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**THE DARK TRIAD OF PERSONALITY AND WORK EFFICIENCY
OF KINDERGARTEN TEACHERS**

Sergey L. Lenkov (a)*, Nadezhda E. Rubtsova (b), Elena S. Nizamova (c)

*Corresponding author

(a) Institute for Childhood, Family and Education Studies of the Russian Academy of Education, 5/16, Makarenko str., Moscow, 105062, Russia, new_psy@mail.ru

(b) Russian Academy of Education, 8, Pogodinskaya str., Moscow, 119121, Russia

(c) Psychological Institute of the Russian Academy of Education, 9/4, Mokhovaya str., Moscow, 125009, Russia

Abstract

The current study investigates the association between work efficiency indicators and the Dark Triad of personality traits (Machiavellianism, narcissism, and psychopathy) within the professional group of kindergarten teachers. The sample included 129 female Russian kindergarten teachers who completed a Russian-language adaptation of the Short Dark Triad questionnaire (SD3). The work efficiency included 5 indicators evaluated by experts and the total efficiency score (the average of the five indicators). The results obtained with one-way ANOVA showed significant ($p < .05$) association between the Dark Triad traits and some work efficiency indicators. The specificity of these associations for different traits of the Dark Triad was found to be manifested in two aspects: (1) sets of vulnerable efficiency indicators, and (2) the type of association in relation to the level of a trait. Thus, high Machiavellianism was associated with lower scores for the efficiency indicator "Professional competence", whereas both high and low psychopathy were associated with reduced scores for the indicator "Functional completeness". Finally, unlike both of these cases, narcissism had an ambiguous effect: all four efficiency indicators were sensitive to its effects (functional completeness, labor creativity, professional motivation, total efficiency), decreasing with both low and high narcissism. This result is consistent with an unfolding discussion about the special role of narcissism within the Dark Triad. The results of the study suggest certain requirements to a kindergarten teacher's personality, namely low or medium Machiavellianism, medium narcissism and low psychopathy.

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Keywords: The Dark Triad of personality traits, Machiavellianism, Narcissism, Psychopathy, Kindergarten teachers, Work efficiency.



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1. Introduction

For many years Machiavellianism, narcissism, and psychopathy have been studied in psychology as important but unrelated personality traits. However, Paulhus and Williams (2002) proposed a theoretical model of the Dark Triad, in which these traits are considered as a single complex consisting of complementary constructs that contribute to various levels of socially undesirable behavior. From that moment until the present time, research of the Dark Triad has been developing very intensively (e.g., DeShong, Ashley, Lengel, Meyer, & Mullins-Sweatt, 2017; Furnham, Richards, & Paulhus, 2013).

On the other hand, in Russia similar research within the framework of a holistic concept of the Dark Triad has only started recently. An important step in this direction was the creation of Russian-language adaptations of two well-known questionnaires for measuring level of the Dark Triad traits:

- "The Dirty Dozen" (Jonason & Webster, 2010), adapted by Kornilova, Kornilov, Chumakova, and Talmach (2015);
- "The Short Dark Triad (SD3)" (Jones & Paulhus, 2014), adapted by Egorova, Sitnikova, and Parshikova (2015), which is used in our study.

These questionnaires have allowed to obtain information on the influence of the Dark Triad traits on social behavior (e.g., Egorova, Sitnikova, Parshikova, & Chertkova, 2016; Kornilova & Chumakova, 2016). At the same time, research on the the effect of these traits directly on work efficiency on the Russian sample could not be found.

2. Problem Statement

The study of preschool education currently has received considerable attention (e.g., Bassok, Latham, & Rorem, 2016), namely in the framework of the Russian educational reforms. However, the studies of the kindergarten teacher personality are rare in comparison to, for example, studies of required educational skills (e.g., Abdul-Haq, 2014); and they are focused primarily on traditional models of personality. For instance, Ciceu, Manolescu, and Neagu (2016) revealed distinctive personality characteristics of kindergarten teachers compared to a group of other professionals in the framework of the Big Five model; Wong and Li-fang (2013) analyzed the personality of the kindergarten teacher based on Myers-Briggs typology, etc. As a result, occupational requirements of a kindergarten teacher personality were formulated based solely on positive personal qualities (see, e.g., Araujo, Carneiro, Cruz-Aguayo, & Schady, 2016).

At the same time, to date, there is abundant evidence that the Dark Triad traits might influence various aspects of social behavior (e.g., Carton & Egan, 2017) and professional activities including its efficiency, style, counterproductive behavior at work, etc. (e.g., Cohen, 2016; Nübold et al., 2017; O'Boyle, Forsyth, Banks, & McDaniel, 2012; Spain, Harms, & LeBreton, 2014). However, the literature review shows that such studies do not yet include the area of professional activity of kindergarten teachers and in fact have not been conducted neither in Russia nor in other countries. Herewith they may give important results for the improvement of kindergarten teachers' work and preschool education in general.

We assumed that the Dark Triad might play a great role in the professional activity of kindergarten teachers in the same way as in other professions. An additional rationale for our hypothesis is the fact that many studies showed the influence of the Big Five personality traits on the efficiency of various professional activities including those of kindergarten teachers (e.g., Corcoran & O'Flaherty, 2016). On the other hand, associations of the Dark Triad and the Big Five personality traits were found (e.g., Huang & Liang, 2015; Kornilova & Chumakova, 2016; Kowalski, Vernon, & Schermer, 2016).

Thus, the current research goal was to identify and analyze the association of the Dark triad personality traits and the work efficiency of kindergarten teachers.

3. Research Questions

This study was designed to answer the following questions:

(1) What levels of the Dark Triad personality traits (Machiavellianism, narcissism, psychopathy) characterize a professional group of kindergarten teachers in modern Russia?

(2) Are any Dark Triad traits associated with work efficiency of kindergarten teachers?

(3) Is there evidence of differences in the association of these traits with work efficiency in kindergarten teachers?

(4) What should be the general requirements to the level of the Dark Triad personality traits that are appropriate in terms of professional selection and training of kindergarten teachers?

4. Purpose of the Study

The main purpose of the study was to test the possible association of the Dark Triad personality traits with the work efficiency of kindergarten teachers in modern Russia. In addition, it was expected to reveal the specifics of these associations (if any) for different traits of the Dark Triad and to justify appropriate application for the development of preschool education system.

5. Research Methods

5.1. Conceptual framework

The Dark Triad of personality. In the study, the Dark Triad of personality is considered in accordance with the theoretical model in which the Dark Triad of personality is understood as a single complex, causing different levels of socially undesirable behavior and includes three interrelated, yet relatively independent traits – Machiavellianism, narcissism, and psychopathy (Paulhus & Williams, 2002; Jones & Paulhus, 2014).

The work of kindergarten teachers. This work is understood as a qualified professional activity aimed at the development and education of preschool children within the educational conditions and programs provided by preschool educational institutions. However, certain work efficiency indicators of kindergarten teachers are still debatable (e.g., Adewale, 2013; Araujo, Carneiro, Cruz-Aguayo, & Schady,

2016; Bassok, Latham, & Rorem, 2016). In this regard, the current study used expert assessment by professionals with extensive experience in the organization and execution of kindergarten activities. Moreover, the chosen indicators were not profession-specific in order to be able to compare various professional groups in the future.

5.2. Participants and procedure

Kindergarten teachers were invited to participate in this study aimed at studying the influence of personality traits on the effectiveness of professional activity. All kindergarten teachers who agreed to participate in the study were selected. Kindergartens in which the study was conducted were located in several regions of Russia (Moscow, Saint-Petersburg, Tver, Ulyanovsk and others).

After excluding cases containing missing data, the final sample consisted of 129 kindergarten teachers – all female, aged from 19 to 58 years ($M = 32.15$, $SD = 10.47$), work experience as a kindergarten teacher ranged from 0,3 to 33 years ($M = 7.94$, $SD = 8.77$). In addition, the study involved experts, who were highly qualified employees of the kindergartens where the study was conducted and performed expert evaluation of the work efficiency indicators. All research participants were volunteers. In accordance with ethics requirements, written informed consent was obtained from all participants.

5.3. The measured variables and the research design

In accordance with the main purpose of the study, its design was aimed primarily at identifying the association of the Dark Triad traits of personality with the work efficiency in kindergarten teachers. In this regard, we used three groups of variables:

- independent variables – – the traits of the Dark Triad considered as factors and in this respect associated with groups divided by levels of each factor;
- dependent variables – indicators of work efficiency of kindergarten teachers;
- other controlled variables – age and work experience.

The description of all variables and groups is given in Table 01.

Table 01. Variables and groups

Variable or group	Description
<i>Independent variables (traits of the Dark Triad)</i>	
Machiavellianism	Trait «Machiavellianism» from the Dark Triad of personality
Narcissism	Trait «narcissism» from the Dark Triad of personality
Psychopathy	Trait «psychopathy» from the Dark Triad of personality
<i>Groups divided by levels of each independent variable</i>	
Mac 1, Mac 2, Mac 3	corresponding to low, medium and high levels of Machiavellianism respectively
Nar 1, Nar 2, Nar 3	corresponding to low, medium and high levels of narcissism respectively
Psy 1, Psy 2, Psy 3	corresponding to low, medium and high levels of psychopathy respectively
<i>Dependent variables (indicators of the work efficiency)</i>	
<i>Efl</i>	<i>Completeness</i> – completeness of execution of functional responsibilities and job

	discipline
<i>Ef2</i>	<i>Creativity</i> – creativity at work
<i>Ef3</i>	<i>Jointness</i> – jointness of work, the effectiveness of professional interaction with colleagues and managers
<i>Ef4</i>	<i>Competence</i> – professional competence, the practical application of professional knowledge, skills and experience
<i>Ef5</i>	<i>Motivation</i> – internal work motivation, the practical expression of interest to the current work as a kindergarten teacher
<i>TE</i>	<i>Total efficiency</i> – total work efficiency, defined as the arithmetic average of the five indicators (<i>Ef1–Ef5</i>)
Other controlled variables	
Age	Age (years)
<i>WE</i>	<i>Work experience</i> – specific professional experience, i.e., work experience as a kindergarten teacher (years)

5.4. The measured variables and the research design

The Dark Triad. The personality traits of the Dark Triad were assessed using the "Short Dark Triad (SD3)" questionnaire (Jones & Paulhus, 2014) in its Russian-language adaptation by Egorova, Sitnikova, and Parshikova (2015). This adapted questionnaire:

- includes 27 items (9 items per subscale – Machiavellianism, narcissism, and psychopathy) which include short sentences that describe the behavior characteristic of the corresponding personality traits;
- provides for the evaluation of each statement on a 5-point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*);
- shows satisfactory psychometric properties; in particular, for Machiavellianism, narcissism, and psychopathy the Cronbach's alpha was equal to .74, .72, .70 respectively (Egorova, Sitnikova, & Parshikova, 2015).

The efficiency of the work. The work efficiency indicators of kindergarten teachers were assessed by experts on a 5-point Likert scale (from 1 = *very low* to 5 = *very high*). The number of experts evaluating the work of one kindergarten teacher ranged from 3 to 8. Expert ratings for each indicator were averaged. We used five indicators and the total score (see Table 01).

Age and work experience. Age was measured as the number of full years at the time of the study. The work experience (see Table 01) was also measured as the number of full years with one decimal digit (if work experience was less than one year).

5.5. Data analysis

The main method of data analysis used to identify the association of the Dark Triad personality traits on work efficiency was a one-way analysis of variance (ANOVA). In addition, we used Pearson correlations and a number of well-known methods of statistical hypothesis testing (Mann-Whitney test etc.).

6. Findings

6.1. The level of the Dark Triad traits

Before the ANOVA, the whole sample ($N = 129$) was divided into three groups corresponding to low, medium and high levels of each Dark Triad trait based on the frequency distribution. Descriptive statistics for the selected groups and the whole sample are shown in Table 02 for the Dark Triad traits, age and work experience and in Table 03 for work efficiency indicators.

Table 02. Descriptive statistics for the Dark Triad traits, age and work experience

Group	n	Mean (SD)				
		Age	WE	Mac	Nar	Psy
Mac 1	41	35.90 (11.52)	10.99 (9.93)	2.30 (0.37)	2.77 (0.45)	1.73 (0.39)
Mac 2	46	29.50 (7.69)	5.63 (5.49)	3.09 (0.09)	2.82 (0.53)	1.95 (0.45)
Mac 3	42	31.38 (11.19)	7.50 (9.78)	3.44 (0.18)	3.07 (0.37)	2.19 (0.36)
Nar 1	42	33.10 (9.72)	8.40 (8.71)	2.76 (0.60)	2.35 (0.34)	1.90 (0.41)
Nar 2	44	32.05 (9.59)	8.96 (9.28)	3.01 (0.49)	2.94 (0.08)	1.96 (0.41)
Nar 3	43	31.33 (12.09)	6.45 (8.29)	3.09 (0.44)	3.36 (0.22)	2.01 (0.50)
Psy 1	42	34.07 (9.14)	9.47 (7.45)	2.66 (0.56)	2.84 (0.50)	1.46 (0.15)
Psy 2	51	32.92 (11.48)	8.13 (10.42)	3.03 (0.48)	2.88 (0.52)	1.97 (0.12)
Psy 3	36	28.81 (9.89)	5.90 (7.36)	3.19 (0.39)	2.95 (0.38)	2.51 (0.22)
Overall sample	$N = 129$	32.15 (10.47)	7.94 (8.77)	2.96 (0.53)	2.89 (0.48)	1.96 (0.44)

Note. WE – work experience, Mac – Machiavellianism, Nar – narcissism, Psy – psychopathy; description of the groups and variables is presented in Table 01.

Table 03. Descriptive statistics for the work efficiency indicators

Group	Mean (SD)					
	Completeness (Ef1)	Creativity (Ef2)	Jointness (Ef3)	Competence (Ef4)	Motivation (Ef5)	Total efficiency (TE)
Mac 1	4.25 (0.64)	3.78 (0.89)	4.02 (0.79)	3.51 (0.96)	3.79 (0.79)	3.87 (0.61)
Mac 2	4.24 (0.64)	3.90 (0.83)	3.76 (1.07)	3.65 (0.91)	3.94 (0.76)	3.90 (0.58)
Mac 3	4.17 (0.59)	3.72 (0.69)	3.69 (0.84)	3.05 (0.69)	3.67 (0.71)	3.66 (0.50)
Nar 1	4.05 (0.66)	3.61 (0.86)	3.69 (0.84)	3.28 (1.00)	3.74 (0.72)	3.67 (0.58)
Nar 2	4.53 (0.47)	4.11 (0.77)	3.99 (1.01)	3.63 (0.64)	4.04 (0.77)	4.06 (0.46)
Nar 3	4.08 (0.62)	3.68 (0.70)	3.76 (0.87)	3.31 (0.98)	3.63 (0.73)	3.69 (0.58)
Psy 1	4.45 (0.53)	3.99 (0.75)	3.84 (0.89)	3.67 (0.81)	3.97 (0.71)	3.99 (0.56)
Psy 2	4.07 (0.60)	3.73 (0.83)	3.84 (0.99)	3.33 (0.94)	3.80 (0.73)	3.75 (0.57)
Psy 3	4.17 (0.69)	3.70 (0.82)	3.75 (0.86)	3.23 (0.87)	3.62 (0.83)	3.69 (0.54)
Overall sample	4.22 (0.62)	3.80 (0.81)	3.82 (0.92)	3.41 (0.89)	3.81 (0.76)	3.81 (0.57)

Note. Description of the groups and variables is presented in Table 01.

For most of the studied variables and groups, the normality of distribution was confirmed by the test of Kolmogorov-Smirnov and/or Shapiro-Wilk test. The remaining cases allow us to conclude only relatively small deviations from normality, that based on evaluation of the ratio of skewness and kurtosis

to standard errors (see, e.g., Field, 2009, p. 139). At the same time, one-way ANOVA is very robust to violations of normality (e.g., Field, 2009, p. 360), which allowed us to use this method (see section 6.3).

For the comparison of the results of the Dark Triad levels, we failed to find any relevant data obtained on a sample of kindergarten teachers. Thus, we analyzed several studies conducted on professionally non-specific female samples (see Table 04).

Table 04. The comparison of the Dark Triad traits levels across studies

Study	Sample	Trait	Mean (SD)	p
Present study	Female, Kindergarten teachers, <i>N</i> = 129	Machiavellianism	2.96 (0.53)	-
		Narcissism	2.89 (0.48)	-
		Psychopathy	1.96 (0.44)	-
Egorova, Sitnikova, and Parshikova (2015)	Female, Russian population, <i>N</i> = 334	Machiavellianism	3.13 (0.70)	.013*
		Narcissism	2.73 (0.76)	.026*
		Psychopathy	1.96 (0.63)	1.000
Study 1 by Jones and Paulhus (2014)	Female from Amazon's Mechanical Turk (MTurk); country of origin was restricted to Canada and the United States;	Machiavellianism	3.27 (0.56)	.000**
		Narcissism	2.78 (0.48)	.037*
		Psychopathy	1.96 (0.57)	1.000
Study 2 by Jones and Paulhus (2014)	Study 1 <i>N</i> = 230 Study 2 <i>N</i> = 128	Machiavellianism	3.03 (0.53)	.289
		Narcissism	2.77 (0.59)	.074
		Psychopathy	2.00 (0.54)	.516
Study 3 by Jones and Paulhus (2014)	Study 3 <i>N</i> = 133	Machiavellianism	2.91 (0.53)	.445
		Narcissism	2.64 (0.56)	.000**
		Psychopathy	2.04 (0.57)	.206
Study 1 by Jonason, Wee, Li, and Jackson (2014)	Female Americans from MTurk, <i>N</i> = 182	Machiavellianism	2.88 (0.56)	.204
		Narcissism	2.60 (0.57)	.000**
		Psychopathy	1.84 (0.60)	.054

Note. *p* – the significance of the differences in the mean values with the results of present study.

* *p* < .05. ** *p* < .01.

The mean value for Machiavellianism obtained in our study was significantly lower compared to the one reported by Egorova, Sitnikova, and Parshikova (2015) and by Jones and Paulhus (2014) in Study 1, but did not differ from the mean values obtained by Jones and Paulhus in Study 2 and Study 3, and by Jonason, Wee, Li, and Jackson (2014). In turn, the mean value for narcissism in the current study was significantly higher compared to the one reported by Egorova et al. (2015), Jonason et al. (2014), and Jones and Paulhus in Study 1 and Study 3, but did not differ from the mean obtained in Study 2 by Jones and Paulhus. Finally, the mean value for psychopathy did not differ from the results of the four studies used for comparison (see Table 04).

Thus, based on these results we suggest that Russian female kindergarten teachers:

- have lower levels of Machiavellianism than on average in the Russian population, and lower or equal level in comparison to various foreign female samples;

- have higher levels of narcissism than on average in the Russian population, and a higher or equal level in comparison to various foreign samples of women;
- show the same levels of psychopathy as Russian women on average, as well as women in the USA and Canada.

It should be noted that the results on the level of narcissism were quite unexpected and might be related to an ambivalent role of narcissism in the professional activities of kindergarten teachers, we shall return to this in the discussion (section 6.5). Another surprising result was on the levels of psychopathy: we expected that the professionals working with children would have shown lower levels than professionally non-specific groups.

6.2. Correlation between measures

We used the linear Pearson's correlation coefficient to evaluate correlations between the variables. Although due to the above noted deviations from normality it would be more valid to use the nonparametric Spearman's correlation in some cases, we used the Pearson's correlation to compare our results with other researchers. Table 05 presents the matrix of intercorrelations for the Dark Triad traits, work efficiency indicators, age and work experience.

Table 05. Pearson correlation matrix ($N = 129$)

	Age	WE	Mac	Nar	Psy	Ef1	Ef2	Ef3	Ef4	Ef5	TE
Age	-	.82**	-.12	-.14	-.17*	.23*	.18*	-.02	.39**	.33**	.30**
WE		-	-.10	-.14	-.14	.34**	.19*	-.04	.31**	.33**	.30**
Mac			-	.27**	.45**	.02	.05	-.10	-.05	.07	-.01
Nar				-	.11	.01	-.01	.09	-.06	-.04	.00
Psy					-	-.20*	-.14	-.03	-.17	-.17	-.19*
Ef1						-	.60**	.02	.57**	.59**	.73**
Ef2							-	.12	.59**	.66**	.81**
Ef3								-	.09	.16	.43**
Ef4									-	.62**	.80**
Ef5										-	.83**

Note. WE – work experience, Mac – Machiavellianism, Nar – narcissism, Psy – psychopathy, Ef1 – Completeness, Ef2 – Creativity, Ef3 – Jointness, Ef4 – Competence, Ef5 – Motivation, TE – Total efficiency; description of the variables is presented in Table 01.

* $p < 0.05$ level (2-tailed). ** $p < 0.01$ level (2-tailed).

For comparison of the correlations of the Dark Triad traits obtained in our study, we were unable to find any relevant data neither for kindergarten teachers nor for the female samples in general. Therefore, the results from studies using mixed sample (men and women) were compared:

- Egorova, Sitnikova, and Parshikova (2015) on a mixed Russian sample ($N = 571$);
- Study 2 ($N = 279$) and Study 3 ($N = 230$) by Jones and Paulhus (2014) on a sample of men and women from Canada and the United States;

- Study 1 ($N = 422$) by Jonason, Wee, Li, and Jackson (2014) on a sample of men and women from the USA.

We found a significant correlation between Machiavellianism and narcissism (see Table 05), which does not differ ($p > 0.5$) from $r = .31$ reported by Egorova, Sitnikova, and Parshikova (2015) and $r = .16$ reported by Jonason, Wee, Li, and Jackson (2014), nor from the results of Study 2 ($r = .22$) and Study 3 ($r = .29$) by Jones and Paulhus (2014). The significant correlation found between Machiavellianism and psychopathy (see Table 05) did not differ significantly from $r = .35$ reported by Egorova et al. (2015), $r = .47$ from Study 1 of Jonason et al., (2014), nor from the results of Study 2 ($r = .40$) and Study 3 ($r = .47$) by Jones and Paulhus. At the same time, the non-significant correlation between narcissism and psychopathy (see Table 05) did not differ ($p > .05$) from $r = .31$ from Study 2 by Jones and Paulhus, but was significantly lower than the correlations reported by Egorova et al. ($r = .42$, $p < .001$), from Study 3 by Jones and Paulhus ($r = .42$, $p < .01$), and reported by Jonason et al. ($r = .32$, $p < .05$).

Based on these results, we suggest that for the sample of Russian female kindergarten teachers:

- the associations of Machiavellianism and narcissism, as well as Machiavellianism and psychopathy, do not differ from those characteristic for the Russian population (including both men and women), and mixed samples from Canada and the United States;
- in contrast, the correlation between narcissism and psychopathy is significantly lower compared with that characteristic for the Russian population, and is significantly lower or statistically not different from samples that include men and women from Canada and the United States.

The comparison was also performed among the correlations of the Dark Triad traits with age. In the present study, the correlations of Machiavellianism and narcissism with age were non-significant, unlike the correlation of psychopathy with age, which was significant and negative (see Table 05). None of these correlations were statistically different from the correlations of the Dark Triad traits with age reported by Egorova, Sitnikova, and Parshikova (2015) on the sample of Russian men and women: Machiavellianism ($r = -.009$), narcissism ($r = -.026$) and psychopathy ($r = -.031$).

It should also be noted that the both age and work experience were found to be positively correlated with all work efficiency indicators, except Jointness ($Ef3$, see Table 05). This indicator might be to a greater extent mediated by relatively stable in relation to age and work experience personal characteristics such as extraversion and its components (sociability etc.).

We did not find any statistically significant correlations of Machiavellianism and narcissism with the work efficiency indicators. In contrast, psychopathy correlated negatively with Completeness ($Ef1$) and Total efficiency (TE , see Table 05). However, these correlations are very weak, this might be the result of a complex, nonlinear influence of psychopathy on the work efficiency, which is indirectly confirmed by the results of a one-way ANOVA (see section 6.3 and Table 06).

6.3. The results of ANOVA

Table 06 presents the results of a one-way ANOVA meant to test the differences in work efficiency among the groups formed by the levels of the Dark Triad traits (high, medium, low). For all cases with a significant effect, the Levene's test showed homogeneity of variances, except for Competence (*Ef4*) and groups with different levels of Machiavellianism (Mac 1, 2, and 3) with $p = .48$ (see Table 05). However, the violation of homogeneity of variances in this case was small, and an additional check using the Welch's test (Welch's robust test of equality of means) confirmed the significance of differences between groups ($p = .002$).

Table 06. Results of one-way ANOVA and post hoc tests

Factor	Dependent variable	Levene's test p	ANOVA statistics				Bonferroni's test		
			$F(2, 126)$	MSE	p	η^2	Groups	p	
Mac	<i>Ef1</i>	.442	0.206	0,393	.814	.003	-	-	
	<i>Ef2</i>	.098	0.535	0,652	.587	.006	-	-	
	<i>Ef3</i>	.030*	1.506	0,833	.226	.023	-	-	
	<i>Ef4</i>	.048*	5.693	0,744	.004**	.083	1-2	1.000	
							1-3	.051	
						2-3	.004**		
	<i>Ef5</i>	.796	1.424	0,568	.244	.022	-	-	
	<i>TE</i>	.405	2.280	0,317	.106	.035	-	-	
Nar	<i>Ef1</i>	.065	8.991	0,345	.000**	.125	1-2	.001**	
							1-3	1.000	
							2-3	.001**	
		<i>Ef2</i>	.208	5.271	0,607	.006**	.077	1-2	.011*
							1-3	1,000	
							2-3	.031*	
		<i>Ef3</i>	.680	1.334	0,835	.267	.021	-	-
		<i>Ef4</i>	.002**	2.131	0,785	.123	.033	-	-
		<i>Ef5</i>	.972	3.560	0,549	.031*	.053	1-2	.174
								1-3	1.000
								2-3	.035*
		<i>TE</i>	.108	7.024	0,296	.001**	.100	1-2	.004**
								1-3	1.000
								2-3	.006**
	Psy	<i>Ef1</i>	.354	4.785	0,367	.010*	.071	1-2	.009**
							1-3	.125	
							2-3	1,000	
		<i>Ef2</i>	.462	1.631	0,641	.200	.025	-	-
		<i>Ef3</i>	.706	0.116	0,851	.891	.002	-	-
	<i>Ef4</i>	.556	2.783	0,777	.086	.042	-	-	

	<i>Ef5</i>	.423	2.130	0,562	.123	.033	-	-
	<i>TE</i>	.907	3.101	0,313	.048*	.047	1-2	.143
							1-3	.071
							2-3	1.000

Note. Mac – Machiavellianism, Nar – narcissism, Psy – psychopathy, *Ef1* – Completeness, *Ef2* – Creativity, *Ef3* – Jointness, *Ef4* – Competence, *Ef5* – Motivation, *TE* – Total efficiency; description of the Dark Triad traits and work efficiency indicators (*Ef1–Ef5*, *TE*) are presented in Table 01; Levene’s test – Levene’s test of homogeneity of variances; *p* – the significance (2-tailed); ANOVA statistics – statistics of one-way ANOVA; *F*(2, 126) – Fisher statistics, where the number of degrees of freedom (*df*) between groups and within groups were 2 and 126 respectively; the Post Hoc tests were performed only for cases when ANOVA showed a significant differences; Bonferroni’s test – Bonferroni’s post hoc test (multiple comparisons); in the Post Hoc tests compare groups according to the level of the factor, description of these groups presented in Tables 01 and 02.

* *p* < 0.05 level (2-tailed). ** *p* < 0.01 level (2-tailed).

Table 06 also presents the results of the post hoc tests with the Bonferroni's test. After correction for multiple comparisons, the differences remain statistically significant, except for the case of psychopathy (Psy) and Total efficiency (*TE*): the differences between the groups were only significant at *p* =.071.

Thus, we have to admit that the association between psychopathy and total work efficiency, which was originally identified by ANOVA, was not confirmed. However, we have found a number of statistically significant associations between Dark Triad traits and indicators of the work efficiency (see Table 06), which will be discussed in more detail in section 6.4.

6.4. The differences in the associations between the Dark Triad traits and work efficiency

The results of our study show that the Dark Triad traits are significantly associated with the work efficiency. At the same time, these associations are specific for different traits, and these differences are manifested in two aspects.

First, each Dark Triad trait is associated with a particular set of the work efficiency indicators. Machiavellianism was only related to Competence (*Ef4*), psychopathy – only to Completeness (*Ef1*), and narcissism – to four indicators: Completeness (*Ef1*), Creativity (*Ef2*), Motivation (*Ef5*) and Total efficiency (*TE*) (see Table 06).

Secondly, the type of the association differs among the Dark Triad traits. Thus, a higher level of Machiavellianism was associated with lower levels of Competence (*Ef4*), but was only significant for the transition from medium to high level when the mean value of Competence dropped from 3.65 to 3.05 (see Table 03). When we merged the groups with low and medium Machiavellianism, the mean value of Competence in the combined group (*M* = 3.58, *n* = 87) remained higher compared to the high-level group (*M* = 3.05, *n* = 42) at *p* < .01 (here and further we are talking about the asymptotic 2-tailed significance from the Mann-Whitney test). Thus, the association of Machiavellianism and work efficiency cannot be called linear: rather, it is a specific quasilinear effect, which can be called "delayed quasilinear".

In turn, the association of narcissism with four efficiency indicators might be described as an inverted U-shaped curve. This pattern of association is clearly evident for the three indicators of efficiency (see Tables 03 and 06):

- Completeness (*Ef1*) reaches a maximum at the medium level of narcissism ($M = 4.53$) and drops significantly ($p < .01$) with low ($M = 4.05$) and high narcissism ($M = 4.08$);
- Creativity (*Ef2*) reaches a maximum at the medium level of narcissism ($M = 4.11$) and drops significantly ($p < .01$) with low ($M = 3.61$) and high narcissism ($M = 3.68$);
- Total efficiency (*TE*) reaches a maximum at the medium level of narcissism ($M = 4.06$) and drops significantly ($p < .01$) with low ($M = 3.67$) and high narcissism ($M = 3.69$).

The association of Motivation (*Ef5*) with narcissism at the first glance has a different pattern close to the abovementioned quasilinear association with Machiavellianism. In fact, the relationship between narcissism and Motivation corresponds more to the inverted U-shaped curve and is significant ($p < .05$) only at the transition from medium to high narcissism with mean of Motivation decreasing from 4.04 to 3.63 (see Tables 03 and 06). However, when we merged the low and medium narcissism groups, the mean of Motivation in the combined group ($M = 3.74$, $n = 86$) was not statistically differ ($p > .05$) from the high-level group ($M = 3.63$, $n=43$) at $p < .01$. Thus, the association of narcissism and Motivation rather shows a pattern of an inverted U-shaped curve.

Psychopathy was found to be only associated with Completeness (*Ef1*) showing a quasilinear pattern like in the case of Machiavellianism. However, there is a significant difference between the quasilinear patterns of associations of Machiavellianism and psychopathy with work efficiency: the nonlinear effect of Machiavellianism, as shown above, can be called "delayed quasilinear" (it is not present at the transition from low to medium level and is manifested only at the transition from medium to high levels) whereas the effect of psychopathy might be called "constrained quasilinear". While there were significant differences between low and medium psychopathy ($p < .01$) with the mean of Completeness decreasing from 4.45 to 4.07, no differences were found between the medium and high-level groups ($p > .05$), i.e. as if the decrease stops (see Tables 03 and 06). When we merged the medium and high level groups, the mean of Completeness in the combined group ($M = 4.11$, $n = 87$) was significantly lower ($p < .01$) than in the low-level group ($M = 4.45$, $n = 42$). This confirms the specific quasilinear nature of the association of psychopathy with Completeness.

Thus, we identified three different types of nonlinear associations of the Dark Triad traits and work efficiency of kindergarten teachers:

- nonlinear pattern corresponding to an inverted U-shaped curve (characteristic of narcissism);
- "delayed quasilinear" pattern (characteristic of Machiavellianism);
- "constrained quasilinear" pattern (characteristic of psychopathy).

6.5. The ambivalent role of narcissism

The ambiguous role of the Dark Triad traits was noted by many researchers in terms of impact on the success of professional activities, and in other contexts (see, e.g., Egorova, Sitnikova, Parshikova, &

Chertkova, 2016). In this respect, the ambivalence of narcissism found in our study contributes to the overall discussion about the particular role of this trait within the Dark Triad, which has been unfolding in recent years (see, e.g., Kowalski, Vernon, & Schermer, 2016). For example, on the one hand, narcissism is associated with low empathy and difficulties in identifying emotions (Jonason & Krause, 2013), and on the other hand, it is positively associated with emotional intelligence (Petrides, Pérez-González, & Furnham, as cited in Kornilova & Chumakova, 2016), success in interpersonal relationships (Foster & Campbell, as cited in Kornilova & Chumakova, 2016; Morf & Rhodewalt, as cited in Nübold et al., 2017) and morality in individuals with low self-esteem (Zuo, Wang, Wang, & Zhao, 2016). Some authors point directly to the ambivalent role of narcissism. For example, Kornilova and Chumakova (2016) revealed a positive correlation of narcissism with extraversion and negative emotional stability.

Our study also revealed an ambiguous association of narcissism and work efficiency of kindergarten teachers: both high and low levels of narcissism are associated with a decrease in the four indicators of work efficiency, with the medium level being optimal (see section 6.4).

The first possible reason for this ambivalence lies in the specifics of this professional activity. The activity of the kindergarten teacher is largely demonstrative and relies on the external evaluation of outsiders – children, parents, colleagues, managers. There is often a need for a collaborative educational effect through visual, behavioral demonstration of referential reaction patterns. In this respect this activity is "inherently narcissistic", starting with the fact that for the overwhelming majority of actions the teacher is being watched by children.

It is also impossible to completely eliminate such a cause as shortcomings of the operationalization of the construct of narcissism in the Short Dark Triad (SD3) questionnaire, in which, for example, disagreement of a participant with the fact that he is "an average person" contributes to the level of narcissism (see Jones & Paulhus, 2014, p, 38). However, this disagreement can hardly be considered as an adequate correlate of extreme selfishness, self-love and self-admiration because it can be caused by other reasons: for example, very low self-esteem (a person considers himself a loser etc.).

At the same time, Kornilova and Chumakova (2016) come to the conclusion about the ambivalent role of narcissism after conducting empirical research using another popular questionnaire "The Dirty Dozen". Therefore, the problem may lie not in the shortcomings of specific questionnaire, but have a more general character.

Thus, the ambiguous role of narcissism is consistent with the findings of several other studies in which this personality trait also seems to be ambivalent. The results of our study show that, within the existing operationalization of the construct of narcissism, it might be beneficial leading to improvement of some performance indicators.

7. Conclusion

The study suggests that the Dark Triad personality traits are associated with the work efficiency of kindergarten teachers. At the same time, for different traits (Machiavellianism, narcissism, and psychopathy), these associations were different, and manifested in two aspects: 1) associations with particular performance indicators; 2) the nature of the associations in relation to the levels of expression of the Dark Triad traits. Thus, the high level of Machiavellianism was associated with lower professional

competence (application of professional knowledge and skills). High and medium levels of psychopathy were related to lower functional completeness of professional duties. In contrast, narcissism has an ambiguous role. Both low and high narcissism were associated with lower functional completeness, creativity of work, professional motivation and total efficiency of professional activity.

These facts should be taken into consideration in terms of professional selection and professional training of kindergarten teachers. In this respect the general requirements to the personality of a kindergarten teacher include low or medium level of Machiavellianism, medium level of narcissism and low levels of psychopathy.

In general, the obtained results on the association of the Dark Triad traits with work efficiency indicators of kindergarten teachers are largely new as no other studies were found for neither this nor other professional groups.

It should be also noted that the results of the study draw attention to some issues that remain open. For example, the levels of psychopathy among the kindergarten teachers in the current study corresponding to the values obtained on the Russian population as well as women in the US and Canada (see section 6.1), makes us think about its cause:

- do women from Russia, the USA and Canada used for comparison just have good characteristics of mental health and personal development for some reason?
- had the relatively small sample size not allowed us to identify small differences that exist?
- or is it (and this case, in contrast to the previous two, is alarming) the lack of psychological professional selection when hiring kindergarten teachers, as well appropriate professional training?

In addition, some results of this study (e.g., the results of the analysis on the merged groups, similar to the one described in section 6.4) suggest that for the professional group of kindergarten teachers the Dark Triad traits should be considered as constellations, complexes of symptoms having a consolidated impact on certain work efficiency indicators, rather than as independent traits. The potential constellations for different efficiency indicators could be, for example, the whole Triad or dyads of different Dark Triad traits, that could be also aggregated with other factors such as age and/or work experience. These assumptions are also supported by the theoretical ideas of the concept of the Dark Triad (see Paulhus & Williams, 2002), as well as the results of several studies: for example, Jonason (2015) reported that age increases the coherence of the Dark Triad traits while reducing the levels of their manifestation. However, at this point the sample size does not allow us to use relevant methods of data analysis – for example, multivariate analysis of variance (MANOVA). Therefore, such assumptions remain hypotheses requiring verification.

There are several other limitations to the study:

- this study aimed at investigating the professional group of kindergarten teachers, therefore the results cannot be applied to the whole population and other professional groups;
- deviations of the distributions of performance indicators from normality might have affected the results obtained using one-way ANOVA.

Thus, the prospects of this research are associated primarily with expanding the sample size and, therefore, the involvement of more powerful statistical methods of data analysis, which will, in turn, allow us to clarify at least some of the issues identified above.

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