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ARTICLE

Transformation Patterns of the Psyche's Regulatory Subsystem in the Context of Digitalization

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ABSTRACT
This study examines the impact of digitalization on the formation and development of the regulatory subsystem, which is a key component of the human psyche. The findings reveal that digitalization has a significant and complex influence on this subsystem, operating at two complementary levels: analytical and structural. The analytical level reflects a profound decrease in the development of the subsystem's individual components, including essential regulatory processes and their associated qualities. This decline raises concerns about the capacity of individuals to effectively manage their cognitive and emotional resources in a digital context. In contrast, the structural level involves meaningful transformations in the organization, structuring, and integration of these components. These changes indicate a shift in how the regulatory subsystem operates, suggesting that digitalization is reshaping the very foundation of psychological regulation. As a result of this complex influence, a new phenomenon emerges, referred to as the syndrome of reduced personality regulation. This syndrome holds significant implications for overall personality development and regulatory potential, sharing similarities with previously identified syndromes of decreased cognition and metacognition. The structural transformations in the regulatory subsystem, influenced by digitalization, primarily manifest as changes in the degree of organization and integration, rather than qualitative alterations. The qualitative aspects remain invariant and resist the pervasive effects of digitalization, suggesting the subsystem's resilience that may offer avenues for further exploration and intervention.

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Introduction

One of the key factors influencing society, including its professional and educational aspects, is the rapid shift brought about by digitalization and widespread computer technology. This shift is not merely an additional influence on social reality; it signifies the creation of a new reality altogether. The rapid advancement of digital technologies creates new challenges for psychology, which requires not only a deeper understanding but also the development of new responses to these challenges. Notably, while digitalization significantly impacts cognitive processes and personality traits, this impact is often negative, as highlighted by numerous studies (Bobrova, 2019; Bondarenko, 2006; Carr, 2011; Gazzaley & Rosen, 2016; Parsons, 2017; Small & Vorgan, 2009).

Empirical evidence has documented several of these consequences. For example, the dynamics of the Flynn Effect, which measures changes in IQ over time, demonstrate a concerning trend. Until 2000, IQ levels in developed countries increased by an average of 1.5 points every decade (Attrill, 2015; Spitzer, 2012). After 2000, however, this trend reversed, with IQ levels declining by the same rate, which lead to an approximate decrease of three points over the past 20 years (Karpov & Karpov, 2022).

Additionally, modern middle school students are reported to have roughly half the active vocabulary of their peers from two decades ago (Attrill & Fullwood, 2016; Whitty & Young, 2017). Many educators observe that by the ninth grade, students struggle to articulate their thoughts clearly. Modern children also experience difficulties and discomfort when reading long texts and books. Furthermore, creativity test scores among today's students are approximately 20% lower than those of students from twenty years ago.

The nature of digital information, which is often superficial and does not require deep semantic processing, primarily fosters episodic, fragmentary, short-term, mechanical, and involuntary memory (Bakunovich & Stankevich, 2018; Bevz & Goriagin, 2019; Curzon, 2017; Kudinova, 2017; Serezhkina, 2012). In contrast, more complex forms of memory, such as semantic, voluntary, and long-term memory, frequently remain underdeveloped (Matveeva, 2012).

The most significant cognitive transformations provoked by computer technologies are associated with thinking, the most complex cognitive process. To describe these changes, several concepts have been introduced, including mosaic

thinking, digital thinking, and 5G thinking (Attrill & Fullwood, 2016; Curzon, 2017; Klingberg, 2008; Kudinova, 2017; Maslova, 2013; Petrova, 2011; Toffler, 1980). These cognitive transformations are fundamentally shaped by the inherent characteristics of digital information, such as multitasking, hypercontextuality, and distribution.

There is also evidence highlighting the impact of digitalization on various cognitive processes. For instance, in terms of attention, research has shown that when multiple modalities such as lexical, spatial, operational, and structural elements are involved in a stimulus, the cognitive load on attention increases significantly (Soldatova & Nestik, 2010; Tretyakova & Tserkovnikova, 2021). In this context, "modality" refers to specific types of perception processed by different areas of the brain, such as auditory or visual pathways. When a stimulus contains several modalities, the demand on attention grows, leading to cognitive overload (Serezhkina, 2012). Moreover, the structure of modern content is specifically aimed at capturing and retaining attention, which in turn diminishes an individual's ability to manage their attention voluntarily. This reduction in voluntary control weakens volition, a key attribute of consciousness and conscious regulation, and leads to a decline in the capacity for voluntary regulation, especially in the early stages of ontogenesis.

Regarding imagination, another crucial cognitive process, digitalization appears to hinder rather than stimulate its development (Barak, 2008; Whitty & Young, 2017). The digital environment, including internet-specific content and the extensive use of infographics, offers unprecedented tools for generating new, original, and unusual images that surpass the capabilities of even the most developed imagination. This convenience often eliminates the need for the "labor of imagination," replacing active creative processes with passive searching and filtering of ready-made information. Given that imagination is crucial for visual-figurative thinking, which in turn drives overall cognitive processes (a fact acknowledged by many scientists who report thinking *in images*), this negative impact affects the entire cognitive system.

These types of cognitive transformations are often grouped under what is known as *cognitive decline* (Carr, 2011; Small & Vorgan, 2009; Tretyakova & Tserkovnikova, 2021). Essentially, this concept refers to the underdevelopment of basic cognitive processes and personality traits due to the overall influence of digitalization and the widespread use of computer technology.

In addition, our research has identified another phenomenon related to and stemming from digitalization, which can be described as a *syndrome of reduced metacognition* (Karpov, 2021a; Karpov & Karpov, 2022). This syndrome stands for the insufficient development of metacognitive processes, such as metathinking and metamemory, and the associated personality traits under the influence of digitalization. Studies (Karpov, 2021a; Karpov & Karpov, 2022) have shown a decline in these basic metacognitive processes among modern first-year students compared to those in 2013, with reductions averaging 30%–35%. A similar, though less pronounced, decline was observed in the overall level of reflexivity, with a decrease of 20%–25% (Karpov, 2021b).

It is also important to note that cognitive processes, personal qualities, and metacognitive processes together form only one part of the psyche's overall structure

albeit a crucial one, that is the cognitive subsystem. In addition to this, the psyche comprises two other fundamental subsystems: the regulatory and communicative subsystems. Given the close relationship and interdependence among these subsystems, it would be logical to assume that the transformations in the cognitive subsystem will also impact other subsystems, particularly the regulatory one. The regulatory subsystem relies heavily on the cognitive potential associated with basic cognitive processes, which leads us to the reasonable assumption that digitalization acts as a transformative factor not only for the cognitive subsystem but also for the regulatory subsystem of the psyche.

Methodology and Data

To achieve our research goal, we examined a range of representational regulatory processes, both primary and secondary, which are essential for metacognitive regulation. The level of their development was assessed by using established and reliable psycho-diagnostic methods. The following methods were employed to diagnose these processes and the related qualities.

The first set of methods for diagnosing the development of primary regulatory processes, such as self-control, decision-making, planning and programming, includes the following:

- G. S. Nikiforov's method for assessing the degree of self-control development (Nikiforov, 1989), hereafter referred to as SC;
- a method for assessing the decision-making ability, developed by us and described in (Karpov, 2015), hereafter referred to as DM;
- V. I. Morosanova's self-regulation style method (Morosanova, 2001), specifically the scales for diagnosing levels of planning and programming (PL and PR, respectively).

The second set of methods was aimed at evaluating the development of basic metacognitive processes, which are crucial for the functioning of the regulatory subsystem:

- The Metacognitive Awareness Inventory (MAI) (Schraw & Dennison, 1994);
- Self-Assessment of Metacognitive Behavior (SMB) by D. LaCosta (as per Attrill, 2015);
- D. Everson's method for assessing the extent and nature of metacognitive monitoring (MM) (as per Karpov, 2015);
- The KMAI method by S. Tobias for assessing "knowledge monitoring" (as per Karpov, 2015) (KMAI). This term stands for "the monitoring component of metacognition, specifically, students' ability to monitor their learning by differentiating between the known and unknown" (Tobias & Everson, 1996, p. 1).

The research design involved a comparative analysis of two data sets. The first set consists of results from our previous studies, which examined the level of development of basic regulatory and meta-regulatory processes and personality traits among Russian students in 2013. The second set contains similar data, but collected from a survey of students in 2023.

The results of the psycho-diagnostic examination were processed by using two main methods, or more precisely, at two distinct levels of depth and "resolution." Initially, the well-known method of "parallel profiling" was applied. This statistical procedure is designed to generate graphical representations of the studied indicators, enabling their comparison (typically within a shared coordinate system) and highlighting their key distinctive features. The use of this method corresponds to first-level result processing, or *analytical processing*, as it allows for the *separate* identification of differences between the subjects.

Subsequently, a more sophisticated method was employed, allowing for a deeper level of processing at the *structural* and *psychological* levels. This was achieved through the calculation of intercorrelation matrices, a method that determines mutual correlations (i.e., intercorrelations) between the development levels of the studied indicators.

Next, for each group, the method of determining *generalized indices* of structural organization was applied. In our study, these indices include the structure *coherence* index (SCI), the structure *divergence* (differentiation) index (SDI), and the structure *organizability* index (SOI). The structure coherence index is calculated by using the number and significance of positive relationships in the structure, while the structure divergence index is based on the number and significance of negative relationships. The structure organizability index reflects the ratio of positive to negative relationships, as well as their significance (Karpov, 2015). Relationships significant at $p < .01$ are assigned a weight factor of three points, and those significant at $p < .05$, two points. The weights for the entire structure are then summed to produce the values of these indices. This method enables the identification of a phenomenon not only in terms of its isolated connections with individual qualities or parameters but also in relation to its complex structural dependencies within their subsystems.

The matrices contain a comprehensive set of interrelations among the individual qualities under study, expressed quantitatively through their correlation coefficients. As a result, these matrices enable us to identify interrelated complexes of specific qualities and the relationships between them, specifically, in our case, between indicators of regulatory processes.

Finally, the χ^2 method was employed to assess the homogeneity and heterogeneity of the intercorrelation matrices and the corresponding structure diagrams. This method further involves displaying the entire set of intercorrelations from the matrices as structure diagrams (also referred to as correlograms), which visually represent all the significantly correlated components. The correlograms provide a comprehensive view of how these components are interconnected, enabling us to observe patterns and relationships within the regulatory subsystem. The primary objective in this context is to assess the homogeneity or heterogeneity of the matrices, as well as their corresponding structure diagrams.

The *sample* for this study consisted of two groups of university students drawn from the same academic institutions in Yaroslavl (Russia), ensuring a consistent environment for comparison. The first group included a total of 78 students, all of whom were majoring in either humanities or natural sciences. This group comprised

44 female and 34 male participants, with an age range from 17 to 26 years. The inclusion of both genders, nearly in equal proportions, allowed for a more balanced and comprehensive analysis of the regulatory and cognitive processes across male and female participants.

Similarly, the second group consisted of 74 students, also from the same Yaroslavl universities, drawn from comparable academic disciplines. This group included 38 females and 36 males, with a slightly narrower age range of 18 to 24 years. The relatively even distribution of participants in terms of gender and academic focus across both groups was designed to minimize any potential confounding variables, ensuring that the results would primarily reflect the variables under investigation, such as the effects of digitalization on cognitive and regulatory subsystems.

Results

As noted in the previous section, the research procedure involved two main stages. In the first stage, the *analytical method* was used to identify indicators that individually measure the development of the primary parameters of the regulatory subsystem. These indicators are presented in Table 1.

Table 1

Values of the Diagnosed Parameters in Two Groups of Subjects

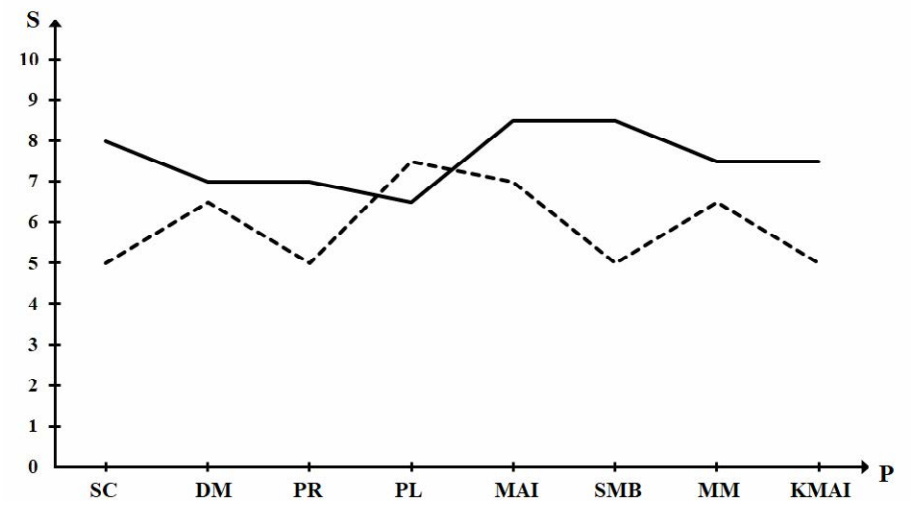
Variable	Groups of Subjects		
	1st group (2013 data)	2nd group (2023 data)	*p*
SC	77.08 (6.22)	41.41 (7.63)	**.000**
DM	59.84 (5.21)	51.41 (4.92)	.159
PR	7.44 (1.01)	5.20 (1.00)	**.000**
PL	5.66 (1.20)	7.88 (1.44)	.051
MAI	181.02 (7.78)	143.36 (10.57)	**.000**
SMB	46.44 (5.02)	30.49 (5.01)	**.000**
MM	14.79 (2.01)	11.66 (2.60)	.051
KMAI	12.44 (2.01)	8.39 (3.40)	**.000**

Note. SC = self-control; DM = decision-making; PR = programming; PL = planning; MAI = metacognitive awareness of activity; SMB = self-assessment of metacognitive behavior; MM = measure and nature of metacognitive monitoring; KMAI = formation of "monitoring knowledge"; *p* = asymptotic differences of the Mann-Whitney U test; the values of $p < .05$ are highlighted in bold.

Using the data obtained from the two test groups, profiles were constructed that reflected the entire *set of values* found, all displayed on a single coordinate plane. To ensure comparability, the primary psychodiagnostic data, originally represented as numerical scores from the matrices, were converted into standard (sten) scores. This allowed for the application of the well-known parallel profiles' method (Figure 1).

Figure 1

The Parallel Profiles Pairwise Comparisons of the Studied Parameters



Note. Source: developed by the authors.

The profiles enable pairwise comparisons of the studied parameters across groups, resulting three key findings.

Firstly, the profile of the students from 2013 is generally situated higher in the coordinate grid compared to that of the students from 2023, indicating that the main parameters of the regulatory subsystem for the 2013 cohort are at a more advanced level of development. This suggests that the basic parameters of the subsystem have undergone significant transformation, which can be characterized as a regression in their developmental level.

As shown in Table 1, this regression is statistically significant for five out of eight parameters, while two parameters only show a trend. Additionally, it is noteworthy that this regression reflects the comparative intensity of these parameters as a whole, since one parameter is actually higher among the students of 2023, although these differences also appear as a trend.

Secondly, the degree of differences between the development levels of the diagnosed parameters is inconsistent when comparing primary and secondary regulatory processes. On one hand, this includes parameters related to self-control, decision-making, forecasting, and planning processes. On the other hand, it involves predominantly secondary parameters such as metacognitive involvement in activities, self-assessment of metacognitive behavior, the extent and nature of metacognitive monitoring, and the formation of “knowledge monitoring.”

Therefore, it can be inferred that primary and secondary regulatory processes exhibit different sensitivities and tolerances to the impact of digitalization factors. In this context, secondary processes appear to be more sensitive and less tolerant to these factors, a phenomenon that will be further explained below.

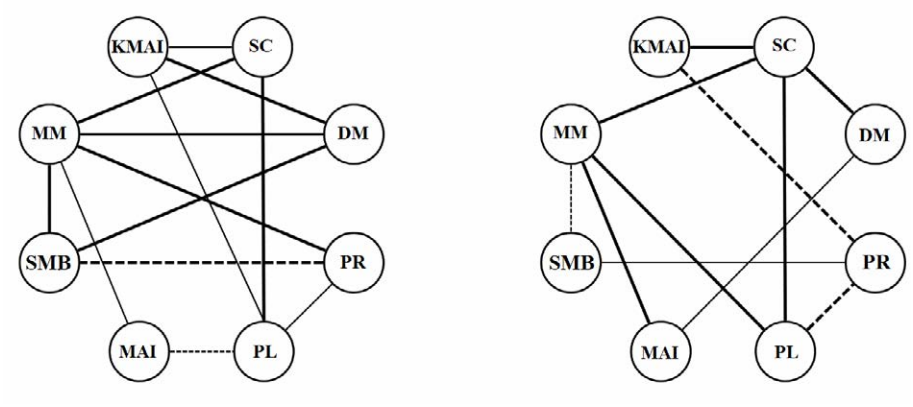
Thirdly, the notable differences in overall profile configurations also stand out. The 2013 students' profile resembles a plateau-shaped configuration, while the 2023 students' profile is closer to a saw-like pattern. As general and professional diagnostics indicate, a plateau-shaped profile reflects a higher degree of organization and development across the diagnosed indicators. Additionally, as shown in various studies, including ours, a plateau-shaped profile is associated with higher external criteria, such as professional effectiveness and social adaptation.

Taken together, these findings show significant, primarily negative, transformations in the regulatory subsystem. Importantly, these changes likely extend beyond individual parameters and their combined effects, impacting the overall organization as well, which necessitates moving to a more advanced level of research that is better suited to the complexity of the subject or, in other words, to a *structural* level.

At the structural level, intercorrelation matrices of the parameters were determined separately for each group. Based on these matrices, structure diagrams of significantly correlated parameters (correlograms) were constructed (Figure 2).

Figure 2

Structure Diagrams of Significantly Correlated Parameters (Correlograms)



Note. Source: developed by the authors.

Next, the method for determining generalized structural indices, as described above, was applied. This method calculates the coherence index, indicating the degree of integration and synthesis of parameters into a whole; the divergence index, reflecting the degree of differentiation and disintegration; and the general organizability index, which combines the first two indices and describes the overall organization, defined as the extent to which integrative tendencies prevail over disintegrative (or disorganizational) ones. The resulting index values are shown in Table 2.

Table 2
Values of the Structural Indices in Two Groups

Structural Indices	Group 1	Group 2
SCI	29	22
SDI	5	8
SOI	24	14

An analysis of the results, particularly the data in Table 2, brings to light the following key findings and patterns.

Firstly, the most significant difference between the two groups lies in the coherence index of the regulatory subsystem's processes. The first group has a coherence index (SCI) of 29, while the second group has only 22. This indicates a decrease in overall coherence, suggesting that a reduction in structural integrity is the dominant trend in these transformations.

Secondly, the divergence index shows less pronounced dynamics, especially in absolute values (SDI), which can be explained by the inherent organization of the regulatory subsystem. The latter, as noted by Karpov (2015), is primarily influenced by synthetic, structure-forming mechanisms. These mechanisms are generally more prominent than those responsible for differentiation.

Thirdly, in its most generalized form, the dominance of integrative tendencies and the underlying means and mechanisms finds its clearest expression in the dynamics of the *organizability* index, which stands at 24 and 14 points, respectively. Furthermore, since this dynamic is primarily influenced by changes in the coherence index, and the dynamics of the divergence index is significantly smaller, it closely resembles the coherence index.

Overall, these results indicate a decline in the regulatory potential of individuals in the second test group, both concerning individual regulatory processes at the analytical level and their overall organization at the structural level. Notably, in the latter case, these transformations are predominantly negative; a decrease in the degree of structuredness, or organization, is recognized in theory as a significant determinant that can diminish the functional capacity of systems, including the regulatory system in this context.

The most general and fundamental conclusion from the analysis of the presented results is that there is a significant and noticeable *decrease* in the degree of organization (structuredness and integration) of the main parameters within the regulatory subsystem of the individual in the two examined groups. Additionally, the difference in the most important structural index, that is general organizability, between the two groups is nearly two-fold; it is over 1.7 times higher in the first group. Such differences cannot be dismissed as mere artifacts; rather, they signal a profound and fundamental restructuring. Therefore, it is essential to identify and explain these differences, as well as their broader implications and underlying causes. This necessity is further underscored by another important result, which will be discussed below.

The comparison of the identified matrices of the regulatory subsystem parameters, along with the structural diagrams constructed from them, aimed to investigate their *homogeneity-heterogeneity* using the χ^2 criterion. The results demonstrated statistically reliable homogeneity (at $p < .05$), indicating a *uniformity* among the studied parameters. This suggests that the dominant direction of transformations in the structural organization of the regulatory subsystem is characterized by quantitative changes rather than qualitative ones. In other words, the general structural organization of the regulatory subsystem remains fundamentally invariant between the two groups, with changes primarily occurring in the degree or measure of its organization.

The above observation does not imply a complete absence of qualitative transformations; such changes do occur, but they are somewhat localized and mainly result from the reduction of certain structural connections and their replacement with new ones. Nevertheless, the overall pattern of these connections is preserved. While isolated features and manifestations may change, the structure remains broadly homogeneous.

Discussion

The following interpretation can be drawn from the above-described results. The question of potential changes in the regulatory subsystem and its key parameters was largely influenced by findings related to similar changes in the cognitive subsystem. As previously noted, the cognitive subsystem has undergone well-documented declines, including cognitive decline and reduced metacognition, which we identified in our work. The close relationship and interdependence of these two subsystems are widely recognized and considered fundamental to the theory of mental processes. The distinction between cognitive and regulatory processes is not structural but functional, as both can perform cognitive and regulatory roles. Therefore, the development levels of these subsystems, taken both individually and as a whole, are closely interconnected. Consequently, changes in cognitive and metacognitive processes inevitably affect regulatory processes. The unidirectionality and fundamental similarity of these changes are evident in our results and help explain them.

Furthermore, it is crucial to consider the fundamental fact that the entire array of cognitive and, especially, metacognitive processes should not be viewed as a collection of fragments created for analysis, but rather as an integral system effectively represented in the maximally integrative formation known as consciousness. Additionally, from the perspective of modern theories in metacognitive knowledge and the psychology of consciousness, it is the metacognitive processes that serve as the primary components ensuring this integration. These secondary cognitive processes collectively form the content of a tertiary process—reflection—which is interpreted as the fundamental procedural means of supporting consciousness as a whole.

Perhaps most significantly for the objectives of this work is that the level of development of the basic procedural components of reflexive regulation, and consequently of consciousness, underpins critical properties of the psyche and human activity, such as volition, controllability, and manageability. These qualities are

unified under the constructive concept of agency, often interpreted as "subjectivity." Thus, what may appear to be a neutral and "harmless" decline in cognition and metacognition can lead to potentially negative consequences, particularly a decrease in volition, controllability, and behavioral agency. These changes have clear phenomenological manifestations and empirical references widely documented in contemporary research. Examples include the noted growth of immaturity among modern adolescents (and others), a decline in independence and activity, a reduction in traditional motivational attitudes, decreased social adaptation and readiness, and a decline in conflict competence and communication skills (Bobrova, 2019; Kerdellant & Grezillon, 2003; Skinner, 2019; Spitzer, 2012).

Additionally, significant changes in the strategies and methods for searching information needed to solve behavioral problems in a digital environment must be considered. Computerization has shifted strategies from active extraction to request-based methods. Internal search is replaced by external scanning and filtering, leading to a significant reduction in the active provision of information for tasks. This shift partially inhibits the cognitive mechanisms that process information, particularly those involving reflection, contributing to an increase in reflexive tendencies.

Moreover, these results align naturally and comprehensively with our previously developed concept of integral processes in the mental regulation of activity and behavior. This concept, which elaborates on traditional classes of mental processes (cognitive, regulatory, emotional, motivational), introduces a distinct class: *integral processes of activity regulation*. Detailed in (Karpov, 2015, 2021a, 2021b; Karpov & Karpov, 2022), this class includes specific regulatory processes such as goal formation, anticipation, decision-making, forecasting, planning, programming, control, and self-control. These processes, along with the regulatory potential of cognitive and metacognitive processes, form the core of the regulatory subsystem of the psyche.

The most important feature of the structural and functional organization of these processes is not only their regulatory orientation but also the fundamentally synthetic and integrative nature of their content. This means that they are formed and function as procedural syntheses of other classes of processes: cognitive, emotional, motivational, and volitional. Through their integration, specific systemic synergistic effects emerge, leading to new features and patterns that constitute the qualitative specificity of the integral processes.

It is crucial to note that the class of cognitive processes plays a key role in implementing these integrative means and mechanisms, as it is foundational to their overall structure. Consequently, integral processes largely derive from the potential characteristic of cognitive and associated metacognitive processes. Therefore, it is both understandable and natural that any deficits in cognitive and metacognitive processes, defined as syndromes of decreased cognition and metacognition, will similarly manifest as deficiencies in the development of integral processes. As a result, the degree of their development diminishes, leading to a decrease in their regulatory resource, which, in turn, elucidates the mechanisms behind this decline.

Additionally, it should be emphasized that the degree of change, or sensitivity to external factors associated with digitalization, varies between primary and secondary

regulatory processes. The results indicate that secondary regulatory processes generally experience a higher degree of reduction compared to primary processes. This reveals a new observation: primary processes exhibit greater tolerance to digitalization influences than secondary processes. Conversely, secondary processes, due to their more complex organization, tend to be more sensitive and "fragile" in response to such influences. This finding aligns with systems theory, which posits that complex systems and their components are typically more sensitive to external factors.

All of the above leads us to the conclusion that we are witnessing the rise of a new phenomenon, *the syndrome of reduced regulation*, primarily driven by the qualitative transformations of society under the influence of digitalization. This syndrome, closely linked to the previously identified syndromes of decreased cognition and metacognition, allows for a broader and deeper understanding of the true scale of societal transformations and their complex, multidimensional impact on the psyche and personality. Furthermore, these three syndromes–reduced regulation, decreased cognition, and decreased metacognition–do not operate in isolation but rather in synergy, amplifying their collective impact on individuals.

While acknowledging these generally negative and evident trends, it is important not to fall into the common trap of overemphasizing new results or dramatizing the situation. Our findings suggest this as well, particularly when examined at a deeper level. The identified structures of the regulatory subsystem's parameters were found to be statistically homogeneous according to the χ^2 criterion. This indicates that the differences are primarily *quantitative*, that is, related to the degree of organization, rather than *qualitative*. This outcome contrasts with the assumption that the strong influence of decreased cognition, metacognition, and digitalization would lead to qualitative changes.

While it might be more theoretically appealing to conclude that digitalization causes qualitative shifts in the regulatory subsystem, our results show no such phenomenon. This means that we have grounds for optimism in predicting future trends: regulatory processes and personality traits, as fundamental mechanisms, remain relatively resilient to external influences, including powerful factors like digitalization. Although these processes and traits do respond to such factors, they maintain their core structural principles and patterns, which appear stable and invariant.

Finally, it is crucial to emphasize that any interpretation of the entire set of results would be incomplete and flawed if it overlooked a broader, and somewhat "inconvenient," issue. This issue lies in the fact that the observed transformations of the regulatory subsystem are not solely the result of digitalization. They are also shaped by a wider and equally significant set of factors linked to the qualitative transformations occurring in society at large, and across its various core spheres.

For instance, the formation and development of the individual's regulatory subsystem are deeply influenced by changes in the educational system. Similarly, transformations in another, seemingly opposite domain—recreation and leisure, especially those connected to non-professional and extracurricular activities—have a profound impact on this subsystem.

In a broader sense, it is nearly impossible to identify any major sphere of society that has not undergone substantial changes in recent times. Each of these changes inevitably plays a role, to varying degrees, in shaping both the development of the individual's personality as a whole and the fundamental subsystems of the psyche in particular.

In this context, a key question arises: what aspects of the transformations in the regulatory subsystem are linked to digitalization factors, and which are associated with other influences, including the aforementioned societal changes? However, upon closer examination, this issue does not argue against but rather supports the ideas previously articulated. More general transformations in the main spheres of society are largely driven by the effects of digitalization.

Consequently, the significant influence of digitalization on the development of individuals and their psyche particularly on its fundamental subsystems, cognitive and regulatory, is evident in these broader transformations. Thus, the process of digitalization exerts both direct and immediate effects on the transformation of the regulatory subsystem. Additionally, it has an indirect impact: digitalization alters the major spheres of society, which, in turn, exert a specific transformative influence on the formation of the regulatory subsystem and the individual as a whole.

Conclusion

In summary, the conclusions drawn from the results presented above can be articulated as follows. Generally speaking, digitalization, which permeates nearly all major spheres of society, including professional and educational activities, significantly impacts the formation of the regulatory subsystem of the psyche. This influence is characterized by both positive outcomes and several negative trends. Consequently, the regulatory subsystem and its key components are notably sensitive to the determinative effects of digitalization.

Furthermore, it is important to note that this determinative influence is characterized not only by its significance and the presence of negative trends but also by its complex nature. It operates on two main levels: analytical and structural, with the latter having a priority and more pronounced effect on the transformations of the regulatory subsystem. The analytical level involves a notable decrease in the development of individual components of the regulatory subsystem, including basic regulatory processes and their corresponding qualities. In contrast, the structural level of determination reflects significant changes in the overall organization, or the structuredness and integration, of these components into a cohesive system, which is what the regulatory subsystem of the psyche essentially represents.

As a result of this complex determinative influence, a fundamentally new phenomenon emerges, which can be termed the syndrome of reduced personality regulation. This syndrome holds significant implications for personality development and its regulatory potential. It shares similarities in meaning and tendency with previously defined syndromes of decreased cognition and metacognition. Additionally, it is functionally and genetically linked to these syndromes, as the regulatory subsystem

is closely interconnected with the cognitive subsystem of the psyche. This relationship reflects the fundamental features of both the structural and functional organization of the cognitive subsystem, as well as the level of its development.

Finally, an important pattern emerges regarding the structural transformations of the regulatory subsystem influenced by digitalization factors. These transformations are primarily evident in changes to the degree of organization and integration—essentially the quantitative structural characteristics—rather than in qualitative changes, which remain relatively invariant. This invariance is reflected in the statistically reliable homogeneity of the regulatory subsystem structures across the two studied test groups. This observation serves as both a consequence and an indicator of the regulatory subsystem's high tolerance to the impacts of digitalization, as well as its significant compensatory capabilities. Not only does this suggest the potential to mitigate negative influences, but it also lays the groundwork for developing effective, action-oriented psychological recommendations and didactic procedures aimed at enhancing the formation and development of the regulatory subsystem in an increasingly digital society.

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