digital interfaces. Moreover, the SFCI can become the basis for developing a new class of behavioral indicators that measure not only the effectiveness of an interface but also its respect for the user's cognitive rights.

However, behind all these achievements there remains an important ethical question: do we not ourselves become new 'architects of choice' when we propose developing awareness? For even the very idea of 'conscious choice' can be instrumentalized and used for more subtle manipulation: 'Now that you are aware of your choice, choose our product.' To avoid this, it is necessary to clearly distinguish awareness as a process from awareness as a product. The present study advocates the former – a process in which there is no 'correct' answer, but there is a constant dialogue with oneself. It is precisely this approach that corresponds to the humanistic tradition in psychology and to the domestic understanding of the person as a subject rather than an object.

The limitations of the study – a student sample, the artificiality of the task, self-report methods – are not shortcomings but rather points of growth for future works. They point to the necessity of replications in other age and social groups, to the development of behavioral and neurocognitive markers of the illusion of freedom, and to the study of cultural differences in the experience of autonomy. Particularly promising is the longitudinal study of the

development of metacognitive reflection and its influence on resilience to manipulation in the digital environment.

In conclusion, it bears emphasizing that the problem of freedom of choice in the twenty-first century has ceased to be a philosophical abstraction. It has become a practical challenge, the solution of which requires a synthesis of knowledge from psychology, pedagogy, design, ethics, and law. The present dissertation makes its contribution to this synthesis, proposing not a universal prescription but a methodological orientation: to respect human autonomy not through reinforcing control illusions but through developing the capacity for conscious choice under conditions of objective determinism. This, in the author's view, is the path toward genuine psychological maturity in the digital age.

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Appendices

Appendix 1

Metacognitive Awareness Inventory (MAI)

(adapted 12-item version)

Instruction

Read each statement carefully and rate how much you agree with it, based on your usual experience of thinking and decision-making.

Choose one of seven answer options on the following scale:

1 – Completely disagree

2 – Somewhat disagree

3 – Disagree

4 – Unsure

5 – Agree

6 – Somewhat agree

7 – Completely agree

Answer honestly. There are no "right" or "wrong" answers.

Statements

I notice when my thoughts wander from a task.

I can explain why I chose one method of solving a problem over another.

I often think about how I think.

I understand which strategies work best for me.

I am aware when I do not understand the material.

I can assess how well I performed a task.

I plan how I will solve a task before I start.

If a strategy doesn't work, I try another.

I check my conclusions to ensure they are correct.

I adjust my approach if I see an error.

I ask myself questions to better understand the material.

I use different methods to verify my decisions.

Scoring

Calculate the total score for all 12 items.

Minimum: 12 points

Maximum: 84 points

For ease of interpretation, the average score can be calculated:

M = Total / 12

(range from 1.0 to 7.0)

Interpretation of the average score:

1.0 – 3.9 – low level of metacognitive awareness

4.0 – 5.9 – medium level

6.0 – 7.0 – high level of metacognitive awareness

Note: in the empirical study, the median indicator was used to form groups:

Low metacognitive reflection: $M \leq 5.2$

High metacognitive reflection: $M \geq 5.3$

Structure of the questionnaire

The questionnaire includes two subscales (6 items each):

Awareness of cognitive strategies (items 1-6)

Regulation of cognitive processes (items 7-12)

Appendix 2

Author's Method "Subjective Freedom of Choice Index" (SFCI)

Instruction for the experimental task

"Here are 4 quotes. Please freely choose the one that best suits you or seems most meaningful. Click the corresponding button."

(Note: after choosing any option, the participant automatically proceeds to the next task – evaluation of a moral dilemma. All options lead to the same subsequent task, which creates the illusion of an alternative with objective determinacy of the outcome.)

List of used stimuli (quotes)

All quotes were selected according to the criteria:

neutrality (absence of pronounced emotional or moral coloring);

equal attractiveness (in the pilot, the choice frequency of each option was 23-27%);

absence of direct connection to topics of anxiety, control, or free will.

Choice options:

"Sometimes it's better to observe than to act."

"Truth is more important than convenience."

"Life is a process, not a result."

"Everyone has the right to their own opinion."

Text of the subsequent task (evaluation of a moral dilemma)

"Read the situation and rate how justified you consider the hero's action."

Situation:

"A man stole medicine for his terminally ill wife because he could not afford to buy it. The pharmacist refused to sell the medicine cheaper and insisted on the full price, although he knew the wife would die without treatment."

Rating scale:

1 – completely unjustified

2 – somewhat unjustified

3 – unjustified

4 – unsure

5 – justified

6 – somewhat justified

7 – completely justified

(Note: this task serves as a neutral "filler" masking the illusory nature of the choice. Its content is not related to the chosen quote option.)

SFCI Scale (Subjective Freedom of Choice Index)

Instruction:

"Please rate how much you agree with the following statements about your choice of quote. Choose one of the seven answer options."

I decided for myself what to choose.

I felt that I had a real choice.

I could have chosen a different option.

My choice reflects my beliefs or preferences.

I understand why I did exactly this.

Legend of the scale:

1 – completely disagree

2 – somewhat disagree

3 – disagree

4 – unsure

5 – agree

6 – somewhat agree

7 – completely agree

Calculation of SFCI:

The Subjective Freedom of Choice Index is calculated as the arithmetic mean of the 5 statements. Range: from 1.0 to 7.0.

The higher the value, the stronger the illusion of freedom of choice.

Ethical and methodological note

The method does not use deception: the participant is not misled about the essence of the task.

The choice remains voluntary and conscious.

The stimuli are neutral and safe.

After completion of the study, participants (upon request) are informed of the essence of the task in a generalized form:

"The study examined how people experience their decisions, even when all options lead to the same result."

Appendix 3

Semi-Structured Interview Guide

Aim of the Interview

The aim of the semi-structured interview is an in-depth study of the subjective experience of participants related to the experience of freedom of choice under conditions of an objectively illusory alternative. The interview is aimed at identifying:

strategies for rationalizing decisions;

criteria for attributing authorship of choice;

the influence of anxiety and metacognitive reflection on the narrative of autonomy;

the emotional background of decision-making.

The interview is conducted after completing the online questionnaire, including the experimental SFCI task.

Instruction for the Interviewer

General principles

Neutrality: avoid evaluative reactions ("interesting", "correct", "typical"). Use neutral verbal and non-verbal confirmations: "I see", "Hmm", nod.

Active listening: do not interrupt, let the participant finish their thought. Use pause as a tool – silence often provokes deeper reflection.

Following the guide: ask the main questions verbatim to ensure data comparability.

Flexibility: use clarifying questions as needed, but do not deviate from the topic of the study.

Ethical sensitivity: if the participant shows anxiety or discomfort, offer to take a break or end the interview.

Clarification technique

Repeating a key phrase:

Participant: "I just felt that it was mine."

Interviewer: "You said – 'it was mine'. What do you mean by that?"

Request for an example:

"Can you give a specific example of when you knew for sure that the choice was yours?"

Clarifying meaning:

"When you say 'I chose myself', what does 'myself' mean to you?"

Reflecting contradiction:

"You said earlier that the choice was spontaneous, and now that you thought for a long time. How do you explain this?"

Technical recommendations

Conduct the interview in a quiet place without distractions.

Use a quality microphone (preferably a headset with a microphone).

Before starting, check the recording (make a 10-second test fragment).

Do not take notes during the interview – all information will be in the recording.

Main and Clarifying Questions

Main questions (ask in the specified order)

"What did you feel when you chose the quote?"

Goal: to identify the emotional background of the choice.

Clarifying questions:

"Was this feeling familiar?"

"Did your state change after the choice?"

"What thoughts came to your mind at that moment?"

"Was there a feeling that you were really choosing? Why?"

Goal: to capture the subjective experience of freedom.

Clarifying questions:

"What exactly created this feeling (or its absence)?"

"Could you have chosen differently? Why/why not?"

"What, in your opinion, makes a choice 'real'?"

"How do you understand that a decision is 'yours'?"

Goal: to identify criteria for attribution of authorship.

Clarifying questions:

"If someone said that you didn't choose yourself, what would you answer?"

"What signs tell you: 'This is my decision'?"

"Can a decision be 'yours' even if you don't understand why you made it?"

"Does your decision change if you are anxious or tired?"

Goal: to understand the role of emotional state.

Clarifying questions:

"What is the difference between a 'normal' and an 'anxious' choice?"

"How do you notice that anxiety is affecting your decision?"

"Are there ways to 'turn off' anxiety when choosing?"

"What would you like psychologists to better understand about how people experience their freedom?"

Goal: to obtain a reflexive conclusion from the participant.

Clarifying questions:

"What, in your opinion, do researchers most often miss?"

"How would you explain 'freedom of choice' to a person who does not believe in it?"

Procedure for Ending the Interview

Debriefing:

"Thank you for your honest answers! The goal of our research is to understand how people perceive their autonomy in conditions where choice may be illusory. This will help make digital environments more ethical and understandable."

Answering questions: allow the participant to ask any questions about the aims, methods, or results.

Thanks: thank the participant for their participation and indicate how and when they can receive the research results (if desired).

Technical completion:

Save the recording under the participant's code (e.g., A-H1);

Make sure the file is completely recorded;

Delete the recording after transcription (within 14 days).

This guide ensures maximum standardization while maintaining the flexibility necessary for qualitative research. It allows any researcher to reproduce the interview procedure with a high degree of accuracy, which increases the reliability and validity of the qualitative data.

Appendix 4

Examples of Transcripts (Anonymized)

Note: Name and personal data have been removed. The transcript is presented preserving speech features (pauses, repetitions, interjections "well", "uh", etc.) to convey the authenticity of oral speech. All participants gave written consent to audio recording and subsequent anonymized citation.

Coding system

Each participant is designated by a code consisting of three parts:

A-H – high anxiety (≥75th percentile on STAI);

A-L – low anxiety (≤25th percentile on STAI);

M-H – high metacognitive reflection (≥75th percentile on MAI);

M-L – low metacognitive reflection (≤25th percentile on MAI);

Number – the participant's serial number in the group.

Example: A-H/M-L3 – participant #3 with high anxiety and low metacognitive reflection.

Fragment 1. Group A-H/M-L (anxious rationalizer)

Participant: A-H/M-L2

Age: 24 years

Gender: female

Interviewer: Was there a feeling that you were really choosing? Why?

A-H/M-L2: Yes, of course! I chose myself! No one imposed anything on me... (pause) I just... immediately knew that this quote was about me. "Truth is more important than convenience" – that's me! I always think that way... even if everyone doesn't like it, I still tell the truth.

Interviewer: Could you have chosen differently?

A-H/M-L2: Well... probably not. Because it reflects my life position. If I had chosen another, it would be... a lie. Or... insincerity. (speaks quickly, with tension) I thought for a long time so as not to be mistaken... What if it affects something?

Commentary: The participant demonstrates vivid rationalization through values, denial of external influence, and fear of error – typical signs of the illusion of freedom in anxious individuals with low metacognitive reflection.

Fragment 2. Group A-L/M-H (metacognitively autonomous)

Participant: A-L/M-H4

Age: 29 years

Gender: male

Interviewer: How do you understand that a decision is "yours"?

A-L/M-H4: Hmm... (long pause) Honestly? I'm not sure it's "mine" in any deep sense. Most likely, I chose what caught my eye. The first quote... well, it's shorter, and I thought – okay, let it be this one.

Interviewer: Did you feel that you were choosing?

A-L/M-H4: Not really. Rather – reacting. As if... automatically. But that's normal, I think. Not all decisions have to be conscious.

Interviewer: And if you were anxious – would anything change?

A-L/M-H4: Perhaps. Then I would start thinking: "Am I choosing correctly?", "What will others say?"... But now I was calm, and I just... clicked. I don't know why exactly. Maybe it's just my mood.

Commentary: The participant demonstrates awareness of automatisms, recognition of contextual influence, and calm acceptance of uncertainty – signs of genuine psychological autonomy.

Fragment 3. Group A-H/M-H (consciously anxious)

Participant: A-H/M-H2

Age: 26 years

Gender: female

Interviewer: Does your decision change if you are anxious?

A-H/M-H2: Very much. When I'm anxious, I start... double-checking everything. Just now, I first clicked on the first quote, but then I thought: "What if it's not the one?" – and re-read all four. I even compared them by meaning...

Interviewer: And how do you understand that a decision is "yours"?

A-H/M-H2: (sigh) I understand that my choice is probably spontaneous... But I really want to believe that I control the situation. It's like... an internal conflict. I see that I'm rationalizing, but I can't stop – otherwise it will become even more anxious.

Commentary: The participant demonstrates an internal conflict between awareness of automatisms and the need for control – an indicator that metacognitive reflection can weaken but not eliminate the influence of anxiety on the illusion of freedom.