

## How Alluring Are Dark Personalities? The Dark Triad and Attractiveness in Speed Dating

EMANUEL JAUK<sup>1\*</sup>, ALJOSCHA C. NEUBAUER<sup>1</sup>, THOMAS MAIRUNTEREGGER<sup>1</sup>, STEPHANIE PEMP<sup>1</sup>, KATHARINA P. SIEBER<sup>1</sup> and JOHN F. RAUTHMANN<sup>2</sup>

<sup>1</sup>Karl-Franzens-Universität Graz, Austria

<sup>2</sup>Humboldt-Universität zu Berlin, Germany

*Abstract:* Dark Triad traits (narcissism, psychopathy, and Machiavellianism) are linked to the pursuit of short-term mating strategies, but they may have differential effects on actual mating success in naturalistic scenarios: Narcissism may be a facilitator for men's short-term mating success, while Machiavellianism and psychopathy may be detrimental. To date, little is known about the attractiveness of Dark Triad traits in women. In a speed-dating study, we assessed participants' Dark Triad traits, Big Five personality traits, and physical attractiveness in  $N = 90$  heterosexual individuals (46 women and 44 men). Each participant rated each partner's mate appeal for short- and long-term relationships. Across both sexes, narcissism was positively associated with mate appeal for short- and long-term relationships. Further analyses indicated that these associations were due to the shared variance among narcissism and extraversion in men and narcissism and physical attractiveness in women, respectively. In women, psychopathy was also positively associated with mate appeal for short-term relationships. Regarding mating preferences, narcissism was found to involve greater choosiness in the rating of others' mate appeal (but not actual choices) in men, while psychopathy was associated with greater openness towards short-term relationships in women. Copyright © 2016 European Association of Personality Psychology

**Key words:** Dark Triad; narcissism; Machiavellianism; psychopathy; mating; speed dating

A large body of literature (e.g. Furnham, Richards, & Paulhus, 2013; Paulhus & Williams, 2002) suggests that sub-clinical forms of so-called dark personality traits come in the flavours of three grand traits: narcissism, Machiavellianism, and psychopathy. *Narcissism* circumscribes tendencies of seeking admiration and attention, a grandiose yet vulnerable self-view, vanity and arrogance, exhibitionism and charm, manipulation and exploitation, and feelings of superiority and entitlement (Morf & Rhodewalt, 2001; Raskin & Hall, 1979). *Machiavellianism* circumscribes tendencies of immoral, pragmatic, and cynical thinking, detached affect and coldness, agentic strivings (e.g. money, status, and power), and deceit, exploitation, and strategic long-term manipulation tactics (Christie & Geis, 1970; Fehr, Samsom, & Paulhus, 1992; Rauthmann, 2012; Rauthmann & Will, 2011). *Psychopathy* circumscribes tendencies of callousness, interpersonal manipulation, impulsivity, and thrill seeking, as well as anti-social behaviours (Cleckley, 1941/1964; Hare, 2003).

These three traits, all positively intercorrelated, form the 'Dark Triad of Personality' (DT; Paulhus & Williams, 2002). They share an agentic and exploitative behavioural style at the expense of or disregard for others' welfare (Jonason & Webster, 2010; Jones & Paulhus, 2011; Paulhus & Williams, 2002). Although DT traits are usually

considered socially undesirable, they seem to convey adaptive advantages in several domains, such as leadership and entrepreneurship (Grijalva, Harms, Newman, Gaddis, & Fraley, 2015; Mathieu & St-Jean, 2013) as well as in the mating domain (Geher & Kaufman, 2013). 'Dark' traits like narcissism can be attractive to opposite-sex individuals, especially in short-term mating (STM) contexts (e.g. Dufner, Rauthmann, Czarna, & Denissen, 2013; Rauthmann & Kolar, 2013). In their evolutionary theory, Holtzman and Strube (2011) hypothesize that narcissism is associated with higher mate value, which might be due to a (small) correlation between physical attractiveness (PA) and narcissism (Holtzman & Strube, 2010). Moreover, narcissists<sup>1</sup> are perceived not only as physically attractive but also as charming (Back, Schmukle, & Egloff, 2010), which seems to be a fruitful constellation for mating success. Besides their charmingness at first sight, however, people with dark personalities may follow through with their reproductive interests at the disregard or even expense of their mates (Rowe, 1995) and pursue specific mating strategies. Holtzman and Strube (2013a) proposed an elliptical two-dimensional model in which STM and long-term mating (LTM) strategies are conceptualized as two moderately negatively correlated

<sup>1</sup>We use terms like 'narcissists', 'Machiavellians', 'psychopaths', or 'dark personalities' as abbreviations for people scoring high on (scales of) the respective continuous trait(s). This does not imply a categorization (in terms of person types) or a clinical diagnosis.

\*Correspondence to: Emanuel Jauk, Department of Psychology, University of Graz, Universitätsplatz 2, 8010 Graz, Austria. E-mail: emanuel.jauk@uni-graz.at

dimensions. They found that DT traits were associated with a high STM and low LTM strategy, whereas Big Five traits such as conscientiousness and agreeableness predicted the opposite strategy. In this line, it has also been theorized that exploitative traits have explicitly evolved to facilitate STM (e.g. Jonason, Li, Webster, & Schmitt, 2009; Jonason, Webster, Schmitt, Li, & Crysel, 2012a; Jonason, Li, & Buss, 2010), although the longitudinal interplay between mating behaviour and DT traits remains elusive to date (Holtzman & Strube, 2013a).

In this article, we investigate mate appeal and mating preferences associated with DT traits in a naturalistic speed-dating design. By this means, it is possible to study how individuals with dark personality traits are perceived by others (mate appeal of DT traits) and how they generally tend to perceive others (mating preferences associated with DT traits) in a real-life scenario. In addition, we consider important covariates of mate appeal and DT traits (PA and Big Five traits; refer to succeeding discussions).

### Mate appeal of Dark Triad traits

What makes self-centred, manipulative, and anti-social people appealing mates? Narcissism has been linked to outgoingness, boldness, charmingness, and popularity (e.g. Back *et al.*, 2010; Kufner, Nestler, & Back, 2013) so that narcissists may appear attractive for STM (Dufner *et al.*, 2013), although they can be perceived as unattractive after prolonged interaction (Leckelt, Kufner, Nestler, & Back, 2015; Paulhus, 1998), which might make them unattractive for LTM. Rauthmann and Kolar (2013) used vignettes of all DT traits to study how a fictitious opposite-sex narcissist, Machiavellian, and psychopath were perceived regarding their likeability, attractiveness, friend appeal, and mate appeal (short and long term). In general, narcissists were rated more favourably than Machiavellians and psychopaths (despite all three not obtaining high scores on any dimension). On the basis of the assumption that the DT traits evolved as specific facilitators of men's STM strategies, Carter, Campbell, and Muncer (2014a) had women rate male character vignettes and found that they rated fictitious high DT characters as more attractive than low DT characters. Notably, this attraction was not related to or explainable by perceived Big Five traits. In a series of three studies, Dufner *et al.* (2013) found that narcissism was associated with mate appeal of fictitious opposite-sex (Study 1) and also real same-sex persons (Study 2). Finally, in Study 3, they had men approach women in an ecologically valid field study. More narcissistic men were more successful in obtaining women's contact details and were rated higher on mate appeal by the approached women. Interestingly, these effects were mediated by men's PA and social boldness (which is closely linked to extraversion; e.g. Cattell, Eber, & Tatsuoka, 1970). Thus, the current study will also examine PA and extraversion as potential explainers of DT effects.

While the aforementioned studies have already allowed important insights into the links between DT traits and interpersonal attraction, they almost exclusively relied on self-reports of mating strategy (e.g. Jonason *et al.*, 2009; Jonason,

Luevano, & Adams, 2012b) or hypothetical experimental situations (Carter *et al.*, 2014a; Dufner *et al.*, 2013, Study 1; Rauthmann & Kolar, 2013). To date, only one study directly linked narcissism—the probably most important DT trait in the mating domain (Rauthmann & Kolar, 2013)—to attractiveness in real-life situations (Dufner *et al.*, 2013, Study 3). However, it is unclear whether the high mate appeal of narcissism might also generalize to women and to the other two DT traits. Thus, the current study seeks to investigate with a speed-dating paradigm to what extent and how DT traits sampled for both sexes are associated with attractiveness in actual, genuine STM contexts.

### Mating preferences associated with Dark Triad traits

Dark personalities are opportunistic, casual, volatile, and exploitative in mating contexts (Jonason & Kavanagh, 2010; Jonason *et al.*, 2012b; Jonason, Valentine, Li, & Harbeson, 2011). They are thus more drawn to volatile relationship contexts and follow STM rather than LTM strategies (Holtzman & Strube, 2013b; Jonason & Webster, 2010; Jonason *et al.*, 2009; Jonason & Kavanagh, 2010). This is true for narcissism (Bradlee & Emmons, 1992; Campbell & Foster, 2002; Campbell, Foster, & Finkel, 2002; Foster, Shrira, & Campbell, 2006), Machiavellianism (Jones & Paulhus, 2011; McHoskey, 2001; Paulhus & Williams, 2002), and psychopathy (Lalumière & Quinsey, 1996; Lalumière, Harris, Quinsey, & Rice, 2005; McHoskey, 2001; Vernon, Villani, Vickers, & Harris, 2008). Moreover, as mentioned earlier, DT traits might specifically predict the tendency to follow a STM strategy without an interest for LTM (Holtzman & Strube, 2013b). However, there are also differences between the DT traits. Narcissism goes along with entitlement and devaluation of others (Back *et al.*, 2010, 2013) so that it should be linked to ascribing others less mate appeal. Psychopathy is linked to a particularly impulsive and exploitative mating style (e.g. Figueredo *et al.*, 2006; Jonason *et al.*, 2009; Mealey, 1995), whereas Machiavellianism to a manipulative, deceptive, and coercive one (e.g. McHoskey, 2001; Jones & Paulhus, 2011). However, Machiavellianism might not be central to STM once variance from narcissism and psychopathy is controlled for (Jonason *et al.*, 2011), which fits to the finding that Machiavellians opportunistically pursue STM *and* LTM (e.g. Jones & Paulhus, 2011). Turning to sex differences, Carter, Campbell, and Muncer (2014b) showed that associations between DT traits and mating style (i.e. attitudes towards romance, attachment, and sex; recreational sexual behaviour) were the same for both sexes. The authors thus concluded that 'focus on DT as a male adaptation to short-term mating has been overstated and that men's greater preference for casual sexual encounters is not explained by DT traits' (p. 159). Hence, the current study examined actual behaviour as well as mate appeal ratings in a real-life scenario for both women and men.

### The speed-dating paradigm

In heterosexual speed dating, a group of women and men date each other for a brief time (usually only a few minutes), while partners are rotated such that each woman has dated

each man (and vice versa). Utilizing a speed-dating paradigm within a controlled laboratory setting has several advantages compared with other strategies. First, a relatively large number of dates can be economically studied within a single design. Second, a speed-dating set-up—even under controlled conditions—still allows for genuine interactions between people, and real mate choices are made. Such actual choices have been shown to be based on different processes than self-reports (e.g. Todd, Penke, Fasolo, & Lenton, 2007). As such, they could be seen as superior to self-reports of recalled or hypothetical mate choices and thus ensure higher ecological validity. Finally, the use of sophisticated statistical techniques such as multilevel analyses of social relations models (SRMs; refer to Method section) allows decomposing ratings made within each date into perceiver, target, and uniqueness/relationship components (Kenny, 1994). Such variance decomposition (and the extraction of effect scores) allows for a more fine-grained picture of processes and relations studied (e.g. Back et al., 2011a).

Given their desirable properties, speed-dating paradigms have been used in psychological research for several contexts. For example, they have been employed to study mating preferences in dependence of PA and social status (Li et al., 2013); how attachment anxiety affects early stages of relationship initiation (McClure & Lydon, 2014); how reciprocal mate choices are (Back et al., 2011c); to what extent people accurately judge their mate value (Back, Penke, Schmukle, & Asendorpf, 2011b); and to what extent speed dating leads to mating and relating up until 1 year after the speed-dating event (Asendorpf, Penke, & Back, 2011). However, there is to date no published study on the mate appeal and mating preferences associated with the DT traits in speed dating.

## THE CURRENT WORK

Previous literature postulated that the DT can be appealing in STM contexts and that individuals high on DT traits pursue more STM than LTM strategies. However, several questions remain unanswered. First, it is unclear to what extent such STM facilitation extends to both sexes as most studies have only employed male samples. It could be possible that men scoring high on DT traits are appealing to women (e.g. Dufner et al., 2013), but women scoring high on DT traits not to men. Second, it is also unclear to what extent dating/mating success generalizes across all three of the DT traits. Prior evidence points towards narcissism being the most attractive trait (e.g. Rauthmann & Kolar, 2012, 2013), but how do narcissism, Machiavellianism, and psychopathy predict interpersonal attraction vis-à-vis each other? Third, and most importantly, the dating/mating success of the DT traits, as measured in women and men, has not been investigated in naturalistic, real-life settings so far. Additionally, we will include two important correlates of mating success and the DT as covariates in this study: PA as the most important predictor of speed-dating success (Asendorpf et al., 2011) and one of the most important predictors of mating success in general (Feingold, 1990) as well as extraversion as the most robust Big Five correlate of narcissism (Lee & Ashton, 2005; Paulhus & Williams, 2002;

Robert & Robins, 2000). We seek to address two grand questions (each with three sub-questions).

### Question I: Mate appeal and the Dark Triad

*Question Ia: Relationship between the Dark Triad and being chosen by others (target effects)*

Is actual 'speed-dating success' (i.e. being chosen as a potential mate) associated with DT traits? For narcissism, we expected a positive association, and for Machiavellianism and psychopathy, we expected a neutral or negative association.

*Question Ib: Relationship between the Dark Triad and mate appeal as perceived by others (target effects)*

Is peer-rated mate appeal for STM and LTM relationships associated with DT traits? Again, we expected positive effects for narcissism and neutral or negative effects for Machiavellianism and psychopathy.

*Question Ic: Robustness of findings*

Are the associations found in Questions Ia and Ib dependent upon other characteristics of women and men, most notably PA and extraversion? While we expected positive effects of these variables on being chosen and mate appeal as perceived by others (e.g. Asendorpf et al., 2011; Back et al., 2011c; Luo & Zhang, 2009), we were primarily interested if associations between DT traits and being chosen as well as mate appeal still hold when controlling for PA and extraversion. This should grant insights into some driving forces behind dark traits' potential appeal.

### Question II: Mating preferences and the Dark Triad

*Question IIa: Relationship between the Dark Triad and choosing others (perceiver effects)*

The DT traits should be generally linked to STM rather than LTM strategies, but to what extent are individuals scoring high on DT traits more or less choosy in selecting mates? Because previous studies focused on ratings and self-reports of hypothetical situations, little is known about the actual mate choices related to DT traits. Narcissists, for instance, could be choosy because they desire high-quality mates that match their own presumed high quality, or they could be less choosy to keep many options 'open'. Given these considerations and the lack of prior research, we could not formulate *a priori* hypotheses.

*Question IIb: Relationship between the Dark Triad and perceiving others' mate appeal (perceiver effects)*

Are DT traits associated with how partners' STM or LTM mate appeal is perceived? Again, people scoring high in DT traits should pursue STM rather than LTM strategies, but narcissism has also been shown to correlate with entitlement and devaluation of others so that it should be linked to ascribing others less mate appeal. No concrete predictions were made *a priori* for Machiavellianism and psychopathy.

*Question IIc: Robustness of findings*

Again, we investigated whether the associations found in Questions IIa and IIb might depend upon other characteristics

of women and men, most notably PA (which goes along with choosiness; Back *et al.*, 2011a) and extraversion (as a central Big Five correlate of narcissism).

## METHOD

### Participants

Participants were approached mostly via social media (e.g. Facebook) as well as the electronic calendar of the University of Graz. They were invited to participate in an electronic survey and were offered the participation in a speed dating without any fees. Students of psychology (33%) additionally received course credits. One hundred and seventy individuals completed an online test battery. After this, they were informed about modalities of the speed dating via email. Finally, 90 participants (46 women) aged 18 to 32 years ( $M=22.87$ ,  $SD=3.10$ ) attended one of three speed-dating events (ratios of women:men were 14:11, 19:18, and 13:15 in the three speed-dating sessions, respectively), resulting in a total number of 691 dates. Only six women and three men had formerly participated in a speed dating. Most participants were single; six indicated being in a relationship,<sup>2</sup> and one in a polyamorous relationship. Eighty-three participants were students, and 29 had jobs. No participant had children. Sixteen women (34.8%) used hormonal contraceptives.

### Measures

#### *Pre-event internet survey*

Via LimeSurvey ([www.limesurvey.com](http://www.limesurvey.com)), participants completed German versions of inventories measuring the DT traits, Big Five, and sociosexual orientation (with the latter not being relevant to this research; refer to the Supporting Information for descriptives and correlations).

**Dark Triad.** Narcissism was assessed with the Narcissistic Personality Inventory (Revised German version by Zimmermann, 1994) with 40 items on a 4-point Likert-type scale. Psychopathy was assessed with the Levenson Self-Report Psychopathy Scale (Levenson, Kiehl, & Fitzpatrick, 1995) with 26 items on a 4-point Likert-type scale. Machiavellianism was assessed with the Machiavellianism scale (Christie & Geis, 1970; German version by Henning & Six, 1977) with 18 items on a 5-point Likert-type scale.

**Big Five.** The Big Five traits (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness) were assessed with the short Big Five Inventory (Rammstedt & John, 2005) with 21 items on a 5-point Likert-type scale.

#### *Speed dating*

Upon arrival at the speed-dating event, each participant received a booklet of score cards containing two items on acquaintanceship (*Have you met this person before? Do you*

*know him/her personally?*), five items for estimating the date's Big Five traits (Five-Item Personality Inventory; Rammstedt, Koch, Borg, & Reitz, 2004), and one item for estimating the date's PA, likeability, and intelligence (each on a 7-point Likert-type scale from *strongly disagree* to *strongly agree*; but these data will not be analysed here). The date's appeal for different relationship types was assessed with one item each (e.g. 'I would like this person for a one night stand' on a 7-point Likert-type scale ranging from *strongly disagree* to *strongly agree*) for *friendship*, *one-night stand*, *booty call* (i.e. arranging meetings purely for sex on an *ad hoc* basis), *friends-with-benefits* (i.e. friends having a sexual relationship without being emotionally involved), and for *long-term relationship*. In the following, we refer to these scales as *friend and mate appeal*. Finally, participants were asked to indicate for each date whether they wanted to see her or him again or not,<sup>3</sup> to which we refer to as *actual mate choice*.

#### *Physical attractiveness*

Ratings of participants' PA were obtained from four external raters (two men and two women) who did not participate in the speed-dating events. Photos were taken by a professional photographer prior to the speed-dating sessions and were standardized with respect to size and lighting conditions. All raters judged the PA of each participant on a 7-point Likert-type scale ranging from *not attractive at all* to *very attractive* (Asendorpf *et al.*, 2011; Back *et al.*, 2011c). Ratings showed good intraclass correlation coefficient agreement (Table 1). Because PA ratings given by speed-dating participants were highly correlated with their likeability ratings ( $r=.73$ ), we used the external PA ratings for further analyses to avoid overly confounding effects of appearance and personality/behaviour. PA ratings obtained from external raters and participants' likeability ratings correlated only at  $r=.41$ .

### Speed-dating procedure

We mostly followed the procedure of Asendorpf *et al.* (2011). All three speed-dating sessions took place at 5 PM on regular working days. Men and women entered the main building of the University of Graz from different streets and were guided to separate waiting rooms to avoid any meeting before the speed dating. After having taken standard photos of the face and reported their height and weight, each person received a badge with a code and a block of score cards. The dates took place in specially prepared booths in the Aula Magna of the university, each equipped with opposing chairs. Women were asked to take seats in the booths before the men entered the Aula and were led to the booths. They sat with the back to the booth entrance and stayed in their booth until they had interacted with all men. Each date lasted 3 minutes; the man left the booth upon a ringing of a bell after which he proceeded to the next booth. After men

<sup>2</sup>Analyses were also carried out without these persons. The pattern of results did not change. Moreover, all of these persons indicated that they wanted to see others for further dates. Thus, these persons were kept in the sample to maximize power in subsequent analyses.

<sup>3</sup>Contrary to the rating data, this information was actually used for informing participants about their contact details in case of mutual matches. Participants were aware about this procedure.

Table 1. Descriptive statistics, reliabilities, and intercorrelations of the individual difference measures

Variables	Min–max	Mean ( <i>SD</i> )	Rel.	1	2	3	4	5	6	7	8	9
Narcissism (1)	1.70–3.38 2.00–3.65	2.57 (0.35) 2.66 (0.34)	.89 .88		<b>.55</b>	<b>.62</b>	–.29	<b>.37</b>	–.06	–.12	.07	<b>.51</b>
Psychopathy (2)	1.35–2.77 1.42–3.50	1.99 (0.34) 2.13 (0.38)	.81 .86	<b>.31</b>		<b>.69</b>	.04	.22	–.12	–.23	<b>–.35</b>	<b>.39</b>
Machiavellianism (3)	1.39–4.44 1.61–4.83	2.60 (0.62) 2.91 (0.68)	.83 .86	.29	<b>.67</b>		.01	.01	.04	–.24	.03	.22
Neuroticism (4)	1.75–4.75 1.00–4.25	3.10 (0.80) 2.47 (0.97)	.76 .83	<b>–.40</b>	.05	.17		–.22	.09	–.27	–.06	–.08
Extraversion (5)	2.25–5.00 1.00–5.00	3.81 (0.76) 3.63 (0.85)	.74 .79	<b>.62</b>	–.01	–.05	<b>–.64</b>		.12	.21	.07	.28
Openness (6)	1.00–5.00 1.75–5.00	4.11 (0.78) 4.03 (0.74)	.83 .77	<b>.40</b>	.18	<b>.37</b>	.08	.16		.10	.22	–.14
Agreeableness (7)	2.00–4.25 1.50–4.75	3.26 (0.60) 3.13 (0.78)	.30 .64	–.24	<b>–.49</b>	–.16	–.09	.01	.02		.12	–.18
Conscientiousness (8)	1.75–4.75 2.00–4.25	3.58 (0.71) 3.11 (0.75)	.75 .69	<b>.37</b>	.06	.06	–.01	.25	<b>.57</b>	.11		–.29
Physical attractiveness (9)	2.00–6.50 1.75–6.25	4.05 (1.19) 3.76 (1.08)	.80 .76	.09	–.14	–.12	–.08	.17	.16	.11	–.03	

Note: Women ( $n = 46$ ) are represented in the upper row/above the diagonal and men ( $n = 44$ ) in the bottom row/below the diagonal. Statistically significant associations ( $p < .05$ ) are indicated in bold.

Rel., internal consistency (Cronbach's alpha).

had left a booth but before entering the next, both sexes entered their responses on one score card for each date. After filling in the score cards, another bell ringing signalled men to enter the next booth. After half of the dates, a pause allowed the participants to visit rest rooms in different parts of the building, ensuring that no contact between men and women was possible.

Also following the procedure of Asendorpf et al. (2011), a revision of each rating (except Big Five) was allowed on separate score cards after the end of a session. To aid remembering each date, photos of all partners were shown for the revision procedure (revisions were performed silently in groups of men and women in separate rooms). Finally, the score cards were collected, and participants received a debriefing and were asked for permission to use the photos. Within the next days, participants' choices were processed, and in case of matching mutual choices, they were sent the dating partners' contact details via email.

### Data-analytical strategy

Speed-dating studies yield a complex hierarchical data structure ranging from the dyad over the person to the group level. According to the SRM (Kenny, 1994; Kenny, Kashy, & Cook, 2006), rating scores in dyadic data can be decomposed into different variance sources: *perceiver* (also called *actor*), *target* (also called *partner*), and *relationship* (perceiver  $\times$  target interaction) plus error variance. SRM does allow not only quantifying those variance sources in ratings but also deriving individual-level effect scores. A *perceiver effect* indicates how individuals generally view others, while a *target effect* how they are generally perceived by others. For instance, for the variable '(I want this person as a) one night stand', the perceiver effect reflects a person's tendency to generally rate others as appealing for one-night stands (*mating preference*), while the target effect reflects how

appealing a person generally is for one-night stands (*mate appeal*). Relationship and error (which cannot be commonly disentangled unless using latent variable models with multiple indicators per variable; Schönbrodt, Back, & Schmukle, 2012) indicate the unique interaction between a perceiver and a target beyond the main effects of perceiver and target. We assessed perceiver and target effects using multilevel modelling (MLM). MLM allows for the estimation of perceiver and target effects in each rating variable and, most importantly, provides the opportunity to incorporate individual difference predictors of these effects directly into the model. Model estimation was performed in SPSS 22 using the MIXED module with restricted maximum likelihood estimation. In the MLM, dyadic interactions (level 1) are nested within individuals (level 2) who are again nested in dating groups (level 3). All factors were modelled in exact correspondence to the syntax provided by Ackerman, Kashy, and Corretti (2015), which give a detailed tutorial on how to model SRM parameters using MLM in asymmetric block designs such as speed dating (see also Kenny, 2007). As common in speed-dating research, parameter estimation was performed separately for women and men in the MLMs, as sex is the most clearly distinguishing variable in the mating domain (e.g. Buss, 2003). In the main analyses of target and perceiver effects, we additionally considered sex as a moderating variable. In all analyses, only dates in which participants were not familiar to each other (88–100% of dyads per speed-dating session, or 143, 313, and 182 dates in the three sessions, respectively) were taken into account.

Prior to estimating perceiver and target effects on the individual level, we assessed the significance of perceiver and target variance (i.e. is there significant variability in actual mate choice and each of the rating variables?). As common in SRM research, we also report reciprocity correlations of the involved interpersonal rating variables (Back et al., 2011c). To this end, generalized reciprocity refers to the

correlation between a person's perceiver and target effects (i.e. Is a person who rates others as desirable also perceived as desirable by others?), while dyadic reciprocity refers to the correlation between a particular dyad's relationship effects (i.e. Does liking a particular person go along with being liked by that particular person?).

To examine the relationship between perceiver/target effects for different relationship types and the DT traits (Questions Ia, Ib, IIa, and IIb), we used DT variables as person-level predictors in the MLMs. In order to obtain standardized regression coefficients, all involved predictor and criterion variables were  $z$ -transformed across the entire sample (i.e. across sexes and dating groups) as described in Ackerman *et al.* (2015).<sup>4</sup> The three DT variables were incorporated as fixed effects in one regression model for each relationship type. In a further step, we added potential control variables (PA and extraversion) to the MLMs to test for the robustness of the obtained findings, thus addressing our Questions Ic and IIc. Finally, to ensure comparability to previous studies that did not use MLM, we also report zero-order correlations between target effects (obtained by regular SRM analyses using the formulae provided by Kenny *et al.*, 2006) and personality and individual difference variables in the Supporting Information. Data and syntax in SPSS format can be obtained via the open science framework [osf.io/jvk3u](https://osf.io/jvk3u).

## RESULTS

### Preliminary analyses: Descriptives, sex differences, and intercorrelations

Normality of all variables was assessed by means of the Kolmogorov–Smirnov test, which was not significant for any of the involved measures ( $ps > .12$ ). Mean differences were examined by  $t$ -tests for independent samples; corrected degrees of freedom were used in case of variance inhomogeneity between the groups.

On average, women were chosen for further dates by 48% ( $SD = 27\%$ ) of men, while men were chosen by 30% ( $SD = 21\%$ ) of women, and this difference was significant,  $t(88) = 3.55$ ,  $p < .001$ ,  $d = 0.76$ . Women were also perceived as more appealing for all relationship types involving sexual contact [one-night stand:  $t(78.60) = 9.56$ ,  $p < .001$ ,  $d = 2.16$ ; booty call:  $t(69.93) = 9.76$ ,  $p < .001$ ,  $d = 2.33$ ; friends-with-benefits:  $t(70.73) = 8.86$ ,  $p < .001$ ,  $d = 2.11$ ; long-term relationship:  $t(88) = 4.18$ ,  $p < .001$ ,  $d = 0.89$ ], but not for friendships,  $t(88) = -0.21$ ,  $p = .83$ .

Table 1 shows the descriptive statistics and intercorrelations of all individual difference variables. Regarding self-reported DT and Big Five personality traits, there were significant mean differences between the sexes in Machiavellianism,  $t(88) = -0.24$ ,  $p = .03$ ,  $d = -0.48$ , neuroticism,  $t(88) = 3.39$ ,  $p < .001$ ,  $d = 0.72$ , and conscientiousness,  $t(88) = 3.03$ ,  $p < .001$ ,  $d = 0.65$ . The three DT traits showed substantial intercorrelations in both sexes (although the

correlation between narcissism and Machiavellianism failed to reach statistical significance in men;  $p = .06$ ). Extraversion was related to narcissism in both sexes, while this correlation was more pronounced in men (although not statistically different from women's correlation; Steiger's  $z = 1.58$ ,  $p_{\text{two-tailed}} = .11$ ). PA ratings did not differ significantly between the sexes ( $p = .22$ ,  $d = 0.27$ ) and were significantly correlated with narcissism and psychopathy in women, while there were no correlations between PA and personality traits in men.

### Social relations modelling

#### Variance partitioning

As target and perceiver effects for STM ratings (one-night stand, booty call, and friends-with-benefits) were highly intercorrelated ( $rs = .96$ – $.98$  and  $.82$ – $.94$  for target and perceiver effects, respectively), we aggregated these scores to an average short-term relationship indicator prior to further analyses. Thus, all subsequent analyses focus on SRM parameters of *actual mate choice*, *friendship* (FS), *short-term relationship* (STR), and *long-term relationship* (LTR). Each of these scores displayed significant perceiver and target variance (Table 2). Perceiver and target components accounted for 6% to 34% of variance in the different scores, while relationship plus error variance accounted for 48% to 80%.

#### Reciprocities

As can be seen in Table 3, there was a negative generalized reciprocity for LTRs in both sexes (i.e. a woman/man who generally indicated interest in LTR to other men/women was generally perceived as an unattractive LTR partner by her/his partners). The same trend was apparent for actual mate choices, although reciprocity correlations did not reach statistical significance ( $p = .06$  for women and men, respectively). Significant positive dyadic reciprocity correlations were observed for actual mate choices and FS ratings, indicating that those individuals who wanted to see a particular dating partner again or rated a particular dating partner as desirable as a friend received similar ratings from this dating partner. This was the case for STR only by trend ( $p = .06$ ), while no evidence for dyadic reciprocity was observed for LTR ( $p = .63$ ).

### Question I

#### Question Ia and b: The Dark Triad and target effects of mate choices and mate appeal

We tested the specific effects of DT traits on actual choices and mate appeal using MLM in which all three predictor variables were entered simultaneously (i.e. unique effects of narcissism, psychopathy, and Machiavellianism controlling for the other two; Table 4). In women, narcissism and psychopathy displayed positive effects on being chosen as a mate (Question Ia) and STR ratings (Question Ib). Narcissism also significantly predicted LTR (Question Ib) ratings. Machiavellianism, in contrast, was negatively associated with being chosen (Question Ia) and STR ratings (Question Ib). In men, none of the DT traits were significantly associated with being chosen as a mate, but there was a trend for

<sup>4</sup>Standardization was performed on the bases of pairwise data for SRM variables and personwise data for individual difference variables.

Table 2. SRM variance partitioning for the involved rating variables

Variables	Relative percentage of variance in dating record variable accounted for by SRM component			Total variance
	Perceiver	Target	Relationship plus error	
Actual choice (yes/no)				
M → W	15.26**	20.69**	64.05	0.25
W → M	8.10**	17.83**	74.07	0.21
Friendship				
M → W	34.00**	6.03**	59.97	2.96
W → M	10.78**	9.44**	79.78	3.60
Short-term relationship				
M → W	23.31**	28.71**	47.98	3.47
W → M	27.61**	17.73**	54.65	1.94
Long-term relationship				
M → W	27.86**	23.65**	48.49	3.35
W → M	28.33**	11.87**	59.81	2.84

Note: W → M, women rating men; M → W, men rating women. The percentages in each row add up to 100%. The first row, for example, reads as follows: Men's ratings of women were accounted for by 15.26% perceiver variance (men's characteristics), 20.69% target variance (women's characteristics), and 64.05% relationship and error variance. SRM, social relations model.

\*\* $p < .01$  using the Wald tests provided by SPSS.

Table 3. Reciprocity correlations for the involved rating variables

Variables	Generalized reciprocity coefficients		Dyadic reciprocity coefficients
	Women	Men	
Actual choice	-.39	-.35	.13**
Friendship	.19	-.14	.13**
Short-term relationship	-.08	-.13	.08
Long-term relationship	-.38*	-.38*	.02

Note:

\* $p < .05$ ;

\*\* $p < .01$ .

narcissism ( $p = .09$ ; Question Ia). Narcissism was significantly associated with STR and LTR ratings (Question Ib). The effects of all DT traits on STR were significantly moderated by sex ( $ps = .02-.03$ ) in the way that slopes were higher for women than for men (Table 4). The effect of psychopathy on actual choices was also significantly moderated ( $p < .05$ ; positive association in women, insignificant association in men; Table 4). The other effects were not moderated ( $ps = .09-.61$ ).

#### Question Ic: Target effects associated with the Dark Triad corrected for important covariates

We sought to evaluate to what extent the relationships between DT traits and mate appeal ratings were independent of PA and extraversion (note that narcissism and PA were substantially correlated in women, while narcissism and extraversion were substantially correlated in men; Table 1).

Table 5 shows the MLMs from Questions Ia and b with PA and extraversion as additional predictors. As soon as PA is controlled (Model I), no significant effects of DT traits were evident in women. In men, controlling for PA also led to insignificant effects of DT traits, but narcissism still displayed tendencies towards positive effects on STR and LTR ratings ( $ps = .06-.07$ ). PA by itself was associated with being chosen as a mate and all mate appeal ratings in both sexes. These effects appear to be more pronounced in women.

The same analyses were performed for extraversion as a control variable (note that extraversion was the only Big Five trait related to actual mate choices and mate appeal ratings; Supporting Information). Table 5 (Model II) shows the MLM effects. In women, narcissism still had significant effects on being chosen as a mate and STR as well as LTR

Table 4. MLM standardized estimates of target effects regressed on Dark Triad traits

	Actual choice		Friendship		Short-term relationship		Long-term relationship	
	$\beta$ (95% CI)	$p$	$\beta$ (95% CI)	$p$	$\beta$ (95% CI)	$p$	$\beta$ (95% CI)	$p$
Women								
Narcissism	<b>.24 (.05 to .42)</b>	<b>.01</b>	.01 (-.11 to .14)	.81	<b>.36 (.17 to .54)</b>	<b>.00</b>	<b>.21 (.02 to .40)</b>	<b>.03</b>
Psychopathy	<b>.21 (.01 to .42)</b>	<b>.04</b>	.10 (-.03 to .24)	.14	<b>.25 (.04 to .45)</b>	<b>.02</b>	.14 (-.06 to .35)	.17
Machiavellianism	<b>-.25 (-.46 to -.03)</b>	<b>.03</b>	-.10 (-.25 to .04)	.16	<b>-.28 (-.49 to -.06)</b>	<b>.01</b>	-.08 (-.30 to .13)	.45
Men								
Narcissism	.13 (-.02 to .28)	.09	.09 (-.04 to .22)	.18	<b>.12 (.01 to .23)</b>	<b>.03</b>	<b>.13 (.01 to .25)</b>	<b>.04</b>
Psychopathy	-.08 (-.28 to .12)	.44	-.02 (-.20 to .16)	.81	-.05 (-.20 to .09)	.47	-.06 (-.22 to .10)	.44
Machiavellianism	.00 (-.19 to .19)	.99	-.05 (-.22 to .13)	.59	.00 (-.14 to .14)	.98	.02 (-.14 to .17)	.83

Note: Statistically significant associations ( $p < .05$ ) are indicated in bold.

MLM, multilevel modelling.

Table 5. MLM standardized estimates of target effects regressed on Dark Triad traits and physical attractiveness (Model I)/extraversion (Model II)

	Actual choice		Friendship		Short-term relationship		Long-term relationship	
	$\beta$ (95% CI)	<i>p</i>	$\beta$ (95% CI)	<i>p</i>	$\beta$ (95% CI)	<i>p</i>	$\beta$ (95% CI)	<i>p</i>
<b>Model I</b>								
Women								
Narcissism	.02 (–.08 to .12)	.73	–.04 (–.17 to .08)	.48	.08 (–.10 to .25)	.37	.00 (–.19 to .18)	.96
Psychopathy	.07 (–.04 to .18)	.21	.06 (–.08 to .19)	.39	.06 (–.12 to .24)	.50	.00 (–.19 to .19)	.98
Machiavellianism	–.10 (–.22 to .01)	.08	–.06 (–.21 to .08)	.37	–.06 (–.25 to .13)	.51	.07 (–.13 to .27)	.46
Physical attractiveness	<b>.35 (.27 to .44)</b>	<b>.00</b>	<b>.11 (.01 to .21)</b>	<b>.03</b>	<b>.43 (.29 to .56)</b>	<b>.00</b>	<b>.35 (.21 to .49)</b>	<b>.00</b>
Men								
Narcissism	.09 (–.04 to .22)	.19	.07 (–.06 to .20)	.29	.09 (.00 to .18)	.06	.10 (–.01 to .20)	.07
Psychopathy	–.03 (–.20 to .15)	.76	.01 (–.17 to .18)	.93	–.01 (–.14 to .11)	.83	–.02 (–.16 to .12)	.79
Machiavellianism	.00 (–.17 to .17)	.98	–.05 (–.21 to .12)	.57	.00 (–.12 to .12)	.98	.02 (–.12 to .15)	.81
Physical attractiveness	<b>.25 (.11 to .38)</b>	<b>.00</b>	<b>.14 (.01 to .27)</b>	<b>.04</b>	<b>.19 (.10 to .29)</b>	<b>.00</b>	<b>.20 (.10 to .31)</b>	<b>.00</b>
<b>Model II</b>								
Women								
Narcissism	<b>.21 (.01 to .40)</b>	<b>.04</b>	–.06 (–.18 to .06)	.29	<b>.32 (.12 to .52)</b>	<b>.00</b>	<b>.21 (.01 to .40)</b>	<b>.04</b>
Psychopathy	.19 (–.02 to .40)	.07	.05 (–.08 to .18)	.42	<b>.22 (.00 to .43)</b>	<b>.05</b>	.14 (–.07 to .35)	.20
Machiavellianism	–.21 (–.44 to .02)	.07	–.02 (–.16 to .12)	.77	<b>–.23 (–.46 to .00)</b>	<b>.05</b>	–.08 (–.31 to .15)	.51
Extraversion	.08 (–.08 to .23)	.33	<b>.16 (.06 to .26)</b>	<b>.00</b>	.09 (–.06 to .24)	.23	.01 (–.14 to .16)	.89
Men								
Narcissism	.06 (–.14 to .27)	.53	.07 (–.12 to .26)	.45	.08 (–.07 to .23)	.29	.11 (–.06 to .28)	.22
Psychopathy	–.07 (–.27 to .13)	.49	–.02 (–.20 to .16)	.84	–.05 (–.19 to .10)	.52	–.06 (–.22 to .10)	.47
Machiavellianism	.02 (–.18 to .21)	.87	–.04 (–.22 to .14)	.63	.01 (–.13 to .16)	.86	.02 (–.14 to .18)	.78
Extraversion	.09 (–.10 to .28)	.34	.03 (–.14 to .19)	.76	.05 (–.09 to .19)	.45	.03 (–.12 to .18)	.69

Note: Statistically significant associations ( $p < .05$ ) are indicated in bold. MLM, multilevel modelling.

ratings. Extraversion was not associated with being chosen as a mate or mate appeal ratings (STR and LTR) but only with FS ratings. In men, no significant effects or tendencies were observed as soon as extraversion was controlled for ( $ps = .22-.87$ ).

## Question II

*Question IIa and b: The Dark Triad and perceiver effects of mate choices and mate appeal ratings of others*

Again, we used MLM to investigate the specific effects of DT traits on choosing and perceiving others (Table 6). No effects emerged with respect to actual mate choice in women or men (Question IIa). Psychopathy was significantly associated with perceiver effects of STR ratings in women (Question IIb). In men, narcissism displayed negative associations with STR and LTR ratings (Question IIb). None of the perceiver effects were significantly moderated by sex ( $ps = .08-.81$ ).

*Question IIc: Perceiver effects associated with the Dark Triad corrected for important covariates*

As also in the analysis of target effects, we were interested in the robustness of findings when controlling for variables of interest (i.e. PA and extraversion). When controlling for PA (Table 7, Model I), psychopathy displayed a positive association with actual mate choices and STR ratings in women. Machiavellianism and PA showed negative associations with mate choices and LTR ratings. In men, narcissism was negatively associated with STR and LTR ratings, while PA was positively associated with STR ratings.

When controlling for extraversion (Table 7, Model II), FS ratings were negatively associated with narcissism and positively associated with extraversion in women. In men, extraversion was negatively associated with FS and STR ratings.

## Complementary commonality analyses for target effects of mate choices and mate appeal

We observed substantial amounts of shared variance between narcissism and PA in women and narcissism and extraversion in men. To further investigate the role of these variables for SRM target effects, we additionally conducted commonality analyses that allow for the estimation of unique and common portions of variance of a set of variables. For instance, given two variables *A* and *B* predicting outcome *Y*, commonality analysis allows for the estimation of the unique effect of *A*, the unique effect of *B*, and the common (shared) effect of *A + B*. These effects add up to 100%, which reflects  $R^2$  (i.e. the portion of variance in *Y* that can be explained by *A*, *B*, and *A + B*). Additionally, the total effect of each variable can be expressed as the sum of its unique and common effects. This renders a more complete picture of the practical relevance of predictor variables as not only unique contributions but also common contributions of certain variables are estimated (Nimon & Oswald, 2013).

We conducted commonality analyses using the 'yhat' package (Nimon, Lewis, Kane, & Haynes, 2008) for the open statistics software R. Analyses were performed separately for women and men using either narcissism and PA (women) or narcissism and extraversion (men) as predictors. Target effects (according to the SRM formulae; Kenny et al., 2006) of actual choice, STR, and LTR were used as dependent variables (FS was not



Table 6. MLM standardized estimates of perceiver effects regressed on Dark Triad traits

	Actual choice		Friendship		Short-term relationship		Long-term relationship	
	$\beta$ (95% CI)	<i>p</i>	$\beta$ (95% CI)	<i>p</i>	$\beta$ (95% CI)	<i>p</i>	$\beta$ (95% CI)	<i>p</i>
Women								
Narcissism	-.06 (-.20 to .09)	.43	-.08 (-.24 to .09)	.34	-.01 (-.18 to .16)	.89	.00 (-.22 to .21)	.98
Psychopathy	.04 (-.12 to .20)	.61	-.03 (-.21 to .15)	.72	<b>.19 (.00 to .37)</b>	<b>.05</b>	-.01 (-.25 to .23)	.92
Machiavellianism	-.02 (-.20 to .16)	.80	-.09 (-.29 to .11)	.36	-.15 (-.35 to .06)	.15	-.17 (-.43 to .09)	.19
Men								
Narcissism	-.03 (-.19 to .12)	.67	-.17 (-.36 to .02)	.07	<b>-.19 (-.35 to -.02)</b>	<b>.03</b>	<b>-.22 (-.39 to -.04)</b>	<b>.02</b>
Psychopathy	.10 (-.10 to .31)	.30	-.17 (-.42 to .07)	.16	-.01 (-.22 to .21)	.96	-.18 (-.40 to .05)	.12
Machiavellianism	-.11 (-.30 to .09)	.28	.16 (-.08 to .39)	.19	-.03 (-.24 to .18)	.77	.13 (-.09 to .35)	.24

Note: Statistically significant associations ( $p < .05$ ) are indicated in bold.

MLM, multilevel modelling.

Table 7. MLM standardized estimates of perceiver effects regressed on Dark Triad traits and physical attractiveness (Model I)/extraversion (Model II)

	Actual choice		Friendship		Short-term relationship		Long-term relationship	
	$\beta$ (95% CI)	<i>p</i>	$\beta$ (95% CI)	<i>p</i>	$\beta$ (95% CI)	<i>p</i>	$\beta$ (95% CI)	<i>p</i>
Model I								
Women								
Narcissism	.08 (-.02 to .18)	.11	-.03 (-.21 to .15)	.74	.06 (-.12 to .24)	.52	.18 (-.03 to .38)	.09
Psychopathy	<b>.14 (.03 to .24)</b>	<b>.01</b>	.00 (-.19 to .19)	.99	<b>.23 (.03 to .42)</b>	<b>.02</b>	.10 (-.12 to .32)	.36
Machiavellianism	<b>-.12 (-.24 to -.01)</b>	<b>.04</b>	-.12 (-.32 to .08)	.24	-.20 (-.41 to .01)	.06	<b>-.29 (-.53 to -.05)</b>	<b>.02</b>
Physical attractiveness	<b>-.26 (-.34 to -.18)</b>	<b>.00</b>	-.09 (-.23 to .05)	.20	-.11 (-.25 to .04)	.15	<b>-.30 (-.47 to -.14)</b>	<b>.00</b>
Men								
Narcissism	-.02 (-.18 to .14)	.77	-.16 (-.35 to .03)	.10	<b>-.22 (-.37 to -.06)</b>	<b>.01</b>	<b>-.22 (-.40 to -.04)</b>	<b>.02</b>
Psychopathy	.10 (-.11 to .30)	.36	-.19 (-.44 to .06)	.14	.03 (-.18 to .23)	.78	-.17 (-.41 to .06)	.14
Machiavellianism	-.11 (-.31 to .09)	.28	.16 (-.08 to .39)	.19	-.03 (-.22 to .17)	.78	.13 (-.09 to .35)	.24
Physical attractiveness	-.06 (-.22 to .10)	.44	-.08 (-.27 to .11)	.42	<b>.17 (.01 to .32)</b>	<b>.04</b>	.01 (-.17 to .19)	.90
Model II								
Women								
Narcissism	-.08 (-.24 to .08)	.33	<b>-.17 (-.33 to .00)</b>	<b>.04</b>	-.05 (-.23 to .13)	.58	.00 (-.24 to .23)	.99
Psychopathy	.03 (-.14 to .20)	.72	-.08 (-.26 to .09)	.33	.16 (-.03 to .36)	.09	-.01 (-.26 to .24)	.93
Machiavellianism	.00 (-.19 to .19)	.97	.00 (-.20 to .20)	1.00	-.11 (-.33 to .11)	.32	-.17 (-.45 to .11)	.22
Extraversion	.04 (-.10 to .17)	.58	<b>.18 (.04 to .32)</b>	<b>.01</b>	.07 (-.08 to .23)	.33	-.01 (-.20 to .19)	.96
Men								
Narcissism	.02 (-.19 to .23)	.85	.02 (-.23 to .26)	.90	-.04 (-.25 to .18)	.74	-.08 (-.31 to .16)	.51
Psychopathy	.10 (-.11 to .30)	.34	-.20 (-.43 to .04)	.10	-.02 (-.23 to .18)	.81	-.19 (-.42 to .03)	.08
Machiavellianism	-.12 (-.32 to .08)	.24	.11 (-.12 to .34)	.34	-.07 (-.27 to .13)	.51	.09 (-.12 to .31)	.38
Extraversion	-.07 (-.26 to .12)	.47	<b>-.25 (-.47 to -.03)</b>	<b>.03</b>	<b>-.20 (-.40 to -.01)</b>	<b>.04</b>	-.19 (-.40 to .02)	.08

Note: Statistically significant associations ( $p < .05$ ) are indicated in bold.

MLM, multilevel modelling.

used as we found no effects of narcissism on FS). Figure 1 displays the unique and common contributions to  $R^2$  separately for both sexes. The total (unique + common) effects of narcissism on choice, STR, and LTR were 29%, 38%, and 38%, respectively (and were thus virtually equal to the common variance of narcissism and PA; Figure 1). In men, the total effects of narcissism were 65%, 81%, and 27% for choices, STR, and LTR. The unique effects of narcissism on choice, STR, and LTR were 1%, 2%, and 2% in women, and 7%, 18%, and 20% in men, respectively.

## DISCUSSION

Before we deal with our main research questions of relations between DT traits and being chosen as a mate as well as mate

appeal, some important preliminary findings shall be outlined: In our sample, we found substantial intercorrelations among the DT traits in both sexes. As expected, narcissism was substantially correlated with extraversion in both sexes, but we did not find the frequently reported negative association with agreeableness (which is probably due to the low reliability of the scale). All rating variables of mate choice and mate appeal displayed significant target and perceiver variance in women and men, respectively. Thus, interpersonal perceptions of mate appeal were not only due to relationship (i.e. how a particular person is perceived by another particular person) plus error variance but also due to significant inter-individual differences in being perceived by others (target variance) and perceiving others (perceiver variance). Most importantly, these differences were related

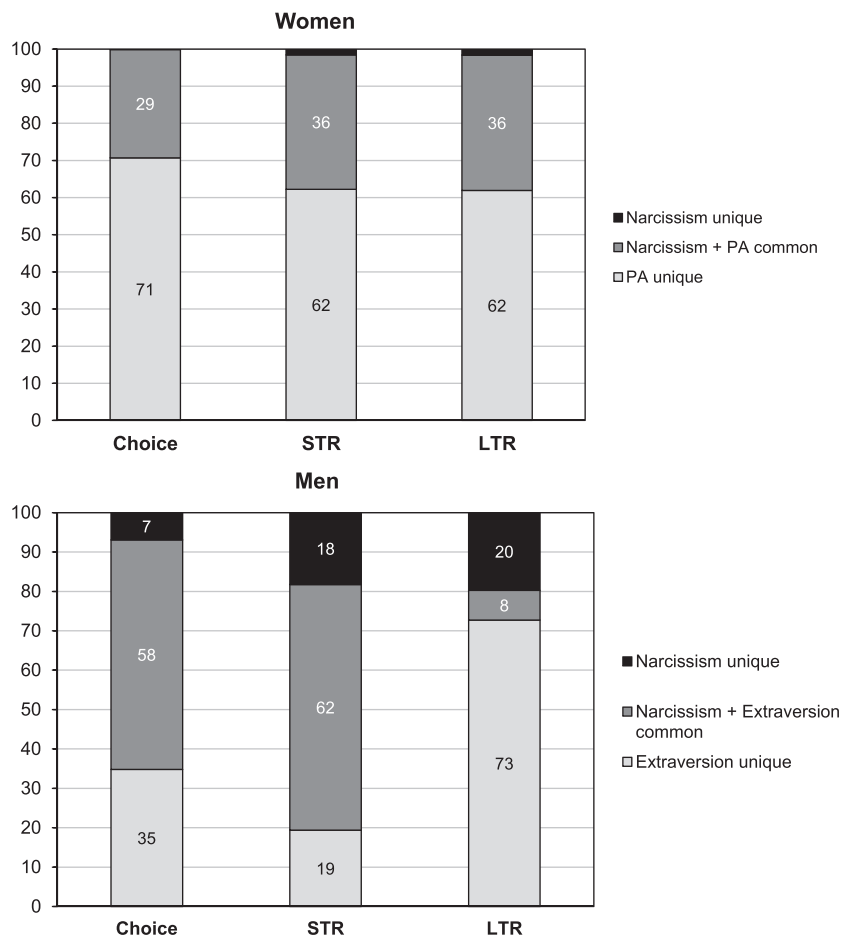


Figure 1. Commonality analyses of narcissism and physical attractiveness.

to personality traits in a systematic manner. The effect sizes of associations between target/perceiver effects and personality traits were generally small to moderate but of comparable size with that of previous research (e.g. Ackerman et al., 2015). To this end, it is important to consider that the effects were obtained by means of MLM, which means that small effects can be significant because they were obtained on a large basis of dyadic data.

Moreover, it is interesting to note that generalized reciprocity correlations were significant only for LTR and were negative such that both women and men who tended to view other partners as desirable for LTRs were *not* viewed as desirable partners by others on average. By trend, this also applied to actual mate choices: Individuals who may somehow appear to be ‘in desperate need’ for a partner are less likely to be chosen by others (and vice versa). Dyadic reciprocity correlations (i.e. the correlation between a person’s rating of a particular partner and this particular person’s mutual rating) were—in contrast—positive, markedly lower than generalized reciprocity estimates and statistically significant for actual mate choices and FS ratings. This suggests that there is at least some agreement between dating partners when it comes to actual choices and FS, which was not the case for relationship ratings involving sexual contact (STR and LTR). Negative generalized reciprocity alongside positive dyadic reciprocity is a common

finding in speed-dating research (Ackerman et al., 2015; Back et al., 2011a; Eastwick, Finkel, Mochon, & Ariely, 2007).

### The appeal of narcissists (target effects)

According to previous findings, we expected a positive relationship between narcissism and actual speed-dating success (being chosen for further dates; Dufner et al., 2013) as well as mate appeal as perceived by others (Carter et al., 2014a; Holtzman & Strube, 2013a; Rauthmann & Kolar, 2013). Our findings largely confirm the positive role that narcissism plays for (short and long term) mate appeal in men: We found that narcissistic men were perceived as more favourable partners for STR as well as LTR, but not for FS. The same trend was evident for actual mate choices. Such effects were not found for the other two DT traits. Importantly, we found that this pattern of results generalized beyond men to narcissistic women also (which have to date not been explicitly studied as targets in real-life interactions), in which the effect was even more pronounced (in terms of a significant sex moderation for STR). Results show that female narcissists were indeed chosen more often for further dates and were perceived as more favourable partners for STR and LTR (but, again, not FS) by men.

In the next step, we sought to evaluate whether these effects might be linked to important covariates, namely, PA and extraversion. When controlling for PA, the effects vanished for women, while in men, effect sizes were similar (although *p*-values increased to .06 and .07 for STR and LTR, respectively). This pattern of findings could be explained in at least two ways. First, narcissism correlated highly with (other-rated) PA in women but not at all in men. Second, correlations between being chosen/mate appeal ratings and PA were more pronounced in women (although these differences were not significant). But how does narcissism relate to PA? More attractive women might develop higher narcissism, and/or more narcissistic women might invest more in their physical appearance in terms of effective adornment (e.g. choice and investment in make-up, hair-dressing, and clothing; Holtzman & Strube, 2013b; Vazire, Naumann, Rentfrow, & Gosling, 2008). In line with this, it was found that narcissism correlated with vanity, and both traits are, in turn, related to mating effort (Egan & McCorkindale, 2007). The commonality analyses also support the view that the positive association between narcissism and being chosen as well as attractiveness ratings was not due to the unique variance of narcissism (which was around zero) but due to the common variance of narcissism and PA.

In men, the association between narcissism and mate appeal as rated by others was not accounted for by PA. Although PA was also correlated with all mate appeal indicators in men (correlations around .50 [Supporting Information] conforming to previous research; e.g. Back et al., 2011c), it was not associated with narcissism. Thus, PA could not account for the relationship between narcissism and mate appeal in men. Instead, extraversion accounted for the relationship between both variables. Notably, the correlation between narcissism and extraversion was higher in men ( $r = .62$ ) than in women ( $r = .37$ ), albeit the difference was not statistically significant. Thus, men's narcissism might be more closely tied to outgoing and self-presentational behaviour. This finding underpins the previous results of Dufner and colleagues (2013; Study 3) who found social boldness—a behavioural style closely linked to extraversion (Cattell et al., 1970)—to mediate the effects of narcissism on courtship success in a real-life scenario.

While narcissists' Big Five profiles are known to display high extraversion and low agreeableness (e.g. Paulhus & Williams, 2002; Robert & Robins, 2000), less is known about the causal interplay of narcissism and extraversion. To this end, it seems reasonable to postulate that narcissism drives extraverted behaviour rather than extraversion driving narcissistic behaviour, although this cannot be clarified on the basis of the present data. Back et al. (2010) found narcissists to display more outgoing, charming, and self-confident behaviour, which leads to increased popularity in zero-acquaintance situations. This underpins the notion that it is particularly the outgoing and charming face of narcissism (which may be considered phenomenologically similar to extraversion) that makes narcissism a favourable trait in the courtship domain. This particular behavioural style of self-assuredness and assertiveness might be perceived as a proxy for 'good genes' in terms of a male fitness indicator (Buss,

2003). The commonality analyses further support this notion, as we found that it is not narcissism alone (i.e. the unique variance of narcissism) but rather the overlapping variance between narcissism and extraversion that affects mate choices and STR ratings (while extraversion was more important for LTR ratings). To conclude, narcissism positively affected mate appeal for relationships involving sexual contact in both sexes. The nature of this relationship, however, seemed to involve other variables in both cases: While women's narcissism is accompanied by higher PA, men's narcissism goes along with increased extraversion.

### Other Dark Triad members

Despite narcissism being a correlate of mate appeal, psychopathy displayed positive associations with being chosen as well as mate value for STR in women (and again, the latter effect was significantly moderated by sex). Again, the effects dropped to low and non-significant relationships as soon as PA was controlled. This indicates that the positive mate appeal effect of psychopathy seems mostly due to PA. Again, our data cannot speak to causal or temporal sequences; we cannot infer whether or why attractive women might develop more psychopathy or whether a higher psychopathy induces efforts towards a more attractive self-presentation. A partial explanation of the more similar narcissism and psychopathy effects on women versus men might be the statistical fact that these two traits were correlated considerably higher in the female than in the male subsample (.55 versus .31, respectively).

The third DT trait, Machiavellianism, was significantly negatively associated with being chosen and mate appeal for STR in women. Considering that Machiavellianism comprises cynicism and manipulative interpersonal behaviour (Rauthmann, 2013), which are perceived as particularly dark (Rauthmann & Kolar, 2012) and unattractive (Rauthmann & Kolar, 2013), one possible explanation of this finding might be that others recognize this behavioural style, which could result in avoidance reactions. However, more research will be needed to clarify this finding.

### Dark personalities' mating preferences (perceiver effects)

We found no significant correlations between actual mate choices and DT traits, indicating that actual mate choices were largely independent from DT traits. Interestingly, there were nevertheless significant negative associations between narcissism and ratings of others' mate appeal for relationship types involving sexual contact (STR and LTR) in men. Thus, narcissists perceived others as less favourable partners, although they did not adjust their actual choices accordingly. This might be explained along the lines of cognitive bias in narcissism: Narcissism is characterized by an inflated sense of the self (Morf & Rhodewalt, 2001), which leads narcissists to entitled beliefs like the need for high-quality 'trophy' partners (Campbell, Brunell, & Finkel, 2006). These beliefs result in distorted perception of others' qualities and ultimately to perceived inequity between self and others (e.g. when it comes to attractiveness; Rohmann, Bierhoff,

& Schmohr, 2011). Nonetheless, narcissists do not reject others when it comes to actual mate choices, which might serve their need for admiration by means of social feedback (Back *et al.*, 2013). Although these results seemingly contradict the well-documented positive association between narcissism and STM (e.g. Jonason *et al.*, 2009), it must be considered that our results refer to mating-related ratings and behaviour *within a particular dating session* (i.e. in face of a limited number of potential partners) rather than *general* short-term orientation. To summarize, both of our initial expectations seem to hold true at different levels of analysis: While narcissists appeared to be choosy when it came to ratings of others' mate qualities, they were not when it came to actual choices (at least in speed dating).

A further interesting effect emerged with respect to psychopathy: Psychopathic women appeared to be more open towards STRs (as reflected in their mate appeal ratings of others). However, like in the seemingly paradox effects of narcissism, this association was not apparent in their actual mate choices. It was, however, *evident in men's choices* towards women with psychopathic traits (i.e. women's target effect; refer to the preceding discussion), which could indicate that psychopathic women send out signals of sexual permissiveness, leading men to choose these women more frequently. This interpretation conforms to the finding of psychopathy being the strongest correlate of sex drive within the DT (Baughman, Jonason, Veselka, & Vernon, 2014). An alternative explanation could be that psychopathic women are more sensitive to men's flirting behaviour and thus give higher STR ratings (but do not alter their actual choices accordingly). In any case, this result once again points to important differences between mate appeal ratings (which are likely to reflect personal beliefs and attitudes rather than actual behaviour) and actual mate choices (see also the distinction between attitudes and behaviour in sociosexuality research; Penke & Asendorpf, 2008). Importantly, in this case, women's attitude (openness towards STR) seemed to be related to men's behaviour (actual choices).

As in the analysis of mate appeal (target effects), we also investigated to what extent mating preferences (perceiver effects) could be due to PA or extraversion. In women, the association between psychopathy and STR ratings was still significant after controlling for PA. Interestingly, as soon as controlling for PA, psychopathy was also positively associated with actual mate choices (while Machiavellianism was associated negatively). This indicates that PA suppressed the association between psychopathy and actual mate choices: Physically attractive women were generally choosier and scored higher on psychopathy. Psychopathy, in turn, was associated with higher openness towards STR (but not LTR; refer to the preceding discussion). As soon as PA is statistically controlled, it turns out that this openness towards STR also manifests in actual behaviour. In other words, women's PA-associated choosiness seems to counteract their higher openness towards STR. When controlling for extraversion, however, these effects vanished completely. This is not surprising as extraversion is defined in terms of outgoing and affiliative behaviour.

In men, controlling for PA did—again—not alter the pattern of associations, but controlling for extraversion did: As soon as extraversion was controlled, there was no significant association between narcissism and mating preference ratings, but extraversion was negatively associated with STR and FS (and LTR, by trend). One possible explanation for this negative effect might be that extraversion entails an increased number of social (including opposite-sex) acquaintances, which could in turn result in a broader (and eventually more critical) frame of reference when it comes to the evaluation of other's mate appeal. However, because there is no possibility to evaluate this speculation based on the data, this interpretation remains subject to future empirical studies.

To conclude, mating preferences related to DT traits mostly in terms of subjective ratings of others' mate appeal ratings, but not in terms of actual mate choices (although the effects of psychopathy and Machiavellianism in women could be suppressed by PA; refer to the preceding discussion). This finding might have important implications with respect to self-report research indicating that DT traits relate to mating styles (e.g. Jonason *et al.*, 2012b), as self-reports might be indicative of beliefs and attitudes towards others rather than actual behaviour.

### Limitations and prospects

There are several limitations that ought to be taken into account and can point towards future research that should replicate, corroborate, and extend our findings. First, sample sizes were (separated for sexes) rather small, and it would be of particular interest to disentangle the target effects associated with narcissism and PA (in women) as well as narcissism and extraversion (in men) using larger samples.

Second, this study had only three speed-dating groups, which renders the analysis of group variance virtually impossible. Although we were interested in person and dyad (not group) effects in this research, it would be interesting to study frame-of-reference effects using a larger number of (specially selected) groups (cf. Asendorpf *et al.*, 2011) in future studies.

Third, another restriction might be that the sample is not population representative in that the (young) people participating in a speed-dating event differ substantially from the population with respect to demographic variables and personality traits. Individuals who participated in this study were indeed more extraverted ( $p < .01$ ), more agreeable ( $p < .05$ ), and less conscientious ( $p < .05$ ) than the general population (Rammstedt & John, 2005). Additionally, the speed-dating setting is a special situation that might favour persons with a more narcissistic personality. In other dating contexts, other personality profiles might be more successful. On the other hand, as pointed out by Asendorpf *et al.* (2011), speed dating is a very realistic context and has a series of advantages as compared with other methods. Most importantly, speed-dating employs real-life interactions with persons who are actually motivated to find a partner rather than to participate in a psychological experiment.

## CONCLUSION

This study investigated the role of DT traits in a real-life speed-dating framework in both sexes. In accordance with our expectations, we found effects were most pronounced and consistent for narcissism: It was associated with increased speed-dating success (in terms of actual choices) and mate appeal in both sexes. The effects of narcissism overlapped with PA in women and extraversion in men. When it comes to choosing others, male narcissists were not found to be more selective in actual mate choices but nonetheless viewed others as less desirable mates. Taken together, narcissism may entail adaptive consequences in mating contexts, but its positive effects seem to be driven—different for men (extraversion) and women (PA)—by other variables also.

## SUPPORTING INFORMATION

Additional supporting information maybe found in the online version of this article at the publisher's web-site.

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