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Testing the hot-crazy matrix: Borderline personality traits in attractive women and wealthy low attractive men are relatively favoured by the opposite sex

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ABSTRACT

Men and women reliably differ on the importance of certain criteria when considering romantic relationships. From an evolutionary perspective that explains sex differences in mating effort and parental investment, men should prioritise attractiveness and women, wealth. Personality traits also signal important information about relationship potential with those of the dark triad facilitating short-term relationships. However, how the vulnerable dark triad traits of borderline personality disorder (BPD) and secondary psychopathy function in relationships remains relatively unexplored. Even though interpersonally tempestuous, individuals high in these traits might be alluring in that they offer a thrilling relationship for the short-term, so long as they are also physically appealing. Across two studies, we examined sex differences in partner preference judged on attractiveness in relation to BPD and secondary psychopathy across short- and long-term relationship contexts. Men were willing to engage in relationships with attractive women high in BPD traits, while women compensated low attractiveness for wealth in long-term dating, and did not desire secondary psychopathy in any relationship. Results show that women are more astute in mate preference, avoiding troublesome or financially challenged men who are time and economically costly, and men more readily engage in potentially turbulent relationships.

1. Introduction

The universal hot crazy matrix (HCM) (otherwise known as the “single guy’s guide to dating women”) is a popular cultural phenomenon, and has featured in American sitcoms and viral YouTube videos. The HCM (Fig. 1) is a graphical representation of men’s dating options based on rating women on two dimensions: “hot” (attractiveness) and “crazy” (emotionality), in reference to a third criteria; the “hot-crazy line”. Women who are less than five on the hot dimension are located in the “no-go” zone. Troublesome relationships are predicted with women who are more than five on the hot dimension and are above the “hot-crazy line”. Women rated between a five and seven hot and under the “hot-crazy line” are in the “fun” zone. The “date zone” is located under the “hot-crazy line” and between an eight and ten hot, whilst the “wife” zone is located between four and seven on the crazy dimension and above eight on the hot dimension. Accordingly, women have their own version of the HCM, the cute money matrix (CMM) (Fig. 2) in which a man’s desirability depends on how attractive and wealthy they are. Men who are less than a seven on the money dimension and between zero

and seven on the cute dimension are in the “no-go” zone. Men between a seven and ten on the money dimension, irrespective of cuteness are in the “husband” zone. The “fun” zone is located between seven and ten on the cute dimension and between a zero and seven on the money dimension.

Despite the pop psychology appeal, the HCM and CMM dovetail with evolutionary theory concerning sex differences in mate preferences that evolved due to disparities in parental investment between men and women (Buss, 1989; Conroy-Beam, Buss, Pham & Shackelford, 2015; Trivers, 1972). Men prioritise attractiveness in a potential mate as a proxy for reproductive health. Attractive women are likely to be physically healthier, able to withstand pregnancy, childbirth and child rearing, and produce gametes of higher genetic quality (Buss & Barnes, 1986; Cunningham, 1986). As the primary care giver however, women prioritise resource acquisition. Wealthy men are desirable because they provision both mother and child, and pass on heritable traits that likewise afford the same advantage to the offspring (Kenrick, Gabrielidis, Keefe, & Cornelius, 1996). Attractiveness is still relevant although not necessarily tied to youthfulness and gamete quality

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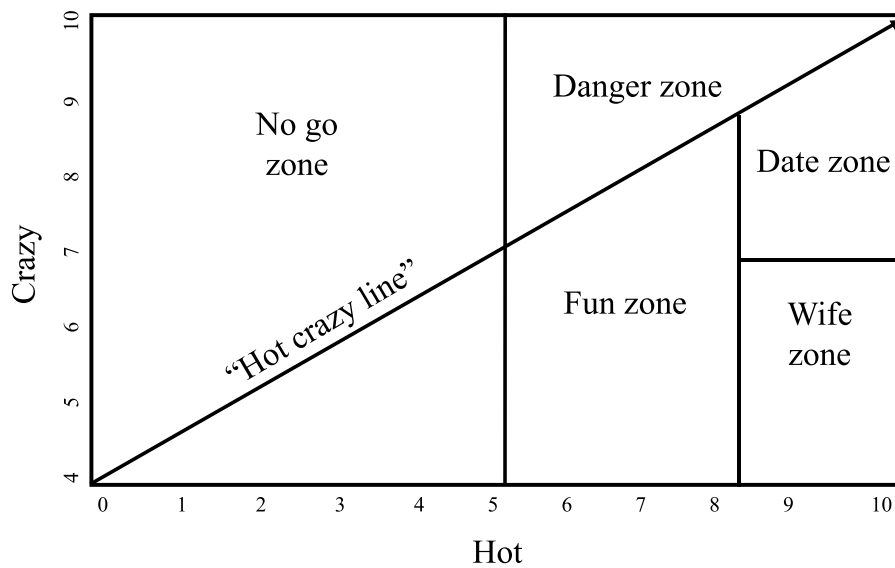


Fig. 1. The "Hot Crazy" matrix.

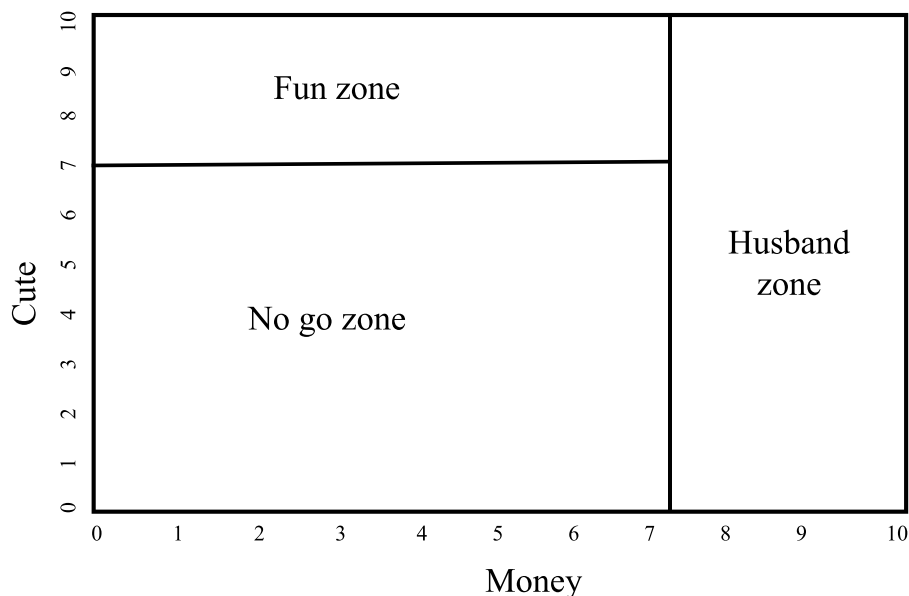


Fig. 2. The "Cute-Money" matrix.

because older men might signal greater resource acquisition (Kenrick & Keefe, 1992). Thus, ratings of attractiveness and wealth are reliably expected in prospective partner evaluations in men and women.

Mate preference also varies according to desired relationship duration. According to life history theory, short-term relationships are preferable under certain circumstances. In environments where long-term survival is uncertain, allocating resources in the short-term to mating effort is adaptive (Del Giudice, Gangestad & Kaplan, 2015). Attractiveness might be prioritised because it signals the types of genetics that are adapted to uncertainty, certainly in terms of physique (e.g., strength and masculinity in men), or potentially downgraded by increasing reproductive opportunities (i.e., not restricting time and resources in pursuing the most attractive partners). Long-term relationships are preferred by women by virtue of motherhood, although paternal investment is optimal if circumstances look reliable and secure for the long-term (Del Giudice, 2009).

Pace of life syndrome (POLS) describes the unique suite of co-varying personality traits and behaviours that function together as part of a life history strategy (Dammhahn, Dingemans, Niemelä & Réale,

2018), and personality is a crucial factor for determining relationship duration (Botwin, Buss & Shackelford, 1997). Traits such as conscientiousness, agreeableness and openness facilitate long-term partnerships (DeYoung, Quilty & Peterson, 2007), whilst those of the dark triad (psychopathy, Machiavellianism and narcissism) are associated with mating effort and short-term romantic encounters (Koladich & Atkinson, 2016). Indeed, women prefer high dark triad personality types for short-term dating (Qureshi, Harris & Atkinson, 2016). Even though dark triad personality types are adversarial, they are associated with fitness outcomes such as power (Kajonius, Persson & Jonason, 2015), masculinity and testosterone (Marcinkowska, Lyons & Helle, 2015; Pfattheicher, 2016) and low facial fluctuating asymmetry (Borráz-León, Rantala & Cerda-Molina, 2019). Dark triad traits may be adaptive because they facilitate short-term mating opportunities in men (Mealey, 1995), although whether this applies to women remains largely un-investigated.

Nevertheless, because they are not characterised by emotionally unstable behaviour, the dark triad are not suitable candidates for the "crazy" dimension of the HCM, although facets of the vulnerable dark

triad, borderline personality disorder (BPD) and secondary psychopathy are. BPD is typified by a lack of understanding the self and other's emotions, problematic interpersonal relationships, and difficulty in controlling emotional impulses (Gardner, Qualter & Tremblay, 2010). Despite this constellation of destructive behaviours, they may forge an opportunistic interpersonal personality type in which emotional instability fosters multiple mating opportunities (Brüne, 2016). Risky decision making, anxiety, poor emotional skills, and impersonal sexual attitudes are also associated with secondary psychopathy (Dean et al., 2013, 2013; Lee & Salekin, 2010), and considering that BPD is diagnosed predominantly in women and secondary psychopathy in men, potentially they are sex-specific manifestations of the same underlying personality disorder (Sprague, Javdini, Sadeh, Newman, & Verona, 2012).

Although it may sound glib to suggest that a personality disorder is desirable in a partner, BPD and secondary psychopathic traits continue to reside in non-clinical populations which suggests they hold adaptive value. Risk-taking and sensation-seeking behaviour might signal genetic quality appropriate to adverse environments (Farthing, 2005; Kelly & Dunbar, 2001), in terms of the ability to withstand environmental insult and to out compete competitors. For some individuals, a relationship with someone high in BPD and secondary-psychopathy might be exciting (Giebel, Moran, Schawohl & Weierstall, 2015). Indeed, secondary psychopathy is associated with fun and sensation seeking behaviour (Hughes, Moore, Morris, & Corr, 2012). As predicted by the HCM, problematic behaviour might be compensated for if the partner is particularly attractive, and particularly so for men who are more likely to prioritise attractiveness in the first instance. The equivalent is seen in the CMM where women should compensate attractiveness for wealth. As such, the "crazy" dimension might be justified, although the HCM would suggest that this would pertain to men's mate preference only.

Thus, in light the current literature, the following predictions generated by the HCM and CMM are to be investigated:

- 1) Men and women rate low attractive, high BPD/secondary psychopathy partners as the least desirable in either short- or long-term dating contexts.
- 2) Men rate high BPD women as desirable for short-term dating, so long as they are also rated sufficiently attractive. The direction for which this holds for women for their equivalents remains open.
- 3) Men and women rate high attractive, low BPD/secondary psychopathy partners as the most desirable for both short- and long-term dating.
- 4) Men and women rate low attractive and low wealth partners as the least desirable for short- and long-term dating.
- 5) Women rate low wealth men desirable for short-term dating so long as the man is rated attractive. Men will rate their equivalents similarly, but less so.
- 6) Women will still rate men who are low in attractiveness desirable for long-term dating so long as they are high in wealth. Men are not expected to rate their equivalents in the same direction.

2. Method

2.1. Participants

Attractive x BPD/secondary psychopathy matrix

Two hundred and twenty participants (113 males, $M_{age} = 36.25$, $SD = 13.50$; 107 females, $M_{age} = 38.79$, $SD = 11.78$) were recruited from Crowdfunder, an online crowd-sourcing platform from countries whose first language is English (i.e., United States, United Kingdom, Canada, and Australia). 89.5% were White, 5% Mixed/multiple ethnicity, 4.1% Asian, 0.5% Black and 0.9% identified as "other ethnic group".

Attractive x wealth matrix

Three hundred and five participants (113 males, $M_{age} = 39.08$, $SD = 12.14$; 192 females, $M_{age} = 41.31$, $SD = 13.06$) were recruited from Prolific, an online crowd-sourcing platform from countries whose first language is English. 85.2% were white, 0.7% Mixed/multiple ethnicity, 6.9% Asian/Asian British/Asian American, 2.3% Black/African/Caribbean/Black British/Black American, 3.3% Hispanic, and 1.6% as "other ethnic group".

2.2. Measures

2.2.1. Facial morphs

Five high and five low attractive Caucasian facial morphs were taken from Braun, Gruendl, Marberger and Scherber (2001). Ratings for both high and low male faces and high and low female faces were significantly different ($t = 18.82$, $p < .001$; $t = -27.57$, $p < .001$). Cronbach's alphas demonstrated good reliability (High attractive female faces = 0.91/0.89; low attractive female faces = 0.94/0.94; high attractive male faces = 0.81/0.85; low attractive male faces = 0.89/0.91)

2.2.2. Personality profile vignettes

Personality profiles vignettes depicted a scenario in which the participant was meeting the character for the first time (see Appendix A). Five high and five low BPD/secondary psychopathy traits profiles were developed from the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; American Psychiatric Association), *National Institute of Mental Health* (n.d.), and Levenson's Self-Report Psychopathy Scale (Levenson, Kiehl, & Fitzpatrick, 1995) and focused on characteristics such as impulsivity, emotional dysregulation, and sensation seeking. Ten personality profiles described individuals high or low in wealth. Profiles sufficiently portrayed characters high or low in BPD/secondary psychopathy traits ($t = -10.82$, $p < .001$) and high or low in wealth ($t = 13.39$, $p < .001$). Cronbach's alphas demonstrated good reliability for the personality profiles (high BPD/secondary psychopathy = 0.85; low BPD/secondary psychopathy = 0.85; high wealth = 0.84; low wealth = 0.82)

2.3. Procedure

Participants were randomly presented with a combination of a high or low attractive face and a high or low BPD personality profile in the Attractive x BPD matrix study, or high or low wealth personality profile in the Attractive x wealth matrix study, and were asked on two scales (0–100) the "extent you would want to be romantically involved with this person" on a short-term and long-term dating basis. Allocation of the facial morph/profile combinations was randomised and counter-balanced to avoid order effects.

A third outcome measure was created by calculating the difference between short- and long-term dating preference for each dimension of mate characteristics which captured preference for short-term over long-term dating. Long-term dating preference score was subtracted from short-term dating preference score and this was carried out for each associated combination of mate characteristics (e.g., high attractiveness and low wealth (HighAttLowWealth)). A positive value represented a preference for long-term dating compared to short-term dating, a negative value represented a preference for short-term dating over long-term dating, and a score of zero represented no particular preference in terms of dating length (short or long-term).

2.4. Data analysis

Multi-level modelling examined differences in dating preference on all three outcome measures (i.e., short-term dating, long-term dating, short/long dating). Multi-level models were specified in a way that treated participant (within-measurement interval) as a random effect with Mate characteristics (HighAttHighWealth vs. HighAttLowWealth

Table 1
Means, SDs and effect sizes (Cohen's d) for dating preferences across all dimensions of mate characteristics.

	Short-term dating		d	Total	Long-term dating		d	Total	Short/long dating†		d
	Male	Female			Male	Female			Male	Female	
HighAttLowBPD	255.43 (97.58)	252.02 (120.63)	0.03	253.33 (112.01)	258.93 (107.64)	256.87 (119.42)	0.02	257.66 (114.68)	3.50 (88.34)	4.85 (68.67)	0.02
HighAttHighBPD	239.62 (102.92)	169.28 (100.64)	0.69*	196.30 (106.85)	219.29 (127.94)	128.01 (91.94)	0.82*	163.07 (115.71)	-20.33 (115.60)	-41.27 (51.03)	0.23*
LowAttLowBPD	123.83 (118.24)	207.19 (114.64)	0.72*	175.17 (122.60)	114.90 (123.27)	198.97 (121.26)	0.69*	166.68 (128.36)	-8.93 (72.82)	-8.23 (56.94)	0.01
LowAttHighBPD	107.24 (103.42)	148.04 (101.40)	0.40*	132.37 (103.77)	76.24 (90.78)	116.56 (90.70)	0.44*	101.07 (92.54)	-31.00 (58.72)	-31.48 (50.47)	0.01
HighAttHighWealth	273.17 (120.78)	220.89 (112.28)	0.45*	240.26 (118.04)	259.81 (123.81)	225.88 (119.85)	0.28*	238.45 (122.15)	-15.15 (86.45)	4.98 (82.89)	0.24*
HighAttLowWealth	291.70 (125.98)	219.75 (118.40)	0.59*	246.41 (125.96)	284.96 (123.73)	229.07 (120.66)	0.46*	249.78 (124.57)	-8.53 (71.90)	9.32 (79.98)	0.23*
LowAttHighWealth	114.88 (113.46)	291.50 (93.12)	1.70*	226.06 (132.25)	99.00 (106.29)	318.41 (85.59)	2.27*	237.12 (141.52)	-16.08 (55.07)	26.91 (76.39)	0.65*
LowAttLowWealth	129.84 (114.46)	178.66 (122.86)	0.41*	160.57 (121.93)	111.96 (109.55)	176.99 (121.59)	0.56*	152.90 (121.24)	-17.88 (65.90)	-1.67 (62.24)	0.25*

Note: SDs are placed in parentheses; †Total = means (SDs) for all participants.

* positive values indicate preference for long-term dating and negative value for short-term dating. ** $p < .05$; †† $p < .10$.

vs. LowAttHighWealth vs. LowAttLowWealth) and Gender (Male vs. Female) as fixed effects (i.e., in the form of an interaction term [Mate characteristics*Gender]). This meant the difference in dating preference for each combination of mate characteristics could be examined across gender.

3. Results

3.1. Descriptive statistics

Mean dating preference scores with SDs can be seen in Table 1.

3.1.1. Attractive x BPD/secondary psychopathy matrix

Three multi-level models were calculated to examine the interaction between partner characteristics (HighAttLowBPD vs. HighAttHighBPD vs. LowAttLowBPD vs. LowAttHighBPD) and gender (male vs. female), using three different outcome measurements (short-term dating preference, long-term dating preference, and the difference between short- and long-term dating preference). The results showed no significant main effect of gender across all dating preference measures (Table 2). The interaction effects showed that males and females differed in terms of the importance placed on attractiveness and borderline personality characteristics (Table 2). The male trajectory of dating preference (across both short- and long-term) generally decreased as attractiveness decreased and BPD increased (Fig. 3). In comparison, females placed more emphasis on personality characteristics and less on physical attractiveness. This can be seen with the increase in dating preference (across both short- and long-term) between HighAttHighBPD and LowAttLowBPD (Fig. 3).

Two significant main effects were present when examining individuals' time preference for dating (short/long-term). Both males and females demonstrated a preference for shorter-term dating when BPD was high (Table 2 and Fig. 3). There were no significant interactions between gender and mate type in terms of time preference.

3.2. Attractive x wealth matrix

Three multi-level models were calculated to examine the interaction between partner characteristics (HighAttHighWealth vs. HighAttLowWealth vs. LowAttHighWealth vs. LowAttLowWealth) and gender (male vs. female), using three different outcome measurements (short-term dating preference, long-term dating preference, and the difference between short- and long-term dating preference). The results show a significant main effect of gender across all dating preference measures (Table 3).

Results showed significant interactions between all combinations of partner characteristics and gender. Attractiveness is similarly important for both males and females (Fig. 4). However, when attractiveness is low, males and females differ in importance placed on wealth as a compensatory partner characteristic (Fig. 4). Females prefer high levels of wealth in a partner compared to males and compensate for low attractiveness with wealth. Females also appear to show a preference for either attractiveness or wealth but not necessarily both in combination. Males disfavour high levels of wealth and prioritise physical attractiveness when making calculations of mate preference. Opposing emphasis placed on wealth across genders is also reflected in the near significant difference ($p = .08$) between females preferring long-term dating with a partner of low attractiveness and high wealth and males preferring such a partner only for short-term dating (Table 3 & Fig. 4).

4. Discussion

The assimilation into mainstream culture of the HCM and CMM has arisen due to their intuitive appeal about men and women's partner preferences in relationships. Research reliably supports such intuitions, demonstrating that prospective partners are indeed rated according to

Table 2
Fixed-effect estimates of dating preference (short-term dating, long-term dating & short/long) across dimensions of BPD and attractiveness.

Predictors	Short-term dating			Long-term dating			Short/long dating pref.		
	Estimates	CI	p	Estimates	CI	p	Estimates	CI	p
(Intercept)	252.02	229.04 – 275.00	<0.001	256.87	233.44 – 280.30	<0.001	4.85	-10.77 – 20.46	0.542
Male	7.80	-29.09 – 44.68	0.677	4.61	-33.01 – 42.23	0.809	-3.18	-28.25 – 21.89	0.802
HighAttHighBPD	-82.74	-102.19 – -63.29	<0.001						
LowAttLowBPD	-44.83	-65.12 – -24.54	<0.001						
LowAttHighBPD	-103.98	-133.26 – -74.69	<0.001						
Gender*HighAttHighBPD	63.71	32.53 – 94.89	<0.001						
Gender*LowAttLowBPD	-86.43	-119.06 – -53.80	<0.001						
Gender*LowAttHighBPD	-42.99	-89.75 – 3.77	0.071						
HighAttHighBPD				-128.86	-149.54 – -108.18	<0.001			
LowAttLowBPD				-57.90	-76.90 – -38.91	<0.001			
LowAttHighBPD				-140.31	-167.25 – -113.37	<0.001			
Gender*HighAttHighBPD				83.74	50.72 – 116.77	<0.001			
Gender*LowAttLowBPD				-85.77	-116.33 – -55.21	<0.001			
Gender*LowAttHighBPD				-42.89	-85.91 – 0.14	0.051			
HighAttHighBPD							-46.12	-62.06 – -30.18	<0.001
LowAttLowBPD							-13.08	-30.02 – 3.87	0.130
LowAttHighBPD							-36.33	-56.49 – -16.171	<0.001
Gender*HighAttHighBPD							20.81	-4.74 – 46.36	0.110
Gender*LowAttLowBPD							1.68	-25.54 – 28.89	0.910
Gender*LowAttHighBPD							0.10	-25.54 – 28.89	0.995
Observations	609			610			609		

Note: ‘*’ signifies interaction; ‘Att’ = attractiveness; ‘BPD’ = borderline personality disorder; significant estimates are highlighted in bold; reference categories = ‘HighATTLowBPD’; ‘Male’.

attractiveness, personality and resources differentially according to sex (Buss, 1989). This study tested the HCM and CMM hypotheses directly and uniquely in relation to BPD and secondary psychopathy as proxies for the “crazy” dimension. For men, attractiveness was the more discerning criteria for determining dating appeal, whilst for women, personality and wealth status were the more important factors. In both short- and long-term dating contexts, women preferred partners who were low in secondary psychopathy, even when they were rated as low in attractiveness.

According to sexual dimorphism in parental investment (Conroy-Beam et al., 2015), women potentially discern partner value more often according to personality traits such as altruism beyond attractiveness because it provides information about a host of critical factors such as the man’s ability to, and likelihood of caring and provisioning their child and her (Bhogal, Galbraith & Manktelow, 2018). It is not difficult to see the need to protect one’s child from an individual high in adverse traits either in terms of their ability to provision, potential for psychological harm and/or the risk of those traits being passed on. Whilst pace of life syndrome suggests that under times of uncertainty it might be adaptive to choose a partner whose adverse personality type might

fare better in hostile environments, the evidence for this is limited, certainly in terms of DT traits, and even more so of the vulnerable DT to women (e.g., Blanchard, Lyons, & Centifanti, 2016). More research is needed to elucidate this further.

In accordance with the HCM however, men judged women high in BPD traits more datable so long as they are attractive, suggesting that attractiveness compensates for personality, and/or the overall combination of traits and looks is preferable beyond low attractiveness. For men, there is less emphasis on personality because whilst it might impact on the ability to mother optimally, a woman cannot give up on the child completely, or at least this is assumed highly unlikely. Interestingly however, dating preferences for men did not change across short- or long-term dating contexts in the HCM, which suggests that men do not necessarily think about the long-term implications for their relationship choices. Indeed, men reliably exhibit preference for short-term dating (Buss, 1989) and are thus potentially disposed to thinking more in the short-term. Furthermore, considering that traits such as sensation seeking and risk taking are perceived as exciting (Giebel et al., 2015; Hughes et al., 2012), a woman high in BPD traits could be initially appealing so long as she is “hot” as compensation for

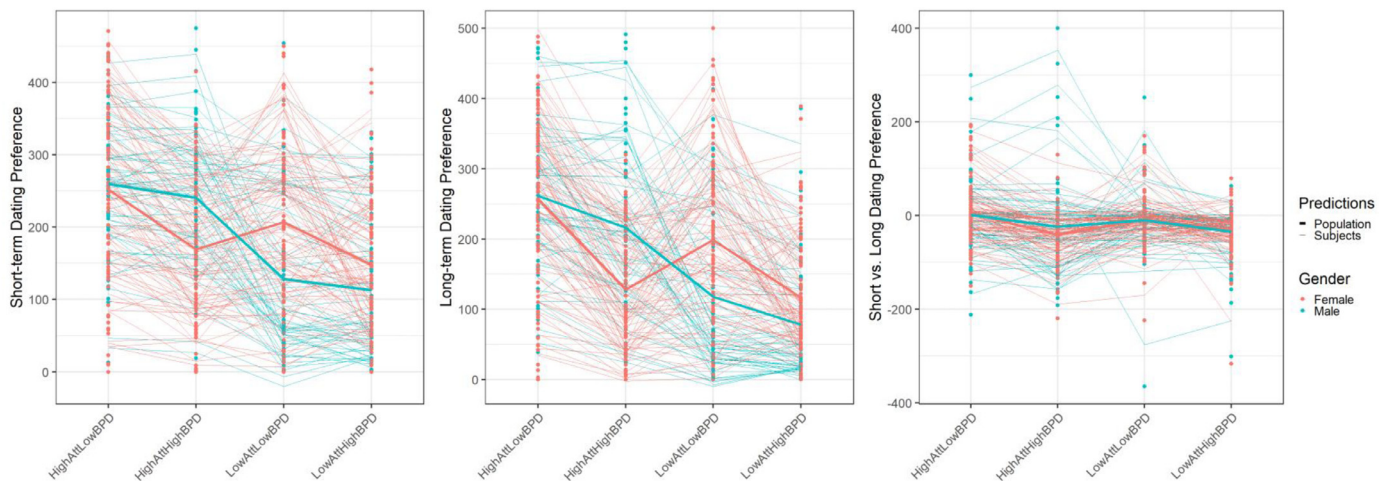


Fig. 3. Population and subject-level estimates of dating preference for males and females across dimensions of attractiveness and borderline personality.

Table 3
Fixed-effect estimates of dating preference (short-term dating, long-term dating & short/long) across dimensions of wealth and attractiveness.

Predictors	Short-term dating			Long-term dating			Short/long dating pref.		
	Estimates	CI	p	Estimates	CI	p	Estimates	CI	p
(Intercept)	220.89	204.53 – 237.25	< 0.001	225.87	208.69 – 243.06	< 0.001	4.98	–6.94 – 16.91	0.412
Gender (male)	53.23	26.20 – 80.25	< 0.001	33.09	4.70 – 61.47	0.022	–20.14	–39.84 – –0.43	0.045
HighAttLowWealth	–1.14	–12.43 – 10.15	0.843						
LowAttHighWealth	70.61	54.83 – 86.39	< 0.001						
LowAttLowWealth	–42.23	–58.49 – –25.97	< 0.001						
Gender*HighAttLowWealth	20.13	1.53 – 38.73	0.034						
Gender*LowAttHighWealth	–229.48	–255.48 – –203.49	< 0.001						
Gender*LowAttLowWealth	–102.12	–128.90 – –75.34	< 0.001						
HighAttLowWealth				3.20	–10.26 – 16.66	0.641			
LowAttHighWealth				92.53	75.31 – 109.75	< 0.001			
LowAttLowWealth				–48.89	–65.72 – –32.06	< 0.001			
Gender*HighAttLowWealth				22.41	0.24 – 44.58	0.048			
Gender*LowAttHighWealth				–252.33	–280.71 – –223.96	< 0.001			
Gender*LowAttLowWealth				–98.19	–125.91 – –70.46	< 0.001			
HighAttLowWealth							4.34	–5.29 – 13.96	0.377
LowAttHighWealth							21.92	6.25 – 37.60	0.006
LowAttLowWealth							–6.66	–20.27 – 6.95	0.337
Gender*HighAttLowWealth							2.28	–13.58 – 18.14	0.778
Gender*LowAttHighWealth							–22.85	–48.68 – 2.98	0.083†
Gender*LowAttLowWealth							3.93	–18.49 – 26.36	0.731
Observations	1216			1216			1216		

Note: ‘*’ signifies interaction; ‘Att’ = attractiveness; significant estimates are highlighted in bold.

† p < .10; reference categories = ‘HighAttHighWealth’; ‘Male’.

anticipated negative consequences of this type of behaviour, but how this might affect the relationship is overlooked. A man might ignore the potential consequences of a tempestuous relationship when he wishes to take advantage of the woman is seemingly more available to him than other women (Brüne, 2016). As such, this explains why the HCM is advisory as well as predictive.

Results supported the CMM. Women rated wealthy, low attractive partners as more datable than men did for their equivalents, for both short- and long-term dating. These findings converge with the extant literature about women evaluating partners on their ability to provision, especially for long-term relationships (Buss, 1989; Buss & Schmitt, 1993). Interestingly, it would be thought as the optimal option, that the most attractive wealthy men would elicit higher datable ratings, however low attractive wealthy men were more desirable. Potentially, high attractive wealthy men might be considered at a higher risk of cheating because they attract more women whilst a less attractive man is a safer bet for long-term commitment. That women still preferred low attractive high wealthy men in the short-term suggests that they adopt this strategy no matter the dating context in case the coupling results in an unexpected pregnancy. Women also rated

high attractive, low-wealthy men as datable as the high-wealthy men, although there was no difference according to dating duration. Women may locate both highly attractive high and low wealth men in the “fun” zone, where the length of the relationship is managed within the context of reduced emotional investment because of the potential for the partner to move on to a new romance. Women therefore appear to be engaging in more realistic appraisals of relationship potential, which is the adaptive response to the punitive costs of pairing with an unreliable partner.

There are various limitations to this study. Whilst there is no inherent issue per se in using a WEIRD sample (Henrich, Heine, & Norenzayan, 2010), for the purposes of explaining partner preferences from an evolutionary perspective, the same trends should be observed in other cultures to ensure such explanations are reliable. The study only presented high or low rather than dimensional characteristics, which would be more in line with the matrices. However, findings have aligned with predictions and are sufficient for an initial examination. Claims about the fitness advantages of detrimental personality traits should be done with caution. At a subclinical level, the extent of adverse outcomes for either partner should be limited and thus

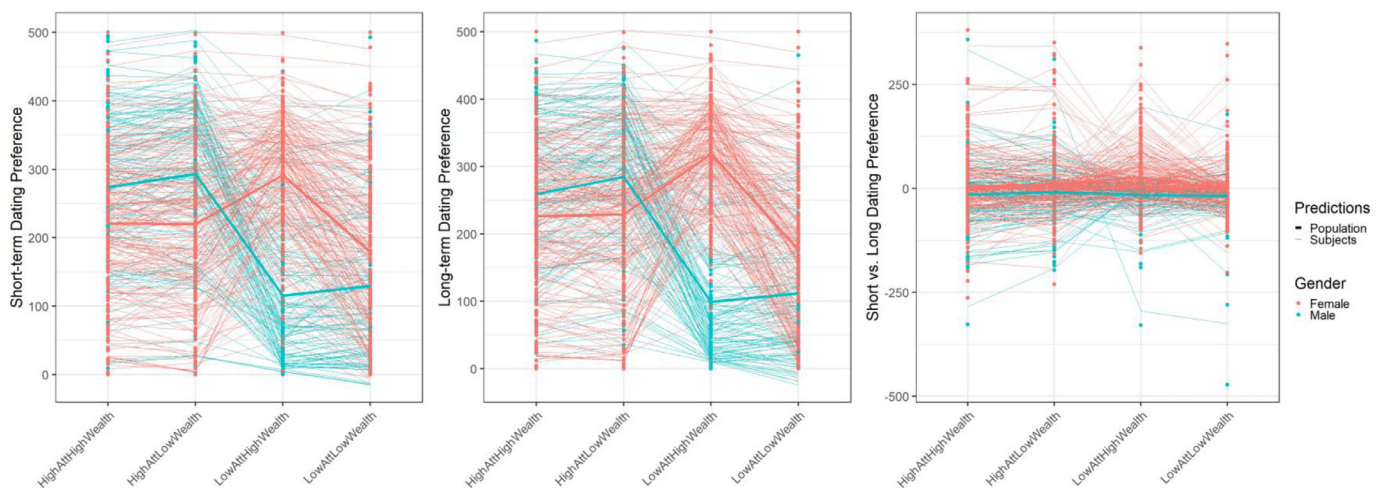


Fig. 4. Population and subject-level estimates of dating preference for males and females across dimensions of attractiveness and wealth.

conclusions made from this study do not make light of the difficulties of those with diagnosed personality disorders. Nevertheless, an evolutionary perspective has merit in explaining why such traits continue to exist in spite of their consequences, and how they are adaptive in certain circumstances.

CRedit authorship contribution statement

Alyson E Blanchard: Conceptualization, Methodology, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Visualization, Project administration. **Thomas J Dunn:** Formal analysis, Visualization. **Alex Sumich:** Methodology.

Appendix A

High BPD/secondary psychopathy personality profiles

- (1) You meet X at a bar. X seems like the life and soul of the party, they are drunk and are talking to lots of people, and look to be having a great night out. X notices you, and comes over to chat. X engages deeply with what you are saying and then ends up telling you quite a bit personally about themselves. They talk about how wonderful their friends are but also mention about a time when they had to stop being friends with someone who really let them down. X is not shy in showing that they really fancy you and want to get to know you better on both a physical and emotional level, so they give you their phone number. You come away thinking that they are quite intense, but are interesting and exciting.
- (2) You meet X at your place of work and are enjoying getting to know them as they like to flout the rules a bit, which can be entertaining, even though you wonder whether X might get in trouble because of it. Sometimes X is in a really good mood too although at other times they can be anxious and you try to make them feel better about themselves, pointing out that they are too self-critical at times. In talking to X, you get the impression that they have some amazing, if not perfect, friends. X seems to really enjoy your company and thinks that you're very funny, and you find yourself talking to them a lot outside of work. One day, X is very angry and upset about something that a colleague said to them, although you don't think it is that bad so you try to make them feel better about it.
- (3) You meet X at your friend's birthday party. You had already noticed them because they appear to be having the most fun out of anyone. Your friend had told you already about X as they have a reputation for being a bit wild - driving fast and taking drugs. You get talking to X and you ask them what they do for a living. They say that they don't have a career and that they only work to pay the bills (apparently, they had previously tried various career paths but they hadn't worked out). During the conversation X notices that an ex-partner of theirs is also at the party and mentions this to you. X is upset and says how awful their ex-partner is and how badly they were treated in the relationship. Judging from what X tells you, you can see why X feels the way that they do. X then asks you if you want to go with them to the store to pick up some vodka and you agree. X's driving lives up to reputation but you are enjoying X's devil may care; approach to life. Back at the party, X tells you that they are really enjoying your company and that you should meet up again soon. They even invite you to go with them to a festival next summer because they can't rely on their other friends to go. They seem to get suddenly very down about this but they perk up when you say that you will go with them to the festival.
- (4) You meet X through Facebook as you both belong to the same Facebook group. You get some insight into X's life through their Facebook posts which range from being really enthusiastic and happy to sometimes really upset. You get the impression that X really likes you, as they always seem to like and comment positively on your posts. You and X end up spending a lot of time chatting

online and you both talk about past relationships. X seems to have had a few bad relationships and they explain the reason for this is because past partners were never committed enough. You end up feeling bad for X as X tells you they did everything they could for their partners but it didn't work out and that they got very depressed about their situation. One evening and out of the blue, X asks if you want to meet up with them, which you agree to and you end up getting completely drunk with them. In the morning, you remember that you and X got up to some crazy antics that were more-risky than what you usually would have done, but made the evening good fun.

- (5) You meet X through a friend at a concert. X intrigues you because of the stories your friend has told you about some of the things they get up to, such as spending a lot of money on clothing and their romantic relationship dramas. However, when you meet X you start to wonder about this reputation as they seem to be having a really good time and are attentive to what you are saying. They tell you how wonderful you are and that they want to meet up with you again. On leaving the concert, one of your mutual friends comes over to tell you that the plan is to go to a bar. X seems to get annoyed and later tells you that they always feel like the social group doesn't include them in any decisions. You don't think this to be the case, but you give X the benefit of the doubt. On getting in the taxi, X suddenly decides to change plans and go to a nightclub instead, and takes you with them. You are a bit taken aback but you are drawn to X's impulsivity because it is exciting. On leaving the nightclub, you exchange numbers with X and by the time you get home, X has text you about five times about meeting up next.

Low BDP/secondary psychopathy personality profiles

- (1) You meet X through Facebook as you both belong to the same Facebook group. You get some insight into X's life through their Facebook posts. You see that X went travelling on their own for a bit, and you ask them about their experience as it is something that you would like to do. X explains that they saved up for over a year for their trip, and spent a long-time planning on what they wanted to do. They advised you on how to stay safe abroad and how to avoid dangerous situations. X seems to have a regular group of friends that they have known for some time, and often posts photos of them at a meal with their friends, or out celebrating a birthday. You end up chatting to X on Facebook messenger about past relationships. X says that they had a couple of long-term relationships that ended for various reasons, but have remained on good terms with their ex-partners anyway. X seems to be confident and happy, and seems to care for other people. Because of how well you two are getting on, X suggests meeting up soon for a coffee.
- (2) You meet X through a friend at a concert. Your friend had already talked to you about X, but only in general about who was going out that evening. When you meet X, you talk to each other about the band and how much you like the music. You ask X about how they know your mutual friend, and they explain that they've been in the same social group for years since school. On leaving the concert, one of your mutual friends tells you that the plan is to get a taxi and go to a bar. X tells you that they can't be up late that evening because they have to get up in the morning to go for a run as they are training for a half marathon. At the end of the evening you have friend requested X on Facebook.
- (3) You meet X at your friend's birthday party. You ask X what they have got for your friend's birthday and they tell you about a present that you know that your friend will really like (you come away thinking that they are really thoughtful). Your friend had previously told you about X and how supportive they are, which you think seems to be the case. X asks you if you want to go with them to the store to pick up some wine and beer, as it is running low at the party. On the way to the store, you ask X about their job and they

explain that they recently started work at a new company, which resulted in a promotion and a pay-rise. X's job sounds high-pressured, but you think that they must be able to deal with it successfully. Back at the party you and X chat some more about various things and at the end of the night you are friends with each other on Facebook and end up chatting online now and then.

- (4) You meet X through work. During your break, you get chatting to X and they tell you a little bit about themselves. They've been to university, got a good degree and want to do well in the company so that they can go into management. Later on, you find yourself asking X for advice. You tell X that something happened at work that could make you look bad, although it wasn't your fault. X tells you not to worry because having worked at the company for longer than you, they know this type of situation arises regularly. You feel reassured by X and they invite you out with their friends to the cinema. Later on X tells you about some road rage they were subject to on the way into work and you comment that they did well not to have been more upset by the situation.
- (5) You meet X whilst out with your friends at a bar. Whilst waiting to order a drink, you and X happen to start talking. X seems to be enjoying their night out with their friends and they tell you a bit about themselves, about their job and that they are celebrating their friend's birthday. X works for an employment agency which they enjoy, and their friend is someone they've known from university. You and X seem to be getting on and having a laugh, and you think it's possible that X might fancy you. You decide to give X your number as they seem friendly and are fun to be with.

High wealth personality profiles

- (1) You meet X whilst out with your friends at a bar. You can tell from what X is wearing that they are successful. They are wearing quality clothes, have prepared their hair nicely and are wearing attractive jewellery. You start talking to X and you find out that they own a couple of businesses, which are doing really well. They own a house in the most desirable part of the city, as well as a holiday home in France. Their friends seem similarly affluent. You exchange conversation about various other things and you seem to get on well. X gives you their number. X then has to leave and you see them getting into an expensive car outside of the bar.
- (2) You meet X through a friend at a Kanye West concert. You both talk about how much you like the music. X goes on to say that they really respect Kanye's other business ventures such as his clothing label. X looks very fashionable and is wearing brands that are more expensive than high-street brands. X tells you about their career as an estate agent and that at some point they want to set up their own business. At the end of the concert you and X walk back to the car park and you see that X drives a brand-new car. You and X talk about meeting up again, and X suggests a restaurant that is very nice but might be a bit out of your price range.
- (3) You meet X at work. X is driven and always achieves targets. On your lunch break you and X talk about *The Apprentice*. X talks about how they love the opening credits of *The Apprentice* and they admire Sir Alan Sugar/Donald Trump because of their success in business. You notice that X always dresses really well for work and owns the latest iPhone. You talk about a recent news story but X states that they aren't really interested in politics. X suggests about meeting up outside of work, perhaps at the new bar where the celebrities go to.
- (4) You meet X through Facebook as you both belong to the same Facebook group. X has a high number of Facebook friends and posts lots of photos of themselves looking stylish and out with their friends, usually at an up-market restaurant or bar. X posts comments about their new Apple Watch. You get chatting to X over Facebook messenger and they invite you to a dinner party that they are having at their house. X lives in a brand-new apartment in the

city centre that is decorated in a sleek and modern style. When you arrive at the apartment, you are greeted with champagne and notice that X owns an expensive sound system. When you talk to X you find out that they have their own recruitment company. On leaving, X says that they would like to see you again, and suggests going to a celebrity chef's restaurant in town.

- (5) You meet X at your friend's birthday party. X tells you about a recent skiing holiday they went on, and that next year they'll be flying first class to Thailand. You notice that they are wearing some designer sunglasses and can smell their perfume/aftershave. You get talking to them about your background and X mentions that they went to private school and then on to Cambridge University. You find out that X runs a business and lives in the country with enough land for a couple of horses. X says that they would like to see you again and suggests that you come to theirs for dinner.

Low wealth personality profiles

- (1) You meet X whilst out with your friends at a bar. Whilst waiting to order a drink, you and X happen to start talking. X makes a joke about how expensive the drinks are, which you agree with. You tell X about your job, and X says that they are currently temping in various office/admin jobs. You ask X what career they would like to have, and they say that they're still not sure, but they're not interested in making lots of money or having material things. They just want to be happy and not caught up in the stress that comes with ambition. You find out that X lives in one of the not so nice areas of the city but they don't mind because they really like the local community feeling of the area. You talk some more with X and come away feeling that they are a nice person who is easy to talk to and fun to be with.
- (2) You meet X through a friend at a Kanye West concert. You both talk about how much you like the music. X goes on to comment that despite their liking for Kanye West, they don't like the way that Kanye or his wife Kim Kardashian, seem to be obsessed by money, and the way that they flaunt their wealth. At the end of the concert, you suggest going to a bar but X says that they would rather go to the pub. At the pub you talk about a recent BBC1 documentary and then which books you are into. X recommends a book that you might like. You and X talk about meeting up again, and X suggests a café in town.
- (3) You meet X at work and get chatting during your lunch break about *The Apprentice*. X says they really dislike *The Apprentice* because of the emphasis on capitalism and greed. X thinks that the contestants are horrible and fake, and says that people should focus on the more important things in life rather than money. You talk about the war in Syria, and X says that the situation is terrible and more should be done to help people trying to escape from the country. X mentions that they are currently training for a half marathon and will be raising money for Oxfam. X suggests meeting up outside of work, perhaps to the local museum where there is a new exhibition.
- (4) You meet X through Facebook as you both belong to the same Facebook group. X posts a lot on different causes that they are passionate about such as homelessness and animal welfare. Sometimes they also post photos of them walking in the country or on a cycle ride with family or friends. You get chatting to X and they invite you to a dinner party they are having. X lives in a modest house in a quiet suburb. When you arrive at the house you are greeted by a couple of ex-shelter dogs that they own and sit down for a vegetarian meal. You find out that X is a teacher. On leaving, X says that they would like to see you again, and suggests going for a walk in the country.
- (5) You meet X at your friend's birthday party. X tells you about their city-break weekend they went on recently with some friends. They say that it wasn't too expensive as they stayed in a budget hotel and booked early. X mentions that they are saving to go abroad next

year. You get talking to them about your background and X says that they went to a local school and then did a degree in Sociology. X tells you that they are buying a house that they have been saving for over the last few years. They had to sacrifice getting a new car for the deposit and having to drive a fairly old car that they've had for a while. X says that they would like to see you again and suggests a local popular restaurant.

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