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ORIGINAL PAPER

Aberrations in emotional processing of violence-dependent stimuli are the core features of sadism

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Abstract Psychopathy and sadism are personality traits that share emotional deficits and propensity towards violence. However, sadism should be based on additional affective aberrations: pleasant emotional responses to hurting others or witnessing others in pain. In Study 1 (N = 116) emotional responses to violent and peaceful images and their associations with the subclinical trait sadism are analyzed. The results showed that elevated positive emotions when observing violent stimuli and negative emotions as a reaction to peaceful stimuli predicted sadism, even when variance of psychopathy was controlled in the analysis. In Study 2 (N = 156) implicit associations between violence-dependent stimuli (measured by IAT task) and terms describing positive and negative emotions are analyzed. Again, lower negative associations to violent stimuli predicted sadism, together with psychopathic trait of callous affect. The obtained results provide additional clarification of emotional processes in subclinical sadism.

Keywords Sadism · Emotional processing · Psychopathy · Callous affect

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Introduction

In the last several decades psychopathy has been recognized as a specific constellation of personality traits that represent a disposition towards immoral, antisocial and criminal behavior (Patrick 2006). One of the crucial features of psychopathy are emotional deficits, especially a low ability to express fear and sadness (Hare 2003), together with the inability to recognize these emotions in others (Wilson et al. 2011). Affective deficits in psychopathy are also reflected in diminished emotional empathy, the ability to emotionally resonate with the emotional states of other people (Jones et al. 2010). It is recognized by scholars that the emotional deficits are the central factor that facilitates violence in psychopathic individuals: their lack of empathy, fear and sorrow recognition inhibits the emergence of aversive emotions that could suppress violent behavior (Marsh and Cardinale 2012).

Sadism, compared to psychopathy, has received considerably less empirical exploration. These two traits have several common features. Most importantly, both traits are rooted in the lack of empathy, especially when the other individual is in distress (O'Meara et al. 2011). Furthermore, sadism is also related to various forms of violence (Robertson and Knight 2014). These similarities between the two constructs motivated some authors to claim that sadism is an aspect of the psychopathic personality constellation, together with narcissistic, borderline and antisocial subtypes (Murphy and Vess 2003). However, this could be a premature conclusion. First of all, sadism has important conceptual differences compared to psychopathy. Most importantly, it comprises of pleasant affective states as a reaction to the pain of other people (O'Meara et al. 2011). In fact, it has been shown that persons with pronounced sadism react with higher enjoyment if the

observed person is in a state of more severe misfortune (Schumpe and Lafrenière 2016). This means that sadism can produce aggressive behavior resulting in the physical or psychological pain of the other person (Palermo 2013), because it represents a positive reinforcement for the sadist. Thus, hurting others can be a primary goal for sadistic individuals, while violence in psychopathy stems from other reasons: the inability to process others distress cues (Kirsch and Becker 2007), overestimating the aggressiveness of others (Porter and Woodworth 2006), or most importantly, as a means to achieve some personal goal, like money, status or getting a task done (Hare and Neumann 2009). It is interesting to mention that sadism was not found to be related to emotional dysregulation, as opposed to psychopathic trait of Callous Affect: the latter was positively related to the lack of emotional awareness and clarity (Zeigler-Hill and Vonk 2015). Finally, a corroboration of sadism as a construct separate from psychopathy is provided directly by empirical data: there is a positive correlation between the two traits, however, it is not high enough to claim the reducibility of sadism to psychopathy (Mokros et al. 2011).

Empirical research of sadism has mostly been performed in the field of psychopathology and forensic psychology, referring to the trait of sexual sadism (Berner et al. 2003). Only in the most recent studies has sadism begun to be explored as a subclinical construct, a personal disposition continuous in its nature (Mokros et al. 2014). Subclinical sadism has been corroborated by the findings that sexual fantasies of hurting others exist in a large number of subclinical and noncriminal individuals (O'Meara et al. 2011), the fact that sadistic personality disorder was removed from the DSM IV manual (American Psychiatric Association 2000) and the data implying that sadistic individuals are not more prone to violent and sexual reoffending than nonsadists (Eher et al. 2016).

Findings obtained in the samples selected from the general population provided interesting information about various behavioral expressions of this trait. Persons who score high on a measure of sadism are more motivated to kill bugs and hurt an innocent person (Buckels et al. 2013). Sadism was also related to antisocial punishment—a form of costly punishing cooperative individuals that emerges in public goods games: individuals higher in sadism are more likely to punish cooperative players (Pfattheicher and Schindler 2015). In a sample of non-referred adolescents, sadism was related to the use of cannabis and alcohol; it predicted delinquent behavior even when the variance of psychopathy was controlled in the analysis (Chabrol et al. 2009). The evidence of the behavioral consequences of sadism is present in internet behavior too: sadism is related to internet trolling (Buckels et al. 2014) and a propensity toward playing violent video games (Greitemeyer 2015; Greitemeyer and Sagioglou 2017). Since empirical evidence suggests the importance of sadism in predicting various immoral behaviors, several authors proposed that it should be explored together with psychopathy, Machiavellianism and Narcissism—a set of personality traits commonly labeled as the Dark Tetrad (Chabrol et al. 2009; Međedović and Petrović 2015; Paulhus 2014).

We could further understand trait sadism from the viewpoint of the reinforcement sensitivity theory (Gray 1987).[1] The theory distinguishes two basic systems which govern motivation and behavior: the Behavioral Activation System (BAS) and the Behavioral Inhibition System (BIS). BAS is thought to be related with appetitive stimuli and approach behavior, while BIS is responsible to aversive stimuli and avoidant behavior. Congruently with basic motives, the systems are differentially related to emotions: BAS is related to positive and BIS to negative emotions (Balconi et al. 2009; Heponiemi et al. 2003). We can assume that for a majority of people, scenes of violence generate negative emotions followed by a tendency to avoid such stimuli. However, sadism should be based on positive emotions as a reaction to violence, which implies that the presence of violence generates the activation of BAS in persons high on trait sadism. The appetitive nature of violence acts as a positive reinforcement for sadists and thus can generate violence in these individuals.

Goals of the present research

There is still a huge gap in empirical literature about subclinical sadism. In the present research we explored the crucial aspects of emotional processing related to sadism. Emotional responses to violent stimuli and their relation to trait sadism were the central focus of the current research. Since sadism shares some characteristics with psychopathy, this trait was also included in the analysis. This could provide two potential benefits: (1) controlling the variance of psychopathy in the analysis will ensure that the relation between sadism and emotional processing is indeed a reliable one; (2) this exploration can result in more detailed information regarding the relationship between sadism and psychopathy. The aim of the present research is to further describe the emotional aberrations related to sadism, and especially the emotional processes which discriminate sadism from psychopathy. This knowledge can help researchers and practitioners to better understand the dark side of human personality, the motivations for violent behavior and to predict a possible violence risk.

[1] The theory is revised afterwards (Gray and McNaughton 2000), however, this revision is not relevant to the topic of the present manuscript.

Study 1

The goal of this study was to examine the explicit affective associations to violence-dependent visual stimuli. Violence was selected as a phenomenon for investigation because the main definition of sadism includes violence inflicted on other persons (Paulhus and Jones 2015). Positive and negative affective reactions to the stimuli that differ in presented violence are analyzed. It was hypothesized that higher levels of positive affect as a reaction to violent stimuli would be associated with trait sadism. Although the topic of the research is directed towards the basic assumptions regarding trait sadism, we were not able to find any previous studies that provided this data. The key hypothesis in this study suggests that sadism would be related to a higher magnitude of positive emotions as a reaction to violent pictures, even if the variance of psychopathy were controlled in the analysis.

Method

Sample

The sample of this study consisted of 116 freshmen psychology students (72% females). Students participated in the research on a voluntary basis. They were awarded by additional points on a course that they were attending during the period of data collection.

Measures and procedure

Ten photographs were presented to the participants (see Supplementary material). Five of them consisted of images that represent scenes of physical abuse, fighting or injury (stimuli depicting violence: the boot; the club; boxing girls; the goat; dog fight) and the other five represented people in interactions that are characterized by pleasantness and satisfaction such as handling, hugging, dancing (stimuli depicting peacefulness: couple with a dog; picnic; dog and a cat; handshake; a group greeting). Violent and peaceful photographs were balanced in the number of people that are on them. All photographs were in color. They were taken from public domain web sites. After the testing, participants were asked if they had already seen the pictures. None of the participants had seen the stimuli before, so all subjects were retained in the analyses.

The task of the participants was to rate the level of emotions they associate with every picture. The list of emotions offered as responses was composed on the basis of the PANAS X (Watson and Clark 1994) taxonomy of emotions: fear, surprise, serenity, sadness, hostility, joviality, self-assurance, fatigue, guilt, shyness and attentiveness. In order to shorten the procedure, we did not administer the exact PANAS items; the items were emotions depicted in this taxonomy. The specific instruction for the participants was as follows: "Please rate to what extent you feel the following emotions when you look at the presented picture". Participants rated the emotions on a scale ranging from 1 to 5 where 1 indicated "the emotion is not present at all", while 5 represented the response "the emotion is present in a high degree" (the mean scores for all emotions on every stimuli can be seen in Supplementary material).

Participants also provided their responses regarding measures of psychopathy and sadism. Psychopathy was measured using the scale from the SD3 inventory (Jones and Paulhus 2014). The scale has nine items ($M = 2.15$; $SD = .55$; item example: "I'll say anything to get what I want"). Sadism was measured by the Direct Sadism scale taken from the VAST inventory (Paulhus and Jones 2015) which also has nine items ($M = 1.74$; $SD = .58$; item example: "I enjoy physically hurting people").

The data was collected via group testing. The pictures were displayed in a random order. The time for emotional evaluation of every stimulus was not constrained. Participants filled out the psychopathy and sadism scales afterwards. Data gathering lasted for 40 min.

Results

Latent structure of evaluated emotions

The first performed analysis was aimed at evaluating the latent structure of emotions. Assessments of all emotions were aggregated in the database, so that the factor analysis was performed on 11 emotions based on the 1160 estimates (116 respondents $\times$ 10 stimuli). Principal axis factoring was used as the method of latent variable extraction, since a two factor solution was expected. Factors were rotated in the promax position. Results of the analysis indicated that a two-factor solution was indeed the most optimal for the explanation of the observed measures variance. The first factor (Eigenvalue = 7.57; 50.45% of explained variance) was unambiguously interpreted as a positive affect. Serenity (.95), love (.92), thoughtfulness (.90), pleasure (.87), cheerfulness (.85) and assertiveness (.57) had the highest positive loadings on this factor. The second factor (Eigenvalue = 1.15; 7.68% of explained variance) was constituted by negative emotions: sadness (.79), fear (.78), guilt (.75), rage (.71), tension (.67) and disgust (.66). Other emotions did not have loadings $\geq .30$ at any factor. The two extracted factors had a high negative correlation ($r = -.73$).

Positions of visual stimuli onto factors of emotional valence

In order to provide the initial data of the emotional evaluations of visual stimuli, we calculated the mean scores of ten photographs on both factors of emotions. These scores are shown on Fig. 1.

As it can be seen from Diagram 1, all of the peaceful stimuli are rated high on positive and low on negative emotions. The opposite pattern of emotional evaluations was obtained on violent stimuli. This result suggests that all violent stimuli are associated with unpleasant, while peaceful photographs are related to pleasant emotions.

Relations between the emotional reactions, psychopathy and sadism

In order to explore the associations between the administrated measures, Pearson's correlation coefficients were calculated. These statistics are shown in Table 1.

It can be seen from Table 1 that congruent emotional reactions (negative emotions to violent and positive to peaceful images) correlate positively amongst themselves, and negatively with incongruent emotional reactions (positive emotions to violent and negative to peaceful stimuli), which is expected. Both sadism and psychopathy are positively related to incongruent emotional reactions, while sadism has negative associations with congruent emotional responses. All correlations between sadism and affective reactions are higher in magnitude than the ones between psychopathy and emotional responses. Psychopathy and sadism are positively related as well.

Prediction of trait sadism by emotional reactions and psychopathy

The main analysis in this study aimed to explain the variation of sadism by emotional reactions to visual stimuli and psychopathy. Since two latent factors of emotions were found and there were two groups of photographs, we calculated four scores of emotional responses: positive emotional responses to violent images, positive emotional responses to peaceful images, negative emotional responses to violent images and negative emotional responses to peaceful images. We set these scores together with psychopathy as predictors in the regression model, while sadism was set as a criterion measure. We calculated the Kolmogorov–Smirnov coefficients for all of the measures and none of them produced significant Z coefficients. This is why the original (non-transformed) measures are used in the analysis. Participants' sex was also controlled in the analysis. The characteristics of the obtained regression function are shown in Table 2.

The analysed predictors explained the variance of sadism above the level of chance: $F(6, 110) = 19.75$, $p < .001$ ($R^2 = .53$). Psychopathy had an independent contribution to the prediction. Increased positive emotional responses to violent stimuli and decreased positive emotional responses to peaceful pictures also contributed to the explanation of sadism's variance. Sex as a predictor was not statistically significant, which means that the sex of the participants does not play a role in the obtained results.

Discussion

Results from Study 1 support the general view of emotional functioning in sadism: it is based on increased levels of positive emotions while images depicting violent interactions are being presented. This result is in line with the basic presumptions regarding emotional functioning in sadism (O'Meara et al. 2011; Palermo 2013). However, the data indicates that decreased positive emotions as a reaction to images depicting peaceful interactions also predict sadism, although with a lesser magnitude. This association is not predicted by the existing conceptualizations of sadism. Taken together, these two results suggest that there is an aberration regarding positive emotions in trait sadism: positive emotions are facilitated by violent and suppressed by peaceful visual stimuli. This pattern of emotional reactions is the opposite of the usual emotional reactivity. It resembles a parathymia, an emotional disorder that

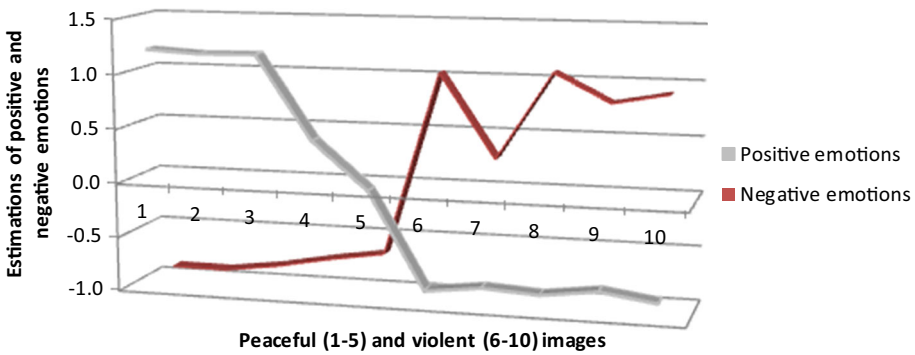

Fig. 1 Mean scores of visual stimuli on the factors of positive and negative emotions. Stimuli: *1*—a couple with the dog, *2*—picnic, *3*—dog and a cat, *4*—handshake, *5*—a group greeting, *6*—the boot, *7*—the club, *8*—boxing girls, *9*—the goat, *10*—dog fight. The first five are peaceful, while the last five are the images with violent content

Table 1 Correlations between the examined measures

	1	2	3	4	5	6
1. Positive emotions on violent pictures	(.73)					
2. Positive emotions on peaceful pictures	−.29**	(.80)				
3. Negative emotions on violent pictures	−.26**	.60**	(.84)			
4. Negative emotions on peaceful pictures	.39**	−.31**	.02	(.69)		
5. Psychopathy	.28**	−.13	−.06	.30**	(.70)	
6. Sadism	.56**	−.39**	−.25**	.42**	.57**	(.69)

α Coefficients of reliability are provided in the parentheses

* $-p < .05$; ** $-p < .01$

Table 2 Regression model for the prediction of sadism by emotional reactions and psychopathy

	β	B	SE	t
Sex	.05	.07	.10	.65
Psychopathy	.41	.45	.08	5.73**
Positive emotions on violent pictures	.35	1.54	.34	4.49**
Positive emotions on peaceful pictures	−.19	−.29	.15	−2.00*
Negative emotions on violent pictures	−.04	−.05	.12	−.37
Negative emotions on peaceful pictures	.09	.34	.33	1.03

r-Zero order correlation between the predictor and a criterion measure

β standardized regression coefficient, *B* standardized regression coefficient, *SE* standard error, *t–t* square

* $-p < .05$; ** $-p < .01$. N = 116

represents a part of schizophrenia's negative indicators (Sato et al. 2004). This result should be considered as preliminary and it needs replication in order to be considered as a part of trait sadism. So far, it only implies that affective disturbances in sadism are deeper and more comprehensive than previously assumed.

It's worthwhile to mention that psychopathy was positively associated with sadism too. This finding is also in line with the previous data (Mokros et al. 2011). Although high in magnitude, this association is not high enough to state that sadism can be reduced to psychopathy or that it represents a subtype of psychopathic traits (Murphy and Vess 2003).

Study 2

In Study 2 we wanted to replicate and deepen the knowledge obtained in the previous study. Psychopathy is measured more precisely, using the instrument that explores four narrow traits of this disposition: Interpersonal manipulation, the Callous affect, Erratic lifestyles and Antisocial tendencies (Paulhus et al. 2016). This was done because of the hypothesis that the Callous Affect, among other facets of psychopathy, would be associated with sadism, because of the lack of empathy as their common core.

Emotional processing is measured differently in this study. We used the same stimuli from the previous study to construct an Implicit Association Test in order to measure automatic and involuntary emotional responses to violence-dependant stimuli. This procedure is based on measuring reaction time (RT) in tasks where participants need to pair stimuli presented on a computer screen as fast as they can (Greenwald et al. 2003). The most important for the present study is the pairing of incongruent stimuli: violent scenes with positive emotions and peaceful scenes with negative emotions. Lower RT would imply that participants have stronger positive affective associations on violence and negative on peaceful interactions. A similar test was used in a previous research, where relations between implicit emotional responses and psychopathy were analysed (Snowden et al. 2004). It was found that elevated psychopathic traits were related to lower RT when participants paired incongruent stimuli. In fact, this emotional pattern interacted with psychopathy in predicting the criminal act of murder (Gray et al. 2003). Another research obtained similar results: participants who responded more quickly to words charged with positive affect after watching violent pictures were particularly prone to engage in unprovoked (proactive) violence (Reidy et al. 2011).

We could not explore emotional reactions to violent and peaceful pictures separately in the present research. However, the results from the previous study motivated us to include the measure of schizotypy in the present analysis. Schizotypy is a broad and general disposition to psychotic-like experiences; it is continuous in its nature and exists in the general population to a certain extent (Claridge 2010; Rawlings et al. 2008). If associations between schizotypy

and sadism could be obtained, that result would be in accordance with the indications of psychotic-like emotional aberrations obtained in the previous study. In this study we expected positive associations between the Callous Affect, schizotypy and sadism. Furthermore, we expected that individuals higher in sadism would have lower IAT scores in general and especially lower RT in pairing incongruent stimuli (violent images—positive emotions and peaceful images—negative emotions).

Method

Participants

The study included 156 subjects. All participants were tested on a voluntary basis. Research participants were male convicts, serving a sentence in two penitentiary institutions in Serbia. Permission to conduct the research was granted by the Republic of Serbia's Ministry of justice and the penitentiary institutions themselves, after the testing material was evaluated by them. The average age of the respondents was 35 years. Respondents had an average of ten years of education (which corresponds to the second year of secondary school). All participants had adequate reading skills. The largest percentage of respondents (59.6%) in the sample served their sentence because of criminal offenses characterized by violence (murder, robbery, grievous bodily harm, etc.), while other respondents committed crimes which had no elements of violence (robbery, unauthorized production, possession and distribution of narcotic substances, fraud, etc.).

Measures and procedure

Psychopathy was measured by the Self-Report Psychopathy scale (SRP-4: Paulhus et al. 2016). The questionnaire assesses four psychopathic traits: Interpersonal manipulation (M = 2.64; SD = .67; item example: "I have pretended to be someone else in order to get something"), Callous affect (M = 2.53; SD = .56; item example: "People sometimes say that I'm cold-hearted"), Erratic lifestyle (M = 2.73; SD = .70; item example: "I'm a rebellious person"), and Antisocial behaviour (M = 2.62; SD = .86; item example: "I have assaulted a law enforcement official or social worker"). It consists of 64 items, 16 per every narrow trait.

Sadism was measured by a subscale of the Amoralism inventory (Paulhus and Jones 2015) that explores sadistic tendencies. The scale is comprised of 5 items (M = 1.95; SD = .79; item example: "I do not care how people around me feel, if I'm enjoying myself"). The validity of the scale has previously been established (Međedović 2015).

Schizotypy was assessed by the DELTA 10 scale, which measures Disintegration, a comprehensive disposition towards psychotic-like experience (Kneževic et al. 2005). The scale measures 10 narrow modalities of schizotypal traits: General executive dysfunction, Perceptual distortions (depersonalization and derealization), Enhanced awareness, Depression, Paranoia, Mania, Social anhedonia, Flattened affect, Somatoform dysregulation (experiences of body change) and Magical thinking. The instrument has 30 items with a 5-point Likert scale. Only the total score on the inventory was used in the analysis (M = 2.24; SD = .61; item example: "I feel the presence of evil forces around me").

All of the previously described instruments are self-report inventories. They use a common 5 degrees Likert response scale where 1 indicates complete disagreement with the statement while 5 stands for complete agreement with the item.

The IAT test that explored affective associations to violence-dependent stimuli was based on the task constructed by Snowden et al. (2004). The difference between the previously used instrument and this version is that the stimuli that represent violence were visual rather than verbal. We used the same photographs as in Study 1 to construct the IAT task, since the results of Study 1 confirmed the validity of the stimuli regarding the emotions they produce in viewers. After the testing, participants were asked if they had already seen the photographs. Again, none of the participants were familiar with the stimuli. The category of pleasant—unpleasant emotions was represented by verbal stimuli describing pleasant (beautiful, wonderful, lovely, joyful, amazing), or unpleasant affective states (terrible, awful, painful, horrible and badly). The key measure that was obtained as information from the IAT test was the D measure or differential score. It is the average difference between reactions to incongruent (e.g. pairing photographs depicting violent interactions with terms that have a positive affective valence) and congruent stimuli (e.g. pairing photographs depicting violent interactions with terms that have a negative affective valence). It is a standard algorithm for obtaining a differential score (Greenwald et al. 2003). We calculated three scores and analyzed them in the present study: the average RT (reaction time) for congruent stimuli, for incongruent stimuli and the D score.

Data collection was performed in three waves. In the first wave, the participants filled out the self-report measures. Questionnaires were administrated in a group. The average time of completing the inventories was 30 min. In the second wave, the participants completed the IAT task. This procedure lasted approximately 25 min.

Results

Correlations between the predictor variables

As in the first study, we analyzed bivariate relations between examined variables first. The correlations between these measures are shown in Table 3.

As we can see from Table 3, psychopathy traits are all positively correlated. Schizotypy is positively associated with psychopathy too. However, the main focus of the present analysis was aimed at the exploration of the relations between implicit affective processing and other administered measures. Sadism was negatively associated with the RT to incongruent stimuli and with the whole IAT measure. The latter was negatively associated with schizotypy as well.

Prediction of trait sadism by psychopathy, schizotypy and IAT

In order to provide further understanding of trait sadism, we set its score as a criterion variable in the regression model, while other analysed variables were set as the predictors. Participants' age and education were controlled in the analysis too. We could not set the D measure (IAT score) as a predictor because it represent a linear combination of RTs on congruent and incongruent stimuli. One participant was removed from the analysis, because he represented a multivariate outlier (>3SD). The results of the regression analysis are shown in Table 4.

The variation of trait sadism was explained above the level of chance: $F = 16.06(9, 146), p < .001$ ($R^2 = .52$). Sadism is related to lower education and higher levels of Interpersonal Manipulation and Callous affect. Most importantly, both the RTs on congruent and incongruent stimuli predicted sadism. Individuals higher in sadism are faster in pairing incongruent, but slower in pairing congruent stimuli.

Discussion

The central focus of Study 2 was to examine the relation of implicit affective associations with trait sadism. That link was found: sadism was negatively associated with the RT necessary to pair incongruent stimuli in the IAT task. This result implies that individuals with elevated sadistic traits have stronger implicit associations between violent stimuli and positive emotions, together with associations between peaceful stimuli and negative emotions. This result corroborates our key hypothesis regarding the data in Study 2. The regression analysis revealed an additional finding: sadism was also related to higher RT when participants paired congruent stimuli. This association suggests that persons high in sadism have problems in associating violence with negative and peaceful interactions with positive emotions. The magnitude of these relations is low, but that could be expected due to the absence of method covariance between the measures (Blonigen et al. 2010). It is also important to observe that the regression statistics for IAT measures are higher than their respective zero-order correlations with sadism. This is especially true for the RT to congruent stimuli, which did not associate significantly with sadism on a zero-order level. This means that the relations in question were under the suppression effect: a situation where the relation between two measures is suppressed by other variables, which can be revealed only when they are included in the analysis (MacKinnon et al. 2000). The lack of zero-order effect implies that the relation between the RT to congruent stimuli and sadism should be interpreted with caution.

Table 3 Correlations between examined measures

	1	2	3	4	5	6	7	8	9
1. Interpersonal manipulation	(.80)								
2. Callous affect	.63**	(.70)							
3. Erratic lifestyle	.64**	.62**	(.78)						
4. Antisocial behavior	.67**	.59**	.69**	(.84)					
5. Disintegration/schizotypy	.35**	.32**	.40**	.34**	(.86)				
6. RT incongruent stimuli	−.08	−.10	−.08	−.04	.04	(.93)			
7. RT congruent stimuli	−.01	−.03	−.03	.03	−.02	.73**	(.91)		
8. IAT score	.07	.05	−.03	.03	−.18*	−.09	.46**	(.85)	
9. Sadism	.43**	.50**	.39**	.39**	.50**	−.20*	.04	−.22**	(.63)

α Coefficients of reliability are provided in the parentheses

* $-p < .05$; ** $-p < .01$

Table 4 Regression model for the prediction of sadism by psychopathy, schizotypy and IAT

	β	B	SE	t
Age	−.02	−.00	.01	−.27
Education	−.18	−.12	.05	−2.74**
Interpersonal manipulation	.20	.23	.11	2.17*
Callous affect	.34	.47	.12	4.04**
Erratic lifestyle	−.02	−.02	.11	−.17
Antisocial tendencies	.02	.01	.08	.16
Disintegration/schizotypy	.29	.36	.09	4.11**
RT incongruent stimuli	−.40	−.60	.13	−4.51**
RT congruent stimuli	.21	.19	.08	2.34*

r-Zero order correlation between the predictor and a criterion measure

B standardized regression coefficient, *B* standardized regression coefficient, *SE* standard error, *t–t* square

* $-p < .05$; ** $-p < .01$. N = 155

The analyses showed relations between Interpersonal Manipulation, the Callous Affect, schizotypy and sadism, which was also expected. The primary hypothesized link between psychopathy and sadism was based on the relation between the Callous Affect and sadistic characteristics, reflecting the lack of empathy as their common core (O'Meara et al. 2011). However, it is not surprising that sadism can facilitate manipulative behavior too, a finding which was obtained in earlier research (Robertson and Knight 2014): the lack of compassion and the enjoyment of other's distress clearly represent a disposition towards the exploitation of others.

It is important to observe other characteristics of the emotional associations measured via the IAT task. First of all, they do not have relations with psychopathic traits, which were found in the previous research (Snowden et al. 2004). Differences between the results of the present and previous study could be attributed to the measurement method: previous research was based on the rating method of psychopathy, while the self-report measures were used in the present one. Previously obtained data suggested that rating and self-report measures of psychopathy can have different relations with other constructs conceptualy related to psychopathy (Kujačić et al. 2015). However, the other reason is plausible too. By its content, the affective process that is explored in the present research can be conceptually related to trait sadism (Reidy et al. 2011), rather than psychopathy. Since the previous study did not analyze sadistic traits (Snowden et al. 2004) the obtained result could be attributed to the shared variance of sadism and psychopathy and not psychopathy itself.

General discussion

The results of the two performed studies converge to findings which deepen the existing knowledge on emotional processes in subclinical sadism. The first study provides data about the general association between psychopathy and sadism, which can already be found in other research (Mokros et al. 2011). However, the nature of this relation remained elusive. Because of the lack of emotional empathy which characterizes both psychopathy (Jones et al. 2010) and sadism (O'Meara et al. 2011), it can be hypothesized that emotional detachment lies at the core of this relation. This is precisely what is obtained in Study 2. Results of the present research suggest that both psychopathy and sadism are partially based on a low ability to generate fear, guilt and empathy, which represent major indicators of the Callous Affect psychopathic trait (Paulhus et al. 2016). The empathic deficits in both traits suggest that these characteristics are associated with deficits in establishing an emotional resonance with others and reacting to their emotions with the same affective states.

However, this finding does not imply that persons with elevated sadism do not react emotionally to the affective states of others at all. In fact, they do, but in a very specific manner: with increased positive emotions to perceived violent interactions and with decreased positive emotions while observing pleasant and joyful interactions (Study 1). A very similar aberration in emotional processing to the previously described is obtained using the IAT procedure (Study 2). According to these findings, sadism is based on facilitated associations between violence and positive emotions, together with peaceful interactions and negative emotions. Obtained by different methodology, this finding is congruent with the data from Study 1, showing the positive affective associations between sadism and violence. This emotional response is hypothesized to be the core feature of sadism (Palermo 2013; Buckels et al. 2013), but this is the first research (as far as we are aware) to empirically confirm this hypothesis. This data is in line with the findings of a positive relation between sadism and the playing of violent video games (Greitemeyer 2015; Greitemeyer and Sagioglou 2017). Results are in accordance with the data indicating that sadism is a moderator of the link between the severity of the perceived person's misfortune and the expression of the perceiver's enjoinment (Schumpe and Lafrenière 2016). Since violence generates positive emotions in individuals with elevated sadism, we can assume that the Behavioral Activation System (BAS) is activated in these individuals when violence is perceived. The reinforcing nature of violent scenes probably represents a motivator for these persons, which

could lead them to violent behavior (Robertson and Knight 2014).

Decreased levels of positive emotions as a reaction to the peaceful and pleasurable social interactions were not previously related to sadism. This finding is obtained in both studies. If we take all of the data on emotional processing in sadism in account, the pattern of emotional reaction resembles parathymia, an emotional dysfunction based on an incongruity between the stimulus content and the valence of experienced emotions (Sigmund 2004). Parathymia is considered an affective symptom of schizophrenia (Seiferth et al. 2008). We wanted to further confirm the psychotic-like nature of this process, so in Study 2 we administrated a measure of schizotypal experiences. Associations of schizotypy with both sadism and the score on the IAT test of emotional reactions to violent stimuli were in accordance with the data obtained in Study 1. This finding corroborates earlier data about the existence of various psychopathological indicators in a group of sexual sadists (Myers et al. 2006), including the markers of borderline disorder which is similar to schizotypy (Rawlings et al. 2001). It is crucial to emphasize that these processes were explored in subclinical populations, by measures that operationalize general, non-pathological constructs. So, precisely stated, the nature of the explored emotional processes *resembles* the one which is present in psychosis, but it represents its non-pathological side.

Limitations

One of the key limitations of the present research is reflected in the sample size. Both studies could benefit from larger samples; this is especially true for Study 2 because of the expected small effect sizes. In the Study 1 participants filled out psychopathy and sadism measures after they were presented with visual stimuli. The order of data gathering might have affected sadism and psychopathy scores. This potential problem could be solved by counterbalancing the conditions of the data gathering in future studies. For the purpose of the present research, unidimensional measures of sadism were administered. However, recent studies identified two different facets of sadism (direct and vicarious sadism: Paulhus and Jones 2015), and it would be fruitful if future research would explore possible differences between them regarding emotional processing.

Conclusion

The empirical research on the emotional characteristics of trait sadism is still in its infancy. In the two studies we presented the relations between sadism and emotional reactions to violence-dependent stimuli. Sadism was associated with aberrant emotional reaction to the visual stimuli related to violence, and this relation was largely unaffected by the method of measurement of the emotional responses. Furthermore, sadism was related to both psychopathic emotional coldness and schizotypal experiences. All of the results suggest that sadism is associated with very specific affective reactivity depicted by the lack of empathy and positive emotions to violence. The present data enables deeper understanding of sadism as a dark and immoral personality trait and its potentials for violent and antisocial behavior. Future research could build on the present findings, especially regarding the possible role of schizotypal features in sadism and its behavioral manifestations.

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