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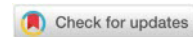
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Cyber Socialization Engagement and Dark Tetrad of Personality among Young University Students

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Abstract: The article considers the relationship between the cyber socialization engagement and the Dark Tetrad of personality (Machiavellianism, narcissism, psychopathy, and sadism). The cyber socialization engagement was understood, according to the author's concept, as having constructive and destructive components. The study purpose was to identify correlation and deterministic relationships between indicators of the cyber socialization engagement and the Dark Tetrad among young university students. The sample included 424 students from Russian universities. For measurements, «The cyber socialization engagement questionnaire» and «The Short Dark Tetrad Scale» were used. It has been established that the relationship between the indicators of the cyber socialization engagement and the Dark Tetrad has a qualitatively heterogeneous character – from the complete absence of connections to mutual determination. The strongest mutual determination is associated with the everyday sadism: it increases the destructive engagement in cyber socialization, explaining 12% of the total variance, and the latter, in turn, increases the severity of sadism (10.5%). It is advisable to take into account the revealed connections between the general cyber socialization engagement and the Dark Tetrad of the personality when organizing psychological support for the socialization of students in the context of expanding social interactions carried out in cyberspace.

Keywords: cyber socialization engagement, constructive engagement, destructive engagement, Dark Tetrad of personality, young university students.

Introduction

The focus of our research is determined by the integration of three research areas, characterized by the concepts of «the cyber socialization engagement», «the Dark Tetrad of personality» and «the young university students».

In the modern world, young people, as in all times, assimilates the social experience accumulated by previous generations, including ideas about social norms and rules, abilities and skills of a social interaction, heterogeneous social relations, etc. Such processes in a generalized form are traditionally called socialization.

At the same time, modern socialization has an important new component, which is called cyber socialization and is associated with that part of socialization processes that are carried out using digital technologies, i.e., in fact, through various interactions carried out in a specific part of the space of human existence – cyberspace (see, e.g., [Lenkov and Rubtsova, 2022](#)). At the same time, the contribution of cyber socialization to the total array of socialization processes has been rapidly increasing in recent years, including under the influence of such force majeure factors as the COVID-19 pandemic. According to [Easa and Bazzi \(2021\)](#), the pandemic has caused a significant lack of the socialization among university students. At the same time, the authors have in mind traditional socialization, and not its specific cyber component. Therefore, the results of their work, taking into account the sharp increase in the activity of young people in cyberspace recorded in many studies during the pandemic, can be interpreted as another significant shift in the relationship between traditional socialization and cyber socialization in favor of the

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latter.

Cyber socialization in one or another of its aspects has actually been studied for a long time. However, two fundamental difficulties stand in the way of such a study. The first of them is theoretical, related to the debatability of the central construct used to describe this phenomenon: along with the concept of cyber socialization (see [Lenkov and Rubtsova, 2019, 2022](#); [Lenkov, Rubtsova and Efremova, 2019](#)), many other competing concepts are used here, such as digital socialization (e.g., [Kim, 2015](#)), virtual socialization ([Saeed and Hassan, 2020](#)), Internet socialization ([Honnekeri et al., 2017](#)), media socialization ([Milenkova, Peicheva and Marinov, 2018](#)), and others. The second difficulty is methodical, associated with measuring tools for determining the severity of certain processes of cyber socialization, their representation in the life of a particular person, i.e., what we call the cyber socialization engagement.

As a result, the cyber socialization engagement, including among university students, has so far been studied mainly:

- in philosophical and theoretical perspectives (R. M. Aysina, S. Livingstone, V. A. Pleshakov, T. Poell, G. U. Soldatova, A. E. Voiskunsky, B. Zizek, etc.);
- either using primary methods that do not have a reliable psychometric justification, such as questioning ([Honnekeri et al., 2017](#); [Kim, 2015](#)), structured interviews and focus groups ([Milenkova, Peicheva and Marinov, 2018](#)), qualitative interviews (e.g., [Smith, Hewitt and Skrbiš, 2015](#)), etc.;
- either taking into account only certain, rather narrow aspects of the cyber socialization engagement, such as motivation or the nature of the use of the Internet (e.g., [Smith, Hewitt and Skrbiš, 2015](#)), smartphones ([Servidio, Griffiths and Demetrovics, 2021](#)), social networks ([Casale, Musicò and Spada, 2021](#); [Kircaburun, Jonason and Griffiths, 2018](#)) and instant messengers ([Casale, Musicò and Spada, 2021](#); [Honnekeri et al., 2017](#); [Saeed and Hassan, 2020](#)), such specific negative manifestations of destructive cyber socialization as cyberbullying and cyberstalking ([Kircaburun, Jonason and Griffiths, 2018](#)), cybervictimization ([Shoib et al., 2022](#)), various cyberaddictions (see, for example, ([Casale, Musicò and Spada, 2021](#); [Siah et al., 2021](#)), cyberloafing ([Metin-Orta and Demirtepe-Saygılı, 2021](#)), etc.

Similar methods and directions of research are widely demanded today. At the same time, the situation changed fundamentally after [Lenkov, Rubtsova and Efremova \(2019\)](#) developed a questionnaire of the cyber socialization engagement, which underwent extensive psychometric testing. This questionnaire does not replace or exclude other methods for studying the cyber socialization engagement, including those mentioned above. However, it provides for the fulfillment of two important requirements for taking the appropriate research positions:

- approach the understanding of cyber socialization from a generalized view point, integrating private manifestations of cyber socialization;
- operationalize this point of view, moving from philosophical and general theoretical reasoning to quantitative analysis and the construction of specific empirically based psychological models.

The next important aspect of the field of study is related to personality structures. Cyber socialization, like traditional socialization, is associated with the formation of specific personal properties that reflect the assimilation of social experience by the individual. It is quite natural to try to identify the role and place of such specific structures in the overall structure of the personality, in particular, to establish their relationship with the well-known basic personality structures, of which we will focus on only one. This is the structure known as the Dark Tetrad of personality and combines features of Machiavellianism, narcissism, primary (non-clinical) psychopathy, and everyday sadism ([Neumann, Jones and Paulhus, 2021](#); [Paulhus et al., 2021](#)), where the addition of the feature of sadism is a relatively new extension of the more traditional Dark Triad, which has been extensively studied for at least at least the last twenty years (see [Kircaburun, Jonason and Griffiths, 2018](#); [March and Marrington, 2021](#); [Moor and Anderson, 2019](#); [Siah et al., 2021](#)). It should also be noted that each of the four properties of the Dark Tetrad has been separately studied in psychology for a much longer time, but it is the identification of their coordinated structure that is of fundamental importance here.

Finally, another point specifying our field of study is the selection of young university students as subjects. This choice is due to the following reasons. Firstly, university students are to a significant extent involved in cyber socialization due to the very specifics of the organization of the educational process, especially in the context of the recent COVID-19 pandemic. Secondly, young students are already representatives of the digital generations, for whom the first acquaintance with computers and gadgets occurs, as a rule, even at preschool age; this factor, accordingly, also increases their cyber socialization engagement; therefore, we have limited the age of students to 35 years.

In relation to our research area as a whole, it can be stated that the relationship between the cyber socialization engagement and the Dark Tetrad (as well as the Triad) of the personality has been studied to date only fragmentarily, taking into account certain aspects of the cyber socialization engagement.

This applies to studies performed both on samples of university students and on other samples. For example, [Servidio, Griffiths and Demetrovics \(2021\)](#) studied the relationship between the Dark Triad and problematic smartphone use, on a sample of Italian smartphone users aged 18 to 38; [Kircaburun, Jonason and Griffiths, 2018](#) on a sample of students from Turkish universities, we studied the relationship between the traits of the Dark Tetrad, problematic use of social networks, cyberbullying and cyberstalking; [Wright et al. \(2020\)](#) studied on a sample of adolescents the relationship between the traits of the Dark Triad and cyberbullying, etc.

Thus, the relationship between the Dark Tetrad of personality and the general structure of the cyber socialization engagement has not been sufficiently studied to date, and this fact determines the relevance of our study.

The purpose of the study was to identify the relationship between indicators of the cyber socialization engagement and the Dark Tetrad of personality among young university students. Achieving this goal meant getting answers to the following research questions:

- Are there any correlations between the indicators of the cyber socialization engagement and the Dark Tetrad of personality?
- Do the factors of the Dark Tetrad of personality have a significant influence on the indicators of the cyber socialization engagement?
- Do the factors of the cyber socialization engagement have a significant influence on the personality traits of the Dark Tetrad?
- How can one generalize the links between the indicators of the cyber socialization engagement, on the one hand, and the properties of the Dark Tetrad of personality, on the other?

Materials and Methods

The conceptual framework of the study forms concepts that operationalize the concepts of the cyber socialization engagement and the Dark Tetrad of personality.

The cyber socialization engagement was understood in accordance with the author's concept, in which cyber socialization is a specific component of the overall socialization process, determined by interactions with actors of various nature (other people, computer programs, virtual immersive environments, artificial intelligence systems, etc.) carried out in cyberspace ([Lenkov and Rubtsova, 2019](#)); herewith the psychological structure of the cyber socialization engagement includes subsystems of constructive and destructive engagement ([Lenkov, Rubtsova and Efremova, 2019](#)). For measurements, we used «The cyber socialization engagement questionnaire», which includes 27 items and two scales: 1) a scale of the constructive engagement in cyber socialization (hereinafter referred to as Constructive engagement), containing 21 items and including three subscales – constructive motivation (Motivation, 6 items), constructive personal position (Position, 7 items), and competence of the cyber socialization (Competence, 8 items); 2) a scale of destructive engagement in cyber socialization (Destructive engagement, 6 items) ([Lenkov, Rubtsova and Efremova, 2019](#)). The reliability of scales and subscales for internal consistency (Cronbach's alpha) was in the study sample (N=424): 0.798 for Constructive engagement, 0.687 for Motivation, 0.733 for Position, 0.724 for Competence, 0.667 for Destructive engagement.

The Dark Tetrad of personality was considered in accordance with the concept by Paulhus et al., operationalized using «The Short Dark Tetrad (SD4) questionnaire» ([Neumann, Jones and Paulhus, 2021](#); [Paulhus et al., 2021](#)), which we used in the Russian translation made in 2020 by the administration of the [PsyTests.org](#) website (URL: <https://psytests.org/darktriad/sd4r.html>, last accessed 2022/03/15). This questionnaire contains 28 items and 4 scales (9 items each) corresponding to the features of the Dark Tetrad: 1) Machiavellianism, 2) narcissism, 3) psychopathy (primary, non-clinical), 4) sadism (domestic, ordinary, everyday). The reliability of the scales was (N=424): 0.457 for Machiavellianism, 0.740 for narcissism, 0.747 for psychopathy, 0.759 for sadism.

Sampling and data processing. The sample included 424 students representing 8 universities from five cities in Russia, aged 17 to 35 (M=22.39, SD=3.938), included: 275 females and 149 males, 252 bachelor students and 172 master students. According to the research procedure, students independently completed Google forms or printed questionnaires. Data collection was carried out between September 2021 and March 2022.

Data analysis was performed using the IBM SPSS Statistics for Windows package (IBM Corp., Armonk, NY, USA). To identify influences, we used one-way ANOVA and effect size η^2 (eta-square) (see [IBM Corp., 2021](#)). The eta-square was also calculated for the results of the Mann-Whitney test according

to the method by Fritz, Morris and Richler (2012).

Results

Descriptive statistics of the cyber socialization engagement and the Dark Tetrad of personality (Table 1) showed that for a number of scales, skewness and kurtosis indicators demonstrate deviations from the normal distribution. In this regard, we used (for generality – for all scales) Spearman's correlations (see Table 2), and for pairwise intergroup comparisons – the Mann-Whitney test (see Table 3). At the same time, in the analysis of influences with the selection of three groups (see Table 4-5), we used analysis of variance (one-way ANOVA), i.e., in fact, a parametric method, which, nevertheless, has a high resistance to noted deviations from normality (see Blanca et al., 2017).

Significant correlations were found between the Dark Tetrad and the cyber socialization engagement: for Machiavellianism, positive correlations with Motivation, Constructive engagement, and Destructive engagement; for narcissism, positive correlations with Motivation, Competence, and Constructive engagement; for psychopathy, as well as for sadism, it is negatively correlated with Position but positively correlated with Destructive engagement (see Table 2).

Table 1
Descriptive statistics (N=424)

Scales	Min/Max	M	SD	Skewness	Kurtosis
Motivation	6/24	13.70	3.803	0.103	-0.453
Position	10/28	21.39	4.020	-0.494	-0.314
Competence	6/32	22.17	5.170	-0.359	-0.262
Constructive engagement	28/81	57.26	9.576	-0.432	0.116
Destructive engagement	0/19	5.33	3.627	0.833	0.776
Machiavellianism	12/32	22.25	3.522	0.005	0.129
Narcissism	7/33	20.92	4.908	-0.209	-0.249
Psychopathy	7/35	16.62	5.392	0.408	-0.080
Sadism	7/31	14.63	5.259	0.702	-0.141

Note. Standard error for skewness is equal 0.119, for kurtosis is equal 0.237.

Table 2
Spearman's correlations (N=424)

Scales	Motivation	Position	Competence	Constructive engagement	Destructive engagement
Machiavellianism	0.112*	0.010	0.095	0.095*	0.178**
Narcissism	0.099*	0.031	0.106*	0.118*	-0.075
Psychopathy	0.042	-0.157**	0.026	-0.022	0.336**
Sadism	-0.021	-0.245**	0.016	-0.092	0.365**

Note. * $p < 0.05$, ** $p < 0.01$

As can be seen from Table 3, females and males did not differ statistically in terms of age and a number of other indicators. At the same time, the expressiveness of a constructive personal position is significantly higher in women, and in men – the competence of cyber socialization, Machiavellianism and sadism. However, these differences are not large: for them, the influence of sex explains from 1.7% to 6.3% of the total variance (see Table 3). Therefore, further, when describing the verification of deterministic relationships, we will present the results for the sample as a whole, noting the specifics that were encountered in the analysis for the male and female groups.

Table 3
Comparison of means for groups of females (n=275) and males (n=149)

Scales	Means for groups		Mann-Whitney test		
	Females	Males	Z	p	η^2
Age	22.53	22.13	-0.746	0.456	0.001
Motivation	13.57	13.94	-1.113	0.266	0.003
Position	21.81	20.62	-2.694	0.007	0.017
Competence	21.56	23.30	-3.626	0.000	0.031
Constructive engagement	56.95	57.85	-1.510	0.131	0.005
Destructive engagement	5.32	5.36	-0.197	0.844	0.000
Machiavellianism	21.77	23.13	-3.539	0.000	0.030
Narcissism	20.97	20.84	-0.270	0.787	0.000
Psychopathy	16.45	16.93	-1.028	0.304	0.002
Sadism	13.63	16.47	-5.154	0.000	0.063

Note. Values $p < 0.05$ are shown in bold.

An analysis of the influence of the Dark Tetrad factors on the cyber socialization engagement on the sample as a whole (see Table 4) and in groups showed that the narcissism factor does not have a significant effect. On the sample as a whole, the Machiavellian factor increases the constructive motivation, but at the same time increases a fundamentally different, alternative indicator – destructive engagement. In groups of females and males the influence of Machiavellianism on constructive motivation was not significant (for females, $F=2.910$, $p=0.056$; for males, $F=1.424$, $p=0.244$), while the effect on destructive engagement was confirmed (for females $F=5.360$, $p=0.005$, $\eta^2=0.038$, for males $F=4.176$, $p=0.017$, $\eta^2=0.054$).

The psychopathy factor on the sample as a whole increases destructive engagement, but in the groups this effect was not significant (for females, $F=0.513$, $p=0.599$; for males, $F=3.028$, $p=0.051$). In addition, for males, in contrast to females and the sample as a whole, psychopathy reduced the constructive personal position ($F=3.821$, $p=0.024$, $\eta^2=0.050$). The sadism factor turned out to be the most loaded in terms of the considered influences: it reduces the constructive personal position and constructive engagement, and also significantly increases the destructive engagement.

Table 4
ANOVA for factors of the Dark Tetrad (N=424)

Dependent variable	ANOVA results			Means		Post hoc test	
	F	p	η^2	Group	M	Groups	p
Factor: Machiavellianism							
Motivation	3.813	0.023	0.018	1	13.34	1-2	0.954
				2	13.46	1-3	0.037
				3	14.57	2-3	0.048
Destructive engagement	8.882	0.000	0.040	1	4.34	1-2	0.014
				2	5.48	1-3	0.000
				3	6.27	2-3	0.169
Factor: psychopathy							
Destructive engagement	19.888	0.000	0.086	1	13.34	1-2	0.954
				2	13.46	1-3	0.037
				3	14.57	2-3	0.048
Factor: sadism							
Position	17.347	0.000	0.076	1	22.65	1-2	0.096
				2	21.68	1-3	0.000
				3	19.65	2-3	0.000
Constructive engagement	7.048	0.001	0.032	1	58.84	1-2	0.695
				2	57.97	1-3	0.003
				3	54.42	2-3	0.009
Destructive engagement	28.663	0.000	0.120	1	3.92	1-2	0.010
				2	5.00	1-3	0.000
				3	7.32	2-3	0.000

Notes. Multiple comparisons were performed according to the Games-Howell post hoc test (see IBM Corp., 2021). The table shows only cases where a significant effect was found ($p < 0.05$). Values $p < 0.05$ are shown in bold. No significant influence was found: the Machiavellianism factor on Position ($F=0.492$, $p=0.612$), Competence ($F=1.556$, $p=0.212$), and Constructive engagement ($F=2.271$, $p=0.104$); narcissism factor – on Motivation ($F=2.669$, $p=0.070$), Position ($F=0.976$, $p=0.378$), Competence ($F=2.192$, $p=0.113$), Constructive engagement ($F=2.682$, $p=0.070$), and Destructive engagement

($F=1.151$, $p=0.317$); psychopathy factor – on Motivation ($F=0.183$, $p=0.833$), Position ($F=2.095$, $p=0.124$), Competence ($F=0.018$, $p=0.982$), and Constructive engagement ($F=0.272$, $p=0.762$); sadism factor – on Motivation ($F=0.470$, $p=0.625$), and Competence ($F=1.776$, $p=0.171$).

Analysis of the influence of the cyber socialization engagement on the features of the Dark Tetrad on the sample as a whole (Table 5) and in groups showed that the factor of constructive motivation does not have a significant effect. The factor of a constructive personal position increases Machiavellianism, but only when moving from low values of the position to medium ones; at the same time, this factor reduces sadism, and also reduces psychopathy on the general sample and in the group of females ($F=3.202$, $p=0.042$, $\eta^2=0.023$), in contrast to the group of males, where such an effect was not significant ($F=2.161$, $p=0.119$). The cyber socialization competence factor on the general sample increases narcissism, but only when moving from low to medium values of competence; at the same time, this effect was not significant in the groups (for females, $F=2.071$, $p=0.128$; for males, $F=1.707$, $p=0.185$).

The factor of constructive engagement on the general sample increases Machiavellianism and narcissism, but in groups this effect was not significant: on Machiavellianism for females $F=2.288$, $p=0.103$; for males $F=2.907$, $p=0.058$; on narcissism for females $F=2.275$, $p=0.078$; for males $F=3.004$, $p=0.053$. The factor of destructive engagement increases Machiavellianism in the general sample (see Table 5) and in females ($F=3.287$, $p=0.039$, $\eta^2=0.024$), in contrast to the group of males, where this effect was not significant ($F=1.564$, $p=0.213$). In addition, both in the general sample and in groups, the factor of destructive engagement greatly increases psychopathy and sadism: on psychopathy for females $F=13.651$, $p=0.000$, $\eta^2=0.091$; for males $F=11.116$, $p=0.000$, $\eta^2=0.132$; on sadism for females $F=16.620$, $p=0.000$, $\eta^2=0.109$; for males $F=10.168$, $p=0.000$, $\eta^2=0.122$.

Table 5
ANOVA for factors of the cyber socialization engagement (N=424)

Dependent variable	ANOVA results			Means		Post hoc test	
	F	p	η^2	Group	M	Groups	p
Factor: Position							
Machiavellianism	5.345	0.005	0.025	1	21.50	1-2	0.004
				2	22.79	1-3	0.386
				3	22.12	2-3	0.260
Psychopathy	5.203	0.006	0.024	1	17.40	1-2	0.656
				2	16.86	1-3	0.007
				3	15.19	2-3	0.029
Sadism	11.400	0.000	0.051	1	16.05	1-2	0.079
				2	14.68	1-3	0.000
				3	12.78	2-3	0.003
Factor: Competence							
Narcissism	3.267	0.039	0.015	1	20.03	1-2	0.168
				2	21.09	1-3	0.029
				3	21.56	2-3	0.680
Factor: Constructive engagement							
Machiavellianism	3.736	0.025	0.017	1	21.45	1-2	0.029
				2	22.48	1-3	0.038
				3	22.58	2-3	0.969
Narcissism	5.118	0.006	0.024	1	19.69	1-2	0.028
				2	21.15	1-3	0.007
				3	21.71	2-3	0.608
Factor: Destructive engagement							
Machiavellianism	4.598	0.011	0.021	1	21.35	1-2	0.048
				2	22.38	1-3	0.008
				3	22.78	2-3	0.568
Psychopathy	24.170	0.000	0.103	1	14.04	1-2	0.000
				2	16.57	1-3	0.000
				3	19.02	2-3	0.000
Sadism	24.754	0.000	0.105	1	12.58	1-2	0.010
				2	14.21	1-3	0.000
				3	17.32	2-3	0.000

Notes as in Table 4, except for the list of cases of no significant effect. No significant influence was found: the Motivation factor – on Machiavellianism ($F=2.687$, $p=0.069$), narcissism ($F=1.754$, $p=0.174$), psychopathy ($F=1.680$, $p=0.188$), and

sadism ($F=0.566$, $p=0.568$); the Position factor on narcissism ($F=0.491$, $p=0.612$); the Competence factor on Machiavellianism ($F=1.977$, $p=0.140$), psychopathy ($F=0.395$, $p=0.674$), and sadism ($F=0.867$, $p=0.421$); the Constructive engagement factor on psychopathy ($F=0.041$, $p=0.960$) and sadism ($F=1.303$, $p=0.273$); the Destructive engagement factor on narcissism ($F=1.262$, $p=0.284$).

Thus, numerous correlational and deterministic links were revealed between the indicators of the cyber socialization engagement and the Dark Tetrad of personality. At the same time, the influence of a number of factors turned out to be ambivalent, and the nature of the identified relationships shows their qualitative heterogeneity.

Discussions

To discuss the results, it is advisable to arrange them, highlighting three qualitatively different types of relationships between the cyber socialization engagement and the Dark Tetrad of personality. Firstly, for a number of indicators, neither correlation nor deterministic relationships were found: Machiavellianism and competence, narcissism and personal position, narcissism and destructive engagement, psychopathy and constructive motivation, psychopathy and competence, psychopathy and destructive engagement, sadism and constructive motivation, sadism and competence.

Secondly, in a number of cases, the presence of only one type of relationship, either correlational or deterministic, was revealed. Thus, narcissism positively correlates with constructive motivation, but there are no significant influences between them. Personal position has a positive effect on Machiavellianism (explaining 2.5% of the variance), but the correlation between them is not significant. Sadism has a negative impact on constructive engagement (3.2%), but the correlation between them is not significant.

Thirdly, for many cases, the presence of both correlation and deterministic relationships was revealed. In the direction of determination, such cases are heterogeneous. In one case, the Dark Tetrad determines the cyber socialization engagement: Machiavellianism and constructive motivation are positively correlated, herewith Machiavellianism increases motivation (1.8%). In a number of cases, the cyber socialization engagement determines the features of the Dark Tetrad: Machiavellianism and destructive engagement correlate positively, while the engagement increases Machiavellianism (1.7%); narcissism and the cyber socialization competence are positively correlated, herewith the competence increasing narcissism (1.5%); narcissism and the constructive engagement are positively correlated, herewith the engagement increasing narcissism (2.4%); psychopathy and the constructive personal position are negatively correlated, herewith the position reduces psychopathy (2.4%). Finally, in a number of cases, indicators of the cyber socialization engagement and the features of the Dark Tetrad are mutually determined: Machiavellianism and destructive engagement correlate positively and have a weak positive effect on each other; psychopathy and destructive engagement are positively correlated, herewith psychopathy increasing such engagement (8.6%), and engagement, in turn, significantly increasing psychopathy (10.3%); sadism and a constructive personal position correlate negatively and have a negative impact on each other (5-8%); sadism and destructive engagement are positively correlated, herewith sadism significantly increasing the destructive engagement (12%), which in turn significantly increases sadism (10.5%).

It is also advisable to order the obtained results in another way – according to the considered features of the Dark Tetrad. So, Machiavellianism positively correlates in the general sample with constructive motivation, constructive engagement, but, at the same time, with destructive engagement (see Table 3). In terms of determination, Machiavellianism increases both constructive motivation (on the sample as a whole) and destructive engagement (on the sample and in groups). Such ambivalence shows the content complexity and heterogeneity of the construct «Machiavellianism». Perhaps, in the operationalization used, the manifestations of Machiavellianism were mixed, related to the ability to achieve one's goals with the help of other people in a way that, on the one hand, is constructive, does not harm them, is directed to their benefit (as, for example, a good teacher, coach, psychotherapist), and on the other – destructive, causing damage to other people, selfishly ignoring their own interests. An indirect confirmation of this is the determination on the part of the cyber socialization engagement (see Table 5): the severity of Machiavellianism is increased by the factors of the constructive personal position (2.5%) and the constructive involvement (1.7%), as well as the factor of the destructive involvement (2.1%).

Narcissism is positively correlated with constructive motivation, competence, and the constructive engagement (see Table 3), which contradicts the fact that narcissism is a dark personality trait. However, in terms of determination, narcissism does not have a significant impact on the indicators of the cyber socialization engagement (see Table 5). It is possible that narcissism and related indicators of cyber

socialization depend on factors common to them that have remained latent. The identification of such factors constitutes another prospect for further research.

Unlike the previous one, psychopathy correlates negatively with a constructive position and positively with destructive engagement (see Table 3), i.e., unequivocally justifies its belonging to dark personality traits. The same role was confirmed in terms of determination: psychopathy increases destructive engagement (significantly in the sample as a whole and almost significantly in the group of males, where $p=0.051$) and reduces the constructive personal position (only in the group of males).

Sadism has also confirmed its dark nature. Sadism correlates negatively with constructive attitude and positively with destructive engagement (see Table 3). In terms of determination, sadism increases destructive engagement and reduces constructive position, and, unlike psychopathy, both on the sample as a whole and in groups.

A direct comparison of the above findings with the results of other authors is difficult, because the study of the connections between the Dark Tetrad and the general cyber socialization engagement in was carried out, apparently, for the first time. At the same time, one can directly compare, for example, the results showing differences in the Dark Tetrad features between males and females. In our study of young university students, males showed higher expression of only two features of the Dark Tetrad – Machiavellianism and sadism. In turn, Paulhus et al. (2021), the authors of the SD4 questionnaire, when developing it, found that the severity of all the features of the Dark Tetrad was higher in males on a sample of students from the University of British Columbia (Canada) representing various ethnic groups (European Heritage, East Asian, and other) (ibid , p. 212). Thus, our results only partly agree with these results. The most likely reason for this seems to us to be cross-cultural differences.

There is also a view point that criticizes the existing Dark Tetrad/Triad questionnaires. For example, Katz et al. (2022) prove that such questionnaires are not invariant with respect to sex, in connection with which the authors propose an alternative approach to the operationalization of the Dark Triad features. However, from our view point, similar claims can be made to any diagnostic tools that reveal differences between males and females. The approach proposed in the cited article has the advantage of simplifying the comparison of mixed samples, but its cost is too high, since the actual differences due to biological sex and gender are lost.

Many of our results agree qualitatively with the results of other authors, but only indirectly, because compared studies considered only particular manifestations of the cyber socialization engagement. We restrict ourselves to only three examples.

Our study found that sadism and a destructive engagement in cyber socialization are interrelated and mutually determined. This result is indirectly consistent with the findings of Greitemeyer and Sagioglou (2017) who, in a longitudinal study, found that sadism and preference for violent video games are interdetermined: everyday sadists are more likely than others to play violent video games, and repeated exposure to violent video games predicts everyday sadism over time.

Our study found that Machiavellianism positively correlates with destructive engagement in cyber socialization and has a positive effect on it. Kircaburun, Jonason and Griffiths (2018) obtained on a sample of Turkish university students that Machiavellianism positively correlates with problematic social media use, cyberbullying, cyberstalking, and cybertrolling and has a positive effect on the last three indicators.

Moor and Anderson (2019) analyzed 26 different studies and concluded that of all the Dark Tetrad traits, psychopathy is most closely associated with antisocial online behaviors, Machiavellianism and everyday sadism are also associated with such behaviors, although to a lesser extent, and narcissism is the least associated. Our study found that for young university students, Machiavellianism, psychopathy and sadism are positively correlated with a destructive engagement in cyber socialization and have a positive effect on it, while narcissism does not show such a connection or such an influence. However, in contrast to the study by Moor and Anderson (2019), the leader in the relationship with a destructive engagement is not psychopathy, but sadism (for psychopathy, $\rho=0.336$, $\eta^2=0.086$; for sadism, $\rho=0.365$, $\eta^2=0.120$). Thus, our results agree only partially with those of Moor and Anderson (2019).

We note also that some of these discrepancies may be due to cross-cultural differences that have been repeatedly identified earlier for the connections between the dark side of the personality and particular aspects of cyber socialization. For example, as Wright et al. (2020) found, cyberbullying is associated with narcissism among Chinese and Indian adolescents, and Machiavellianism among Indian adolescents.

Conclusions

The results obtained answered all the research questions posed and allow us to draw the following general findings:

1. For young university students, the structures of the general engagement in cyber socialization and the Dark Tetrad of personality have a wide range of qualitatively heterogeneous relationships, including three types:

1) complete lack of connections (psychopathy and a constructive motivation, sadism and the cyber socialization competence, etc.);

2) the presence of connections of only one type: for example, sadism reduces a constructive engagement in cyber socialization, although the correlation between them is not significant;

3) the presence of both correlation and determination: for example, the strongest correlation, as well as mutual determination (explaining more than 10% of the variance with influence in each direction) was found between sadism and the destructive engagement in cyber socialization.

2. The determining influence on the cyber socialization engagement is exerted by all the features of the Dark Tetrad, with the exception of narcissism: Machiavellianism increases the destructive engagement, as well as a constructive motivation, which is paradoxical; psychopathy, like sadism, increases the destructive engagement.

3. On the other hand, all indicators of the cyber socialization engagement have a determining influence on the Dark Tetrad features, with the exception of a constructive motivation: a constructive personal position reduces psychopathy and sadism, but slightly increases Machiavellianism; the competence of cyber socialization somewhat increases narcissism; a constructive engagement in cyber socialization increases Machiavellianism and narcissism; a destructive engagement increases the severity of Machiavellianism and, especially strongly, psychopathy and sadism.

4. A number of differences between males and females were revealed in the nature of the relationship between the Dark Tetrad features and indicators of the cyber socialization engagement, as well as in the severity of these features and indicators. For example, Machiavellianism, sadism, and the cyber socialization competence are more pronounced in males, while females have higher constructive personal position.

It is advisable to continue the study, first of all, in the direction of clarifying a number of identified contradictory points: for example, the specifics of the results obtained in groups of males and females, the ambivalent influence of Machiavellianism and a constructive personal position, an unexpected increase in Machiavellianism under the influence of a constructive engagement in cyber socialization, etc.

The practical significance of the study lies in the fact that its results substantiate the need for joint monitoring and taking into account the Dark Tetrad features and indicators of engagement in cyber socialization (both constructive and destructive), which are closely interconnected and can have a significant impact on socialization, personal and professional development of young university students. In particular, the results obtained show that it is hardly effective to prevent the formation of dark personality traits without taking into account the nature and degree of a student engagement in cyber socialization.

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Conflict of interests

The authors declare no conflict of interest.

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