Ermakov P. N., Denisova E. G., Kupriyanov I. V., Kolenova A. S.
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Russian psychological journal, , Vol. 19, No. 2, 21-34. **doi:** 10.21702/rpj.2022.2.2

Research article

UDC 159.9.07

https://doi.org/10.21702/rpj.2022.2.2

Psychological Predictors of Constructive and Destructive Forms of Youth Digital Behavior

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Abstract: Introduction. In the context of the growing digitalization of society, the study of the psychological determinants of Internet activity and related to it psychological phenomena, including various forms of digital behavior, is of particular relevance. However, little research has been conducted to identify psychological predictors of constructive and destructive forms of digital behavior, in particular, we consider it interesting to study the parameters of aggressiveness, hostility and features of the cognitive sphere. **Methods**. The study involved 107 people (70% female) aged 18 to 25 years. In order to identify the level of aggressiveness and hostility, the Buss-Durkee Hostility Inventory was used; to measure individual differences in cognitive sphere in terms of the field dependence-independence parameter we used the test of embedded figures (Gottschaldt figures test); to clarify the individual characteristics of thinking we used the method of measuring the style of thinking. In order to study the features of digital behavior, the questioner "Strategies of informational behavior" (SIP) was used. Statistical analysis included: Shapiro-Wilk test, k-means clustering, Student's t-test, non-parametric Mann-Whitney test, standardized mean differences (Cohen's d) and point-biserial correlation coefficient. **Results**. Users demonstrating active constructive and destructive forms of digital behavior have significantly higher rates in all indicators of aggressiveness and hostility and demonstrate more pronounced field independence. These forms, both constructive and destructive, are united by the subject's activity. However, the focus of this activity and the intensity of individual digital behavior strategies differ. **Discussion**. The obtained results show that the higher levels of subject's online activity is connected to the field independence, aggressiveness, hostility. These results also indicate the need to continue studying the issue of cognitive mechanisms of behavioral regulation of digital behavior.

Keywords: digital behavior, cognitive style, personality, aggressiveness, field dependence, digital behavior strategies, Internet, destructive behavior

Highlights

- cognitive characteristics and levels of aggressiveness and hostility are proposed to be considered as psychological predictors of the formation of various digital behavior.
- strategies of informational behavior are manifested in the individual behavior in various combinations, which can be combined into constructive and destructive forms of digital behavior.
- dominant strategies include using the Internet to find information, to view user-generated content, to consume influencer or celebrity content.
- users with higher levels of field independence, aggressiveness and hostility prefer active forms of digital behavior.

For citation
Ermakov P.N., Denisova E.G., Kupriyanov I.V., Kolenova A.S. (2022). Psychological predictors of constructive and destructive forms of youth digital behavior. *Rossiiskii psikhologicheskii zhurnal – Russian Psychological Journal*, *19*(2), 21–34. https://doi.org/10.21702/rpj.2022.2.2

Introduction

The concept of "informational behavior" (digital behavior), which combines the ways of interacting with information and informational technologies in general, and Internet activity in particular, is relatively new for psychology. Informational behavior is often associated with the terms "Information culture", "Internet use", "Problematic Internet use", "cyber behavior"; "media behavior" is also encountered in more recent works (Zhizhina, 2019; Kassambara & Mundt, 2020; Alt & Boniel-Nissim, 2018; Weinstein et al., 2015). In modern literature, there is no clear term for this phenomenon, which would describe the entire range of its use. At the same time, most authors agree that this is a specific human activity, implemented with the participation of information technology tools, aimed at obtaining and assimilating, using and / or creating new information and its dissemination in society (Abakumova et al., 2020; Voiskunsky, 2017; Novikov, 2015; Dresher & Atlanova, 2005).

It has been shown that patterns and preferred strategies of human behavior online and offline can differ significantly (Ioannidis et al., 2018). The specificity of the Internet space as a social environment lies in the change in the structure of user interaction, which manifests itself in the blurring of boundaries, social norms and forms of responsibility, the plurality and accessibility of social groups, activities, and greater freedom of expression. In this regard, there is reason to believe that digital behavior reflects the personal characteristics of users to a greater extent and is more determined by them than real offline behavior (Panshina, Sungurova & Karabuschenko, 2021).

In the works of modern scientists, attempts are being made to classify Internet activity on various grounds. Thus, numerous classifications of users have been proposed based on motives, predominant types of activity, orientation towards consumption (creation) or production (creation) of content (Panshina, Sungurova & Karabuschenko, 2021; Zhizhina, 2019). Classifications of users of information systems are being developed, incl. social networks and the Internet in general (Kuznetsova & Chudova, 2011; Frindte & Köhler, 2000). Various levels of information perception (neurocognitive, psychological, and value-semantic) and the main effects of influencing them are actively studied (Ermakov, Abakumova & Steinbukh, 2018). Among the psychological phenomena associated with Internet activity, such personality traits as openness, neuroticism, rigidity, sensitivity,

the level of social skills of the subject, the value-semantic sphere, general and emotional intelligence, etc. are more often considered emotional intelligence, etc. (Molchanov & Almazova , 2018; Lysak & Belov, 2013; Belova, Valueva, Ovsyannikova, & Sysoeva, 2012; Peris, de la Barrera, Schoeps & Montoya-Castilla, 2020). When studying destructive forms of online behavior, including Internet addiction and problematic Internet use, researchers also pay attention to the characteristics of self-attitude, the level of aggressiveness, indicators of emotional-volitional regulation, emotional lability (Casale, Lecchi, & Fioravanti, 2015; Chen et al., 2015; Weinstein et al., 2015).

Given the relative novelty of the phenomenon and the methodological complexity of studying the psychological predictors of online activity, there is currently no systematic understanding of the mechanisms for the formation of certain digital behavior strategies. Psychological predictors of constructive and destructive forms of behavior remain insufficiently studied, in particular, the parameters of aggressiveness and hostility and features of the cognitive sphere are of interest. The listed characteristics have mostly been studied either in isolation from each other or exclusively in the context of problematic Internet use (Glazyrina, 2021; Hinić, 2011). However, it is the cognitive organization of the subject, as it seems to us, that largely determines his ways of interacting with information, and a personal predisposition to aggressiveness or hostility can not only largely determine the manifestation of these trends in the online space, but also have a special nature of interaction with the cognitive sphere.

Methods

The study involved 107 people (34 boys, 73 girls) aged 18 to 25 years (Southern Federal District and the Republic of Kalmykia, RF). The survey of respondents was conducted from February 13, 2020 to March 20, 2020 in person, in the format of a blank test. All respondents agreed to participate in the study, were informed about its objectives and notified of further use and publication of the results.

In order to study the psychological characteristics of the respondents, psychological testing was carried out using the following methods: to identify the level of aggression, its behavioral and emotional aspects, the Bass-Darky aggressiveness level questionnaire (Khvan, Zaitseva, & Kuznetsova, 2008); to study individual differences in cognitive activity in terms of the field dependence-field independence parameter - a test of included figures (the Gottschaldt Figures method, (Witkin, 1950); to clarify individual thinking characteristics - a method for measuring the style of thinking "(Belousova, Pishchik, & Molokhina, 2005) In order to study the features of digital behavior, the methodology “Information Behavior Strategies” was used (Abakumova et al., 2020).

Statistical processing of the obtained results was carried out using the “R” statistical data processing system (R Core Team, 2020) with the cluster cluster analysis package (Maechler et al., 2020), the factoextra data visualization package (Kassambara & Mundt, 2017) and the freely distributed JASP Computer software package (Version 0.16, 2021). Statistical methods for processing the obtained results included the Shapiro-Wilk test, k-means cluster analysis, Student's t-test, non-parametric Mann-Whitney test, standardized mean difference (Cohen's d) and point-biserial correlation coefficient.

Results

In order to group the subjects according to the most characteristic combinations of cognitive and personal characteristics and further identify differences between them in terms of constructive

and destructive forms of digital behavior, reflected in the three components (RC1 - RC3) identified by us in our previous work (Abakumova, Ermakov, Denisova & Kupriyanov, 2021), the k-means cluster analysis method was applied, the result of which is shown in the graphs (Fig. 1 and Fig. 2) and in the table (Table 1). All data used to cluster the sample were previously converted to a z-scale in order to standardize the values. The number of clusters was chosen based on the results of preliminary calculations. This number of clusters best discriminates the sample according to the indicators under study, while maintaining the uniformity of the distribution of respondents by age and gender within the clusters. The first cluster included 63 people (33 girls, 30 boys; mean age 20.8 years), the second - 44 (24 girls, 20 boys; mean age 21.1 years).

Figuire 1

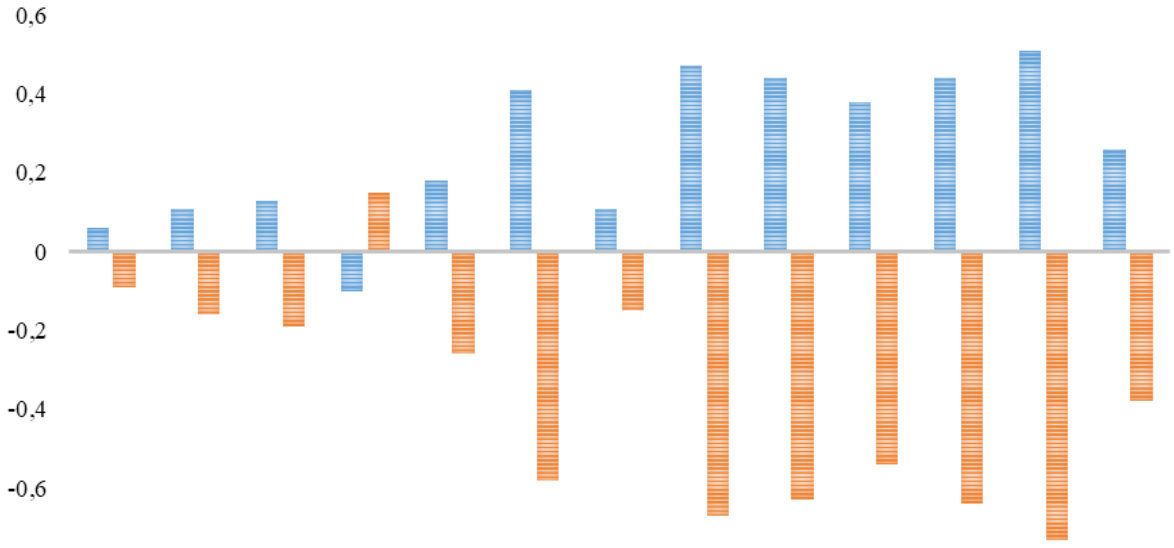
Distribution of observations across clusters

Note: 1 - respondents included in cluster 1 (indicated in red); 2 - respondents included in cluster 2 (marked in blue).

It is shown that the average values obtained for the studied indicators differ significantly in the selected clusters (Fig. 2). Thus, the respondents included in cluster 1 have higher rates in all indicators of aggressiveness and hostility, in initiative, critical and managerial thinking styles and demonstrate more pronounced field independence. Representatives of the second cluster are less prone to manifestations of aggressiveness and hostility, have higher scores in the practical style of thinking, and demonstrate more pronounced field dependence.

Figuire 2

Average values of clusters for the studied indicators



	Initiative thinking	Critical thinking	Administrative thinking	Practical thinking	Field-dependence	Physical aggression	Verbal aggression	Indirect aggression	Negativism	Irritability	Suspiciousness	Resentment	Autoaggression
cluster 1 (means)	0,06	0,11	0,13	-0,1	0,18	0,41	0,11	0,47	0,44	0,38	0,44	0,51	0,26
cluster 2 (means)	-0,09	-0,16	-0,19	0,15	-0,26	-0,58	-0,15	-0,67	-0,63	-0,54	-0,64	-0,73	-0,38

Analysis of variance (ANOVA) values indicate that not all variables contribute equally to sample clustering (Table 1). The most significant were the severity of field dependence and indicators of aggressiveness and hostility (with the exception of verbal aggression).

Table 1

Results of analysis of differences between clusters (ANOVA)

	SS	MS	F	p
Initiative thinking	0,554	0,554	0,552	0,459
Critical thinking	1,921	1,921	1,938	0,167
Administrative thinking	2,702	2,702	2,746	0,100
Practical thinking	1,658	1,658	1,669	0,199
Field-dependence	5,113	5,113	5,321	0,023
Physical aggression	25,55	25,55	33,347	0,000

Verbal aggression	1,713	1,713	1,724	0,192
Indirect aggression	34,039	34,039	49,667	0,000
Negativism	29,353	29,353	40,212	0,000
Irritability	21,823	21,823	27,221	0,000
Suspiciousness	30,274	30,274	41,978	0,000
Resentment	39,358	39,358	62,012	0,000
Autoaggression	10,549	10,549	11,605	0,001

Note: SS - parameter "sum of squares", shows the sum of squared deviations of the average values of clusters from the total average; MS - parameter "mean square", an indicator of intergroup dispersion, which is equal to the result of dividing the sum of squares by the number of degrees of freedom; since the number of degrees of freedom is equal to the number of compared clusters minus 1, in this case SS=MS; F - Fisher's F-test values - is an indicator of how well the corresponding measurement discriminates clusters; p is the significance level.

As a result of the analysis of the severity of the constructive and destructive forms of digital behavior identified by us, a comparative analysis was carried out (Table 2). Due to the fact that the distribution in the selected groups (clusters) in some cases differed from normal, the significance of differences was assessed simultaneously by the Student's t-test and the nonparametric Mann-Whitney test. In addition, effect sizes were studied using standardized group differences (Cohen's d) and r point-biserial correlation coefficient.

Table 2

The results of the analysis of the reliability of differences in the severity of constructive and destructive forms of digital behavior between clusters

Test of Normality (Shapiro-Wilk)			Components	Statistical test	Results	p-value	effect size
group	W	p					
Cluster 1	0.987	0.727	RC1	Student (T-test)	1.70	0.092	0.334
Cluster 2	0.961	0.147		Mann-Whitney	1694.00	0.052	0.222
Cluster 1	0.886	< .001	RC2	Student (T-test)	0.391	0.697	0.077
Cluster 2	0.912	0.003		Mann-Whitney	1421.00	0.827	0.025

Test of Normality (Shapiro-Wilk)			Components	Statistical test	Results	p-value	effect size
group	W	p					
Cluster 1	0.942	0.005	RC3	Student (T-test)	2.412	0.018	0.474
Cluster 2	0.975	0.444		Mann-Whitney	1738.00	0.026	0.254

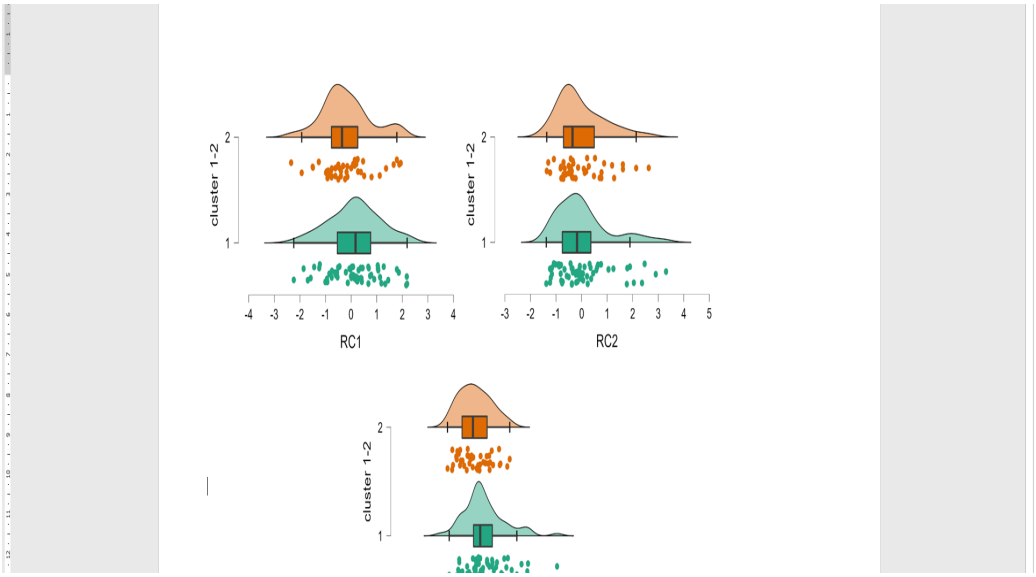
Note: A significant result according to the Shapiro-Wilk test indicates an abnormal distribution. Effect size for the t-test was calculated using standardized group differences (Cohen's d) and r point-biserial correlation coefficient (for the Mann-Whitney test).

It was found that the indices of the third component (RC3) differ significantly between the clusters. That is, in the groups identified on the basis of cluster analysis, the severity of the active destructive form of digital behavior differs. In addition, a trend towards significant differences in the first component (RC1 is the active structural form) was found. The effect size in relation to the detected differences also indicates a significant degree of their severity (average effect size).

When comparing the distribution of values by components in each of the clusters, it was found that the respondents of the first cluster have higher rates both in the active constructive form of digital behavior and in the active destructive one (Fig. 3).

Figure 3

Comparison of the severity of various forms of digital behavior in selected clusters



Note: RC1, RC2, RC3 - designations of the forms of digital behavior identified by the analysis of principal components (active constructive, passive constructive, active destructive, respectively).

The obtained results indicate that users who actively use the Internet for recreational, communicative and pragmatic purposes (RC1), or for the realization of aggressive impulses and/or sexual needs (RC3), have significantly higher scores for all indicators of aggressiveness and hostility and demonstrate more pronounced field independence (cluster 1).

Both active forms, both constructive and destructive, are united by the subject's activity parameter. However, the direction of this activity and the severity of individual strategies of digital behavior, according to the data obtained, differ. An analysis of the representation of specific digital behavior strategies is presented in the table 3.

Table 3

Frequency of occurrence of digital behavior strategies (percentage)

Name of digital behavior strategy	The frequency of occurrence of the strategy as the leading one		
	Sample	Cluster 1	Cluster 2
1.Internet for telling others about yourself	2%	2%	2%
2.Internet for shopping	2%	0%	5%
3.Internet for information	**29%**	**24%**	**36%**
4.Internet for "killing time"	7%	8%	5%
5. The Internet as a motivating force (examples from others)	**23%**	**27%**	**18%**
6.Internet as access to alternative information (opposition views)	7%	8%	5%
7.Internet for participation in communities (extremism, destructive tendencies)	3%	3%	2%
8.Internet for spying on others on social media	**21%**	**22%**	**18%**
9.Internet for the realization of sexual needs	2%	3%	0%
10.Internet for expressing ideas (manifestations of nationalism)	6%	3%	9%

The most common strategies across the sample as a whole are using the Internet to find information, to view user-generated content, and to consume influencer or celebrity content. The same strategies obviously dominate in selected clusters as well. At the same time, the search for information dominates for the representatives of the second cluster, while the content of social networks (motivational, user-generated content) is more important for the first one.

Discussion

The obtained results indicate that users who actively use the Internet for recreational, communicative and pragmatic purposes (RC1), or for the realization of aggressive impulses and/or sexual needs (RC3) have significantly higher rates for all indicators of aggressiveness and hostility and demonstrate more pronounced field independence (cluster 1). Components RC1 and RC3 combine a similar level of activity of the subject and the severity of the connection with the indicator of the strategy "Internet for information retrieval". That is, this strategy is equally expressed regardless of the nature of this information or the direction of user activity. Consequently, the predominance of these forms of behavior among representatives of cluster 1 indicates a connection between a high level of activity in the network and field independence, aggressiveness, and hostility. In general, this is consistent with the results of research on the productivity of information retrieval activities on the Internet, the material of which shows that field-independent users are more successful in performing information retrieval tasks in terms of quantitative (search speed, number of pages viewed, etc.) characteristics (Ferdowsi & Razmi, 2022 ; Ford et al., 2002; Palmquist & Kim, 2000). That is, field-independent users are generally better oriented in the information environment, and also demonstrate more active and confident behavior.

Aggressiveness and hostility of users have been studied to a greater extent in the context of their connection with Internet addictive behavior or as an independent style of behavior (cyberbullying) (Selivanova & Peshnina; 2020; Palmquist & Kim, 2000). At the same time, it has been shown that auto-aggression and other components of aggressiveness are highly likely to be expressed in destructive forms of online behavior (including addictive behavior) (Glazyrina, 2021; Hinić, 2011). In addition, users who demonstrate high aggressiveness are more active and productive in their self-expression online (Naboychenko & Okuneva, 2016; Drepa, 2009; Glicksohn, Naftuliev & Golan-Smooha, 2007).

Thus, our results generally do not contradict the empirical facts described in recent studies. At the same time, given the lack of studies that would consider the combined effect of field dependence and aggressiveness on the behavior of an individual on the Internet, the described data expand the understanding of the role of cognitive style in the choice of digital behavior strategies. However, the results of our study only direct us towards the search for cognitive mechanisms of behavioral regulation and cannot fully answer the question of the distribution of the factor load between the described characteristics.

Conclusion

1. Digital behavior as a specific human activity, implemented with the participation of information technology tools, is a complex phenomenon. The diversity of its definitions is largely due to the lack of a unified methodological approach to its study and a variety of tools that allow us to study only its individual manifestations.

2. Various combinations of digital behavior strategies that are manifested in the behavior of a

particular individual can be combined into constructive and destructive forms of digital behavior.

3. Users who actively use the Internet for recreational, communicative and pragmatic purposes (active constructive form of digital behavior), or for the implementation of aggressive impulses and/or sexual needs (active destructive form of digital behavior) have significantly higher rates for all indicators of aggressiveness and hostility and demonstrate more pronounced field independence.

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Received: 03.20.2022
Revision received: 05.13.2022
Accepted: 05.16.2022

Author Contribution

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Ekaterina Gennadievna Denisova - literature review on the topic of the article, participation in the collection and processing of material, analysis of the data obtained, participation in writing the article, translation of the abstract, design of the final version of the article.
Igor Vladimirovich Kupriyanov - participation in the collection and processing of material, statistical data processing, interpretation of the data obtained, participation in writing and editing the article.
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Information about the conflict of interest

The authors declare no conflict of interest.