



Here and now: Sociosexuality mediates the associations between Dark Triad and Time Perspectives (in females)



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ABSTRACT

The present paper aims to answer the question about actual role of Life History Strategy (LHS) as a factor underpinning associations between the Dark Triad (DT) personality and Time Perspectives (TPs). Recently Birkás and Csathó (2015, *Personality and Individual Differences*, 86, 318–320) provided evidence for some robust associations between these two domains and interpreted them as a product of slow vs. fast LHS. However, their thesis regarding the mediating role of LHS in the associations between the DT and TPs was only speculative. In the present study we administered DT and TP measures (Dirty Dozen and ZTPI), as well as a sociosexuality inventory (SOI-R), which in our study served as an indicator of LHS, in a sample of 329 adults. We aimed to replicate Birkás and Csathó's results separately for each gender, and test for the hypothesized mediation effects. TPs proved related to DT traits, e.g., Future and Past-Positive were both negatively correlated with psychopathy and Machiavellianism. The associations were partly mediated by sociosexuality, but only in females. Our results suggest that LHS may indeed be responsible for the associations between TPs and Dark Triad, however other mechanisms underpinning these relationships need to be taken into account.

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1. Introduction

The Dark Triad, comprising of psychopathy, narcissism, and Machiavellianism, represents a set of three distinct, but related subclinical, maladaptive and socially aversive personality characteristics. Psychopathy is defined by high callousness, thrill-seeking, interpersonal antagonism and manipulation, and by low empathy, remorse, and anxiety (Paulhus & Williams, 2002). Individuals with a high degree of narcissism focus largely on themselves, are characterized by self-absorption, dominance, and feelings of entitlement (Jones & Paulhus, 2014). Machiavellianism is characterized by self-interest and the tendency towards deception, manipulation and the exploitation of others (Paulhus & Williams, 2002). The Dark Triad traits were proved to be a part of fast LHS (Jonason & Tost, 2010).

Life History Theory (LHT) is an evolutionary theory which predicts that personality traits should cluster in a non-random way as adaptations to solve adaptive tasks in response to the stability or harshness of socioecological conditions encountered in young age. While unpredictable conditions tend to produce fast strategies, more predictable environments may produce slow strategies (Kaplan & Gangestad, 2005). A slow life strategy is reflected in a secure attachment pattern, supportive communication patterns (Olderbak & Figueredo, 2009), a general

psychological inclination for long-term strategizing (Gladden, Figueredo, & Jacobs, 2009), and long-term mating effort and relationships. Since the Dark Triad is associated with a short-term mating strategy along with a strategic approach to friendship-selection, and a protean approach to social interactions, these traits appear to be a part of a fast LHS geared towards maximizing immediate returns over delayed outcomes as predicted by LHT (Buss, 2009; Wilson & MacArthur, 1967).

Among various manifestations of slow vs. fast LHS, Time Perspective (TP) is one of the most interesting and theoretically understandable (Dunkel & Kruger, 2015). TP is "the often nonconscious process whereby the continual flows of personal and social experiences are assigned to temporal categories, or time frames, that help to give order, coherence, and meaning to those events" (Zimbardo & Boyd, 1999, p. 1271). It can be considered as process when analyzed as an online cognitive framing of present experiences, and as a trait when understood as a stable habitual focus on a particular time horizon(s), i.e., the past, the present, or the future. In their conceptual model Zimbardo and Boyd (1999) distinguished five TPs: Past-Positive, expressed in a warm, sentimental attitude towards the past; Past-Negative, reflecting a generally aversive view of the past; Present-Fatalistic, revealing a helpless and hopeless attitude towards the future and a consequent focus on the present; Present-Hedonistic, reflecting a hedonistic, risk-taking attitude towards time and life; and Future - a general future orientation. Each of these perspectives is described on a trait-like dimension. Present-Hedonistic

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orientation which reflects an orientation towards immediate outcomes and little concern for future consequences (Zimbardo & Boyd, 2008) seems to be a natural consequence of a fast LHS, whereas Future perspective, reflecting a pattern of behavior dominated by a striving for future goals and rewards, is typical for individuals characterized by a slow LHS (Dunkel & Kruger, 2015).

Although interindividual variability in LHS seems to be a plausible explanation of the links between TPs and DT, as both present-oriented TPs (Dunkel & Kruger, 2015; Kruger, Reischl, & Zimmerman, 2008) and Dark Triad (Jonason, Koenig, & Tost, 2010; Jonason, Li, & Czarna, 2013) were shown to relate to fast life strategy, the link remains speculative. Thus, in the present study we attempted to put it to a direct empirical test. Our study assessed all three constructs: DT, fast LHS strategy and TP in order to verify whether the association between DT and TP could be accounted for by an indicator of a fast LHS strategy.

Recently Birkás and Csathó (2015) provided initial evidence for the associations between TPs (Zimbardo & Boyd, 1999) and the DT traits (Paulhus & Williams, 2002). Their results revealed positive associations of the DT traits with both present-oriented TPs. Moreover, Machiavellianism and psychopathy, but not narcissism, were related to Past-Negative TP. While summarizing their results Birkás and Csathó (2015) stated that “each of the DT traits appeared to be strongly related to present-oriented TPs” which “is in a good agreement with the findings shown by former studies on the fast life strategy (...) of the Dark Triad” (p. 319), making LHS a theoretical background for their analyses. However, their research used a small, gender-biased sample and did not take into possible gender differences in analyzed associations. In our study we put the links between DT, LHS and TP, proposed by these authors, to an empirical test, taking into account possible gender differences.

For that purpose we used sociosexual orientation as an indicator of LHS (Dunkel & Decker, 2010) previously interpreted as such in numerous studies (e.g., Eisenberg, Campbell, Mackillop, Lum, & Wilson, 2007). Unrestricted sociosexual orientation is understood as a propensity to engage in casual sex or sexual activity in uncommitted relationships (Penke & Asendorpf, 2008). Restricted sociosexual orientation constitutes the opposite pole of this dimension. Recently, Ponzi et al. (2015) demonstrated that sociosexuality is robustly positively related to Present-Hedonistic and -inversely - Future TP. Given that high sociosexuality represents fast LHS, this finding indirectly supports our hypothesis that fast LHS plays a key role in explaining the links between DT and TPs.

Hitherto studies show that TPs (particularly Future and Present-Hedonistic) are associated with both DT (Birkás & Csathó, 2015) and sociosexuality (Ponzi et al., 2015), and that the latter two are also robustly related (Jonason, Li, Webster, & Schmitt, 2009). Machiavellianism proved positively related to both Present-Fatalistic and Past-Negative TPs (Birkás & Csathó, 2015). Psychopathy was negatively associated with Future orientation, and inversely with both Present-Hedonistic and Past-Negative TPs. Narcissism was only related positively to Present-Hedonistic TP.

Thus, psychopathy should be negatively associated with a Future orientation based on the repeated links between this trait and traits such as impulse control and future discounting. Moreover, psychopathy and Machiavellianism, but not narcissism, show negative view of the past, which has an impact on the interpretation of the present. Therefore, both traits should be related to Past-Negative. Also each DT trait should positively correlate with the present-oriented TPs, i.e., Present-Hedonistic and Present-Fatalistic. Based on both theoretical reflection and the existing body of empirical evidence, we expected to find that fast LHS, operationalized as high sociosexuality, is an underlying mechanism linking the TP with DT.

2. Method

2.1. Participants and procedure

A set of three questionnaires was administered online, using LimeSurvey facility. The sample, recruited via social media, comprised

of 329 (50.7% men) Polish students and graduates, aged 18–55 ($M = 22.35$, $SD = 3.48$). All participants provided a consent which was obtained online after a detailed instruction describing main purposes and approximate duration of the study.

2.2. Measures

Dark Triad personality traits were measured using the only DT measure adapted so far to Polish language - the Dirty Dozen (Czarna, Jonason, Dufner, & Kossowska, 2016; Jonason & Webster, 2010). It consists of 12 items in total (four per subscale). Participants were asked how much they agreed (1 = not at all; 5 = very much) with statements such as: “I tend to lack remorse” (i.e., psychopathy). Items were averaged to create indices of narcissism, Machiavellianism, psychopathy.

Sociosexual orientation was measured with the revised Sociosexual Orientation Inventory (SOI-R) by Penke and Asendorpf (2008) in a Polish translation (Jankowski, Díaz-Morales, Vollmer, & Randler, 2014) approved by the author of the original inventory (www.larspenke.eu). Higher scores in SOI-R indicate unrestricted sociosexuality, whereas lower scores indicated more restricted orientation. The scale has nine items with a nine-point Likert scale response format. It allows for quantification of three facets of sociosexual orientation: behavior, attitude, and desire, as well as to calculate a general sociosexuality score.

Time Perspective. The Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999) in a Polish (Kozak & Mażewski, 2007) version was used to measure TP. It comprises 56 items divided into five scales: Past-Negative, Present-Hedonistic, Future, Past-Positive, and Present-Fatalistic. Respondents respond using a five-point Likert scale.

3. Results

Taking into account robust gender differences in mating and reproduction strategies (Del Giudice, 2009; Schmitt, 2005) as well as in Dark Triad (Paulhus & Williams, 2002), we conducted the correlation and mediation analyses separately for males and females. Tests of gender differences and intercorrelations between measured variables are provided in Table 1.

As expected, males scored higher in sociosexuality and two DT traits: Machiavellianism and psychopathy. Females scored higher on Past-Positive, Present-Hedonistic and Future scales which suggest a generally more adaptive (“balanced”) TP profile (Stolarski, 2016; Zimbardo & Boyd, 2008). The pattern of correlations also proved to significantly differ between sexes. Probably the most important difference regarded associations between TPs and sociosexuality: whereas in females all TPs dimensions (except for Present-Fatalistic) proved correlated with sociosexuality, in males we obtained a significant association only for Present-Hedonistic, and its magnitude was small. Associations between sociosexuality and DT were all positive and similar in magnitude in both sexes. Finally, the pattern of correlations between TPs and DT traits was somewhat different between males and females: Beside apparent similarities (e.g., the expected negative association between Future and both Machiavellianism and psychopathy, or Past-Positive and the two DT traits) some of the correlations were present in only one gender (e.g., between Present-Fatalistic and Machiavellianism in males or Past-Negative and Machiavellianism in females). Probably the most interesting difference was observed for Present-Hedonism which proved positively associated with both Machiavellianism and narcissism in females, whereas in males - only to psychopathy, and, contrary to our predictions, as well as to results obtained by Birkás and Csathó (2015), the correlation was negative. Only a few of associations obtained by Birkás and Csathó were corroborated in the present study (5 out of 8 in females and 3 out of 8 in males), however it should be taken into account that they did not analyze the data separately for males and females.

Further, in order to determine whether measured variables fulfill necessary conditions for mediation analyses (i.e., significant intercorrelations within analyzed triad of variables), we analyzed correlations of

Table 1

Descriptive statistics, between-gender mean comparisons, and intercorrelations between variables included in the study in females ($n = 162$; above the diagonal) and males ($n = 167$; below the diagonal).

	Females			Males			<i>t</i>	<i>d</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.
	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α											
1. Machiavellianism	8.14	3.62	0.82	9.60	4.31	0.86	-3.32**	0.37	-	0.51**	0.54**	-0.23**	0.15	0.20*	-0.21**	0.23**	0.35**
2. Psychopathy	7.39	2.99	0.64	9.06	4.27	0.82	-4.12**	0.45	0.71**	-	0.26**	-0.37**	0.21**	0.07	-0.31**	0.10	0.31**
3. Narcissism	11.98	3.61	0.79	11.87	3.99	0.85	0.27	0.03	0.48**	0.29**	-	-0.17*	0.13	0.27**	-0.07	0.19*	0.30**
4. Future	3.60	0.58	0.68	3.36	0.66	0.76	3.58**	0.39	-0.31**	-0.43**	0.02	-	-0.38**	-0.35**	0.15	-0.17*	-0.30**
5. Present-Fatalistic	2.62	0.60	0.77	2.60	0.69	0.68	0.32	0.03	0.37**	0.25**	0.10	-0.40**	-	0.37**	-0.28**	0.49**	0.12
6. Present-Hedonistic	3.39	0.56	0.82	3.23	0.65	0.78	2.32**	0.26	-0.06	-0.18*	0.14	-0.12	0.16*	-	0.03	0.25**	0.25**
7. Past-Positive	3.65	0.65	0.64	3.37	0.68	0.62	3.81**	0.42	-0.22**	-0.43**	0.04	0.19*	-0.24	0.40	-	-0.43**	-0.16*
8. Past-Negative	3.01	0.79	0.79	2.99	0.77	0.78	0.28	0.03	0.09	-0.02	0.21**	0.06	0.38**	0.15	0.16*	-	0.19*
9. Sociosexuality	21.52	12.24	0.84	29.53	11.29	0.77	-6.17**	0.68	0.35**	0.20**	0.33**	0.02	0.03	0.16*	0.08	0.03	-

** $p < 0.001$, * $p < 0.05$.

Note. Associations between DT and TPs are shadowed in grey. The *t*-test values were corrected for inequality of variances were appropriate.

TPs and DT with sociosexuality (Table 1). Due to the lack of associations between most TPs and sociosexuality in males, the only pair of variables that could have been tested for mediation was the one between Present-Hedonism and psychopathy. However, due to the fact that the correlation between these variables was negative, such an analysis was unjustified, as the direction of this association was inconsistent with our expectations and excluded the possibility of mediating role of LHS/sociosexuality in this relationship.

In females we identified nine triads of associations that fulfilled the initial conditions for mediation analyses. Thus, nine associations between TPs and DT traits were tested for mediation via sociosexuality using PROCESS macro for SPSS developed by Hayes (2015) (see Table 2). Seven of the analyzed indirect effects proved significant; only those with Past-Positive as an independent variable were non-significant. Ratios of indirect to total effect for significant mediations ranged between 0.18 and 0.46, showing that sociosexuality explained around 30% of the significant relationships between TPs and DT traits in females.

4. Discussion

The present study provided some empirical support for the claim that associations between DT and TPs are driven by fast LHS as indicated by individual differences in sociosexuality. This prediction was confirmed only in females, the mediation effects were only partial, and only some of the associations reported by Birkás and Csathó (2015) were replicated.

In our study Machiavellianism and psychopathy proved related with a narrow TP profile (i.e., low Future and low Past-Positive), that could be labeled 'time restrictive' (see Webster, 2011) in both females and males.

A broader temporal horizon may enable more effective cognitive reappraisals and results in taking various perspectives, whereas narcissism and Machiavellianism are negatively related to empathy and perspective taking (Giammarco & Vernon, 2014).

Narcissism and Machiavellianism proved positively associated with Present-Hedonistic in females. Both these DT traits are powerfully loaded by self-focused, egotistic motivations, and the hedonic concentration on 'here-and-now' seems to be a natural manifestation of such motives. Dark personalities discount long-term gains in favor of short-term gains as expressed in their inability to delay gratification and the variety of risky behaviors they endorse, such as alcohol and drug use (Jonason et al., 2010). Surprisingly, in our study psychopathy did not relate to elevated present focus in females, and related negatively to the trait in males. Although this result may seem a bit confusing, it is highly probable that it results from robusticity of the sociability component of Present-Hedonistic. Positive attitude towards other people is naturally opposite to psychopathy (Jonason et al., 2009), and it seems that this feature of hedonism proved more significant than impulsivity component which should shift the association towards a positive direction (see Zimbardo & Boyd, 1999), at least in males. In females the effects of sociability and impulsivity might have counterbalanced each other, which resulted in a non-significant association.

It is interesting that Machiavellianism and narcissism in females are related to positive, self-serving drives, whereas the case of psychopathy is qualitatively different: psychopathy is not about being guided by hedonic motives; it is rather manifested in a lack of learning from the past or considering future consequences. This may explain an increased tendency of individuals scoring high on psychopathy scales to undertake socially destructive behaviors. The result is also in-line with the results reported by Stolarski, Zajenkowski, and Zajenkowska (2016) who

Table 2

Testing for mediating role of sociosexuality in associations between time perspectives and Dark Triad in females ($n = 162$).

Predictor	a	b	c	c'	Indirect	95%LLCI	95%ULCI	Indirect/total	95%LLCI	95%ULCI
Dependent variable: Machiavellianism										
Future	-0.30***	0.31***	-0.14	-0.23**	-0.09	-0.19	-0.03	0.40	0.11	1.09
Present-Hedonistic	0.25**	0.32***	0.12	0.20*	0.08	0.03	0.15	0.40	0.12	1.48
Past-Positive	-0.16*	0.33***	-0.15*	-0.21**	-0.05	-0.14	0.00	0.25	-0.05	0.84
Past-Negative	0.19*	0.32***	0.17*	0.23**	0.06	0.01	0.14	0.27	0.07	0.73
Dependent variable: Psychopathy										
Future	-0.30***	0.23**	-0.30***	-0.37***	-0.06	-0.16	-0.01	0.18	0.04	0.45
Past-Positive	-0.16***	0.27***	-0.27***	-0.31***	-0.04	-0.12	0.00	0.14	-0.01	0.41
Dependent variable: Narcissism										
Future	-0.30***	0.27	-0.09	-0.17*	-0.08	-0.16	-0.03	0.46	0.13	2.40
Present-Hedonistic	0.25**	0.25**	0.21**	0.27***	0.06	0.02	0.13	0.29	0.07	1.69
Past-Negative	0.19*	0.27***	0.14	0.19***	0.05	0.01	0.29	0.28	0.04	1.09

Note. The table presents results of bootstrapped mediation analyses with 10,000 bootstraps. a – effect of predictor (TP) on mediator (sociosexuality); b – effect of mediator (sociosexuality) on dependent variable; c – direct effect of predictor on dependent variable (DT trait); c' – total effect of predictor on dependent variable; Indirect – mediated effect of a predictor (TP) on dependent variable (DT trait) via mediator (sociosexuality), followed by 95% confidence intervals; Indirect/total – ratio of the indirect effect to total effect (c') indicating a magnitude of mediated effect, also followed by 95% CIs.

* $p < 0.05$.
 ** $p < 0.01$.
 *** $p < 0.001$.

showed that elevated Future and Past-Positive TPs may allow to overcome destructive aggressive tendencies resulting from Present-Hedonistic and Past-Negative. Broad temporal horizons may indicate effective emotional self-regulation (Matthews & Stolarski, 2015), which, in case of individuals manifesting elevated levels of psychopathy, is strongly distorted (Newman & Lorenz, 2003).

Some of the associations reported by Birkás and Csathó (2015) were not confirmed in the present sample. Probably the most striking one refers to the association between Present-Hedonistic and psychopathy, already discussed above. Other differences include the associations between Machiavellianism and both Future and Past-Positive, and psychopathy and Past-Positive, here observed in both sexes. In the Hungarian sample Past-Negative proved to be a significant predictor of Psychopathy. It seems that in the Polish context it is more important to have a positive view of the past instead of not having an elevated Past-Negative perspective.

These discrepancies could result either from moderating role of culture (and the related socioeconomic conditions) or applied methodology. Regarding the former, there is strong evidence for cross-cultural differences in TP profiles (Sircova et al., 2015). Although existing analyses did not include Hungary, we may presume that some differences between Poland and Hungary may exist and influence the magnitude of associations with DT. The latter possibility refers to utilized measures of DT (Short Dark Triad [SD3] vs. Dirty Dozen) and related differences in reliability, as well as theoretical content of the scales. Dirty Dozen and SD3 differ slightly in content and the superiority of one or the other has been discussed (e.g. Jones & Paulhus, 2014; Lee et al., 2013). The differences include, e.g., that Machiavellianism subscale of Dirty Dozen, unlike its counterpart from SD3, correlates positively with measures of short-term orientation indicating impulsivity (Jonason & Tost, 2010). Furthermore, critics demonstrated that the psychopathy subscale of Dirty Dozen might not properly capture certain variance related to interpersonal antagonism and disinhibition (Miller et al., 2012). Such subtle differences might be responsible for the discrepancies between our results and those reported by Birkás and Csathó (2015).

Fast LHS, as indicated by high sociosexuality, proved to be a plausible mediator between TP and DT, but solely in females. Moreover, in case of Present-Fatalistic there was no justification for conducting mediation analyses, whereas for Past-Positive the mediations proved non-significant. Thus, it is likely that dark personalities' inability to delay gratification is a function of exposure to an unstable and unpredictable environment (Brumbach, Figueredo, & Ellis, 2009). Their limited focus on present and lack of consideration for the future or learning from the past seems typical for individuals with a fast life history strategy: they generally plan little for the future (Figueredo, Vásquez, Brumbach, & Schneider, 2007), take risks (Figueredo et al., 2005), lack foresight (Figueredo et al., 2007), and use alcohol and drugs (Figueredo et al., 2006). Altogether high DT evidence a diminished sense of self-control (Jonason & Tost, 2010). Present-Hedonistic and (low) Future TPs are manifested in analogical outcomes, with pronounced effects on risk taking (Jochemczyk, Pietrzak, Buczkowski, Stolarski, & Markiewicz, 2016), substance use (Keough, Zimbardo, & Boyd, 1999), and substantial associations with general self-control (Milfont & Schwarzenhal, 2014). In all, we clearly see that quite strong body of data indirectly supports the present reasoning, seeking for common roots of TP and DT in LHS indicators. The question arises why we have observed these effects solely in females. The missing link was naturally the lack of correlations between sociosexuality and TPs in men. Two explanations of this moderating effect of gender seem plausible. First, sociosexual behaviors and attitudes are less socially accepted in females. This results in a situation in which social consequences of sociosexuality (e.g., stigmatization) in females are much more pronounced (Todd & Billari, 2003), and considering future consequences of a female's sociosexual behavior may prove a significant factor diminishing probability of unrestricted sexual behavior. Second, a similar mechanism may appear on the biological level: consequences of procreation in females are much bigger (Schmitt, 2005), and therefore again awareness of consequences of one's own action (both

resulting from anticipations of the future and recollections of past experiences) may robustly decrease probability of sociosexual action in females. In males mental time travels may bring simply too weak arguments to prevent them from unrestricted sex.

In the present study sociosexuality explained only around 30% of the significant associations between TP and DT in females. In males we did not find any support for the predicted mediating role of LHS/sociosexuality. Therefore, other potential mediators of the analyzed relationships should be considered. Researchers could seek for such variables among shared correlates of DT and TPs, such as emotional intelligence (Petrides, Vernon, Schermer, & Veselka, 2011; Stolarski, Bitner, & Zimbardo, 2011), aggression (Jonason & Webster, 2010; Stolarski et al., 2016), or subjectively assessed intelligence (Zajenkowski & Czarna, 2015; Zajenkowski, Stolarski, Maciantowicz, Malesza, & Witowska, 2016).

5. Limitations & future studies

The study naturally has all limitations typical for cross-sectional designs, such as we could only test mediation indirectly as all of our dispositional dimensions (DT, LHS, and TP) were assessed at the same time. Next, sociosexuality is only one of the facets of LHS (Dunkel & Decker, 2010), and although fast life history strategists tend to exhibit unrestricted sociosexuality, the openness to uncommitted sex can also - especially for males of high quality - be a component of a slower life history strategy that entails investment in both pair-bonds and opportunistic affairs. Thus future studies should use some more general LHS indicators.

Obtained results may be specific for Polish culture, for instance due to high percentage of Catholic citizens (87.2% according to CIA World Factbook, see www.cia.gov) which may influence both social attitudes regarding sociosexuality and frequency of sociosexual behaviors. However, Schmitt (2005) showed that Poland is almost perfectly average in terms of sociosexuality when compared to world's mean score. In any case, cross-cultural replications of the present study could bring a valuable source of information regarding generality of our results.

Finally, more sophisticated measures of DT should be applied in future studies. Birkás and Csathó (2015) used Short Dark Triad (SD3) measure. However, the only short measure adapted to Polish language is the Dirty Dozen scale. The Dirty Dozen, used in the present study, is a brief measure and remains controversial. The instrument has been critiqued in several recent reports (Jones & Paulhus, 2014; Lee et al., 2013; Miller et al., 2012). The main limitation is the psychometric cost of using this short measure. Particularly, compared with standard long multi-item measures of the DT, the Dirty Dozen converges less strongly with other DT measures and shows weaker convergent validity with other external variables (e.g., Miller et al., 2012). Also, it does not take into account sub-components of some DT traits. For instance, recently Zajenkowski, Witowska, Maciantowicz and Malesza (2016) showed that associations between TPs and narcissism depend on a type of narcissism: grandiose narcissism was predicted by Present-Hedonistic (consistent with the present results), whereas vulnerable narcissism was related to elevated Past-Negative and Present-Fatalistic. Thus, full-length measures of dark personality traits could be used in future research on this topic.

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