

Original Article

AVOIDING THE WASH: EXTRAVERSION PROVIDES A NET FITNESS GAIN

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Abstract

As the fields of personality and evolutionary psychology merge, new conceptualizations of personality traits will arise. However, individual differences continue to present a recurrent problem for evolutionary psychologists. We contend that the heterogeneity of personality traits provides fitness benefits and fitness costs that relate to fitness outcomes. As these costs and benefits balance one another in the course of individuals' lives, only those traits that create a net positive balance will be correlated with improved fitness outcomes. In this study ($N = 155$), we showed how extraversion provides positive fitness outcomes to both sexes, suggesting that extraversion creates the best balance of positive and negative characteristics and habits of all of the Big Five. In contrast, other aspects of the Big Five were not related to number of lifetime sex partners, suggesting that the positive and negative aspects of those traits create a near-neutral balance.

Keywords: Big Five, fitness, personality, sex differences, evolutionary psychology

Introduction

Individual differences present a problem for Evolutionary Psychology. Some argue that individual differences are unlikely to be the result of adaptations but rather are noise (e.g., Tooby & Cosmides, 1980). Others argue that individual differences are central to evolutionary fitness (e.g., Buss, 2009). A last, and growing group, argue that individual differences evolved to reduce competition in any one niche among conspecifics, creating frequency-dependent traits that serve to solve adaptive tasks in different ways (e.g., Penke, Denissen, & Miller, 2007). In this study, we add evidence consistent with the third position. This perspective argues that variation in personality is not neutral or a by-product of evolution, but instead represents meaningful within-species

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variation. As long as different rates of a personality trait conferred some reproductive advantage, variation would persist in populations.

Perhaps the most well researched personality taxonomy is the Big Five (for review see Larsen & Buss, 2007). The Big Five traits (i.e., extraversion, agreeableness, emotional stability, conscientiousness, and openness) are reliably linked to numerous measures of mating success, strategies, and personality. For instance, extraversion, openness, and agreeableness are reliably correlated with mating success (Buss & Shackelford, 1997; Hoyle, Fejar, Miller, 2000; Nettle, 2005; Schmitt, 2005; Schmitt & Shackelford, 2008; Wright & Reise, 1997). However, typical research has focused on accounting for variation in sociosexuality (Schmitt, 2005) or mating strategies (Buss & Schmitt, 1993) and not on fitness outcomes measured with number of sex partners.

Unfortunately, understanding how personality traits function as specialized strategies (e.g., Figueredo et al., 2006) to solve adaptive tasks is limited by two problems. First, measuring fitness outcomes in a country where birth control is readily accessible is difficult. In a freely reproducing species or culture, it is probable that number of sex partners in one's lifetime is well-correlated with offspring production (Kanazawa, 2003). Therefore, in using number of sex partners as a modern proxy for reproductive fitness, we are interested in how one can account for fitness outcomes with personality traits like the Big Five. In other words, the Big Five may allow individuals to accomplish or interfere with fitness-related tasks to different degrees.

The second problem is related to the fact that personality traits like the Big Five are heterogeneous, providing characteristics and habits that can be simultaneously fitness enhancing and fitness suppressing. Personality traits may function to allow individuals to specialize in certain niches to solve adaptive task but this specialization comes with costs and benefits (Figueredo et al., 2006). Indeed, such a perspective appears reasonable for all parts of the Big Five: each provide some positive aspects that may relate to niche specialization and survival but may also impose costs.

Extraversion has been well-studied in relation to fitness outcomes (Nettle, 2005, 2006, 2007). Extraversion may provide the right balance of positive attributes that provide new mating opportunities (e.g., outgoingness) while not driving others away (e.g., friendliness). Characteristics like gregariousness, positive mood, and high activity level may put extraverts in more social situations that allow them, by sheer exposure, to have more access to mates and may facilitate mateships. Indeed, individuals desire extraversion in their mates (see Nettle & Clegg, 2008). However, extraversion carries with it some costs. Extraverted women are more likely to have their mates raised by stepfathers; a serious cost to fitness (Daly & Wilson, 1985). One might describe extraversion as part of a *fast* life strategy; putting effort more into mating and less into parenting (see Figueredo et al., 2006). Number of sex partners – our measure of reproductive fitness – may function as a proxy for mating effort. Although, extraversion may provide both costs and benefits, it appears as though when averaged out, individuals with high extraversion do have more mating success (Nettle & Clegg, 2008). It appears as though, being extraverted may allow individuals to avoid the *wash* – the canceling out of benefits and cost. Therefore, we predict that extraversion will be positively correlated with number of lifetime sex partners.

Rates of neuroticism may relate to an individual's ability to detect threats in one's environment (Haselton & Nettle, 2006; Nesse, 2006). Although vigilance over one's environment surely provides survival value, hypervigilance can be costly. In order to avoid dangers, some individuals have developed low-detection thresholds. These low

detection thresholds allow individuals to not make too many Type 2 errors in the detection of, say, predators, but impose serious behavioral, physiological, and social costs. For instance, highly neurotic individuals may undermine their own reproductive efforts through their relentless worrying, jealousy, suspicion, and neediness. Indeed, the number one predictor of the marital satisfaction in partners is the other partner's level of neuroticism (Karney & Bradbury, 1997; Kelly & Conley, 1987). However, it appears the costs and benefits come out in the wash, providing no fitness benefits (Nettle & Clegg, 2008). Therefore, we predict that neuroticism will not be associated with number of lifetime sex partners.

Conscientiousness is similar to neuroticism. Evidence suggests that there is no correlation between scores on conscientiousness and number of lifetime sex partners (Nettle & Clegg, 2008). We would argue that as a result of the benefits and costs of having this trait, it does not provide individuals with net fitness gains. Conscientious individuals have skills that are particularly useful in contexts other than mating like work or school. The benefits of conscientiousness come from an ability to weigh future consequences, be responsible, and to be organized. However, these individuals may present negative personality traits. An overly developed sense of order, an inability to vary from one's routine, and an inability to be spontaneous may make the individual less attractive to mates and may inhibit one's ability to start new relationships. Therefore, we predict that conscientiousness will not be associated with number of lifetime sex partners.

Agreeableness is expressed through traits like loyalty, empathy, trust, and gentleness. It behaves similarly to conscientiousness with a lessened pursuit of mating opportunities and is uncorrelated with number of sex partners (Nettle & Clegg, 2008). Because number of lifetime sex partners taps more closely short-term mating than mating success in general (Jonason, Li, Webster, & Schmitt, 2009), we would expect any correlation between agreeableness and number of sex partners to be negative at first glance. In other words, nice people – guys – finish last (Boudreau, Boswell, & Judge, 2001). Indeed, being disagreeable appears to be associated with both more interest as a short-term (Haselton & Miller, 2006) and being disagreeable by being antisocial is associated with more mating success in the short-term (Jonason et al., 2009). Despite this, disagreeableness itself imposes serious fitness costs vis-à-vis increased aggressiveness (e.g., Gleason, Jensen-Campbell, & Richardson, 2004). Therefore, we predict that agreeableness will not be associated with number of lifetime sex partners.

The last part of the Big Five is openness. Openness is related to a concern for culture, aesthetics, and a drive to seek out new experiences. Such traits may provide individuals with the interests in the arts that are attractive to prospective mates (Nettle & Clegg, 2006). However, these traits are related to a wide-range of cognitive distortions including schizotypy (Nettle & Clegg, 2006). As Nettle and Clegg (2008) put it, openness to experience is a mixed blessing, associated with both psychosis (which is sexually unattractive) and creativity (which is sexually attractive). Therefore, we predict that openness will not be associated with number of lifetime sex partners.

Although some personality traits may serve one sex more than the other sex (Jonason et al., 2009), we expect that extraversion will serve both sexes equally (Nettle & Clegg, 2008). If this is so, there should not be a sex difference in rates of extraversion whereas sex differences in other dimension of the Big Five may exist. For instance, we expect to replicate effects that suggest that men score lower than women do on agreeableness and women are less emotionally stable than men are (e.g., Schmitt & Shackelford, 2008). Additionally, we expect men to report more sex partners than women

do. It is not that we expect men to have higher fitness outcomes than women; this is surely unlikely when measured with lifetime sex partners, but to simply report having had more sex partners in their lifetime. For every time a heterosexual man has sex, there is a woman present. Such a sex difference is more likely an effect of men's over-reporting and not a veridical sex difference (Jonason, 2007; Jonason & Fisher, 2009).

In this study, we present preliminary evidence in support of our claim that lower-order personality traits, like the Big Five, can be treated as part of the toolkit that allow individuals to solve adaptive tasks. Theoretically, we hope to add to the literature on Evolutionary Personality Psychology; advancing it to a view that what we measure as personality traits are reflective of underlying, evolved social strategies that come with costs and benefits (Nettle & Clegg, 2008).

Methods

Participants and Procedures

One hundred-fifty five students (40% men) from the Southwestern U.S. aged 18 to 57 years ($M = 23.43$, $SD = 6.68$) received extra credit for participation in this study. Participants received an informed consent that detailed the nature of the study. If they consented to participate, they signed the form and were given a survey packet described below. When completed, the participants were debriefed and thanked for their participation.

Measures

To measure reproductive fitness, we asked participants how many penile-vaginal sex partners they have had in their lifetime. A log-transformed version of number of lifetime sex partners was used because reported number of sex partners was a positively skewed frequency distribution (Tabachnick & Fidell, 2006). Other authors have argued that such a measure is a good proxy for reproductive success (Nettle, 2005, 2006, 2007; Kanazawa, 2003). It is likely to be more specific (for a review on the need to be specific in measures of frequency of sex see, Sanders & Reinisch, 1999) than self-perceived mating success (Clark, 2006; Jonason, 2007).

Participants completed the 44-item BFI (John & Srivastava, 1999). Participants were asked how much a series of adjectives (e.g., talkative, emotional, has a forgiving nature) described themselves (1 = *not at all*; 5 = *very much*). Five factors could be detected, including extraversion ($\alpha = .75$), neuroticism ($\alpha = .76$), openness ($\alpha = .77$), conscientious ($\alpha = .79$), and agreeableness ($\alpha = .80$). The corresponding items were averaged to create these indexes.

Results

In Table 1, we report sex differences tests. Men were less agreeable, less neurotic, and had more sex partner than women did. There was no sex difference in extraversion as predicted. These results generally replicate prior research.

In Table 2, we report zero-order correlations among the personality and Big Five measures. In confirmation of our cost-benefit hypothesis, extraversion was positively correlated with number of lifetime sex partners, suggesting that there is a net-fitness gain

for being an extravert. In contrast, there were not correlations between lifetime sex partners and openness, neuroticism, and agreeableness, suggesting that the positive and negative sides of these heterogeneous personality traits create a fitness-wash. There was a slight positive correlation between conscientiousness and number of sex partners. These correlations were robust to the partialling of the effect of participant's sex.

Table 1. Sex Differences in Number of Sex Partners and the Big Five

	Mean (SD)			<i>t</i>	<i>d</i>
	Overall	Men	Women		
Extraversion	3.72 (0.81)	3.84 (0.82)	3.63 (0.80)	1.54	0.25
Neuroticism	2.66 (0.86)	2.43 (0.83)	2.79 (0.85)	-2.56*	-0.42
Conscientiousness	4.16 (0.79)	4.14 (0.71)	4.16 (0.84)	-0.13	-0.02
Openness	4.05 (0.70)	4.16 (0.73)	3.98 (0.69)	1.50	0.24
Agreeableness	3.78 (0.88)	3.59 (0.93)	3.92 (0.84)	-2.32*	-0.38
Number of sex partners ¹	1.45 (1.06)	1.80 (1.20)	1.22 (0.89)	3.42**	0.56

Note: *d* is Cohen's *d*

Note: * $p < .05$, ** $p < .01$

Note: ¹ Log-transformed variable

Table 2. Zero-order Correlations Between Fitness Outcome and the Big Five

	Number of sex partners ¹
Extraversion	.32**
Neuroticism	.04
Conscientiousness	.17*
Openness	.07
Agreeableness	-.07

Note: * $p < .05$, ** $p < .01$

Note: ¹ Log transformed variable

Note: These correlations were robust to a partialling of the effect of participant's sex

Discussion

Because strategies to solve fitness-related tasks are likely to come with fitness benefits along with fitness costs, we hypothesized that only those personality traits that conferred a net fitness gain would be correlated with a measure of fitness outcomes – number of lifetime sex partners. Indeed, we showed that extraversion was correlated with fitness gains. Stated another way, personality traits are likely to have evolved via balancing-selection through the balancing of the costs and benefits associated with them over the lifecourse (Nettle & Clegg, 2008; Penke et al., 2007). This suggests that possessing related skills confers enough opportunities to mate while not imposing enough costs to create a wash in terms of fitness. The tool of extraversion appears to be deployed fairly equally across the sexes. Such evidence is consistent with prior research on Evolutionary Personality Psychology (see Nettle & Clegg, 2008) that suggests individual

differences afford niche specialization techniques to solve adaptive tasks (Figueredo et al., 2006).

In contrast to extraversion, agreeableness, openness, and neuroticism evidenced a wash. Although traits like agreeableness may be socially desirable vis-à-vis trust, empathizing, and being nice, it appears these traits are problematic in domains such as employment success (Boudreau et al., 2001) and may be so in mating as well. Agreeableness, like the other two, was uncorrelated with mating success as we measured it. We would argue the costs and benefits of possessing these traits cancel each other out in fitness, or at least mating, domains. This is not to say these traits are worthless. Indeed, traits like openness may be instrumental in creative endeavors. We will not belabor the argument here because a similar argument has been made more elaborately elsewhere (Nettle & Clegg, 2008).

An unexpected finding was that conscientiousness provided a slight and significant fitness advantage. Conscientiousness tends to relate to organization and responsibility and, therefore, may be an artifact of sampling/measurement error. Indeed, the correlation was low enough that we might dismiss it as just that. However, it could also be possible that being responsible provides fitness advantages through time-management. Mating takes time and may take organizational skills to get one's proverbial ducks in a row to find meaningful amounts of time to engage in mating efforts.

This study reports preliminary evidence from a small college-based sample. Future research should assess other potential fitness indicators like number of offspring and may be best served by doing this in more freely reproducing cultures than we used. Although it is typical of personality research to gather data from Western, modern samples, future work should gather international data and data from pre-Westernized groups of people. That said there is evidence that suggests short-term mating strategies are correlated with the Big Five all over the world (Schmitt & Shackelford, 2008).

Admittedly, we present simple analyses. We attempted to conduct moderation and mediation analyses. Moderation tests proved fruitless. The prerequisites for mediation were not met and, therefore, we did not conduct those analyses. However, we did repeat our correlational results after partialling the variance associated with the participant's sex. We feel mediation analyses would be ideal because they provide evidence of the psychological mechanisms that underlie different mating strategies (Jonason & Kavangh, 2010). Past work has made this point (e.g., Jonason et al., 2009). Our failure presently to be able to do so is the result of empirical constraints but may reveal something more pervasive. The Big Five, although extremely popular, may not be fundamental aspects of human nature despite their ubiquitously useful features of describing individuals. Fundamental personality traits may more closely reflect some core differences in social styles (Jonason, Koenig, & Tost, 2010; Jonason, Li, & Teicher, 2010).

Last, we are limited in the use of our measure of mating success. Although some have argued that number of lifetime sex partners is a good proxy for fitness success (e.g., Kanazawa, 2003), this approach is not without its critics (e.g., Geher, Camargo, & O'Rourke, 2008). Number of lifetime sex partners may be more reflective of a short-term mating orientation. Humans do not only increase their inclusive fitness by short-term matings. Long-term mating is also a way to increase fitness and indeed, this may be one major way in which humans, unlike other primates like chimpanzees, have improved their fitness when competing with the costs imposed by a highly helpless offspring.

Therefore, future research should attempt to replicate the current results with more nuanced measure of mating success like number of offspring and success of offspring.

An important question emerges from this work. If extraversion is so great, why does introversion even exist? That is, directional selection should have selected out the less adaptive introversion in favor of extraversion. We feel this is overly simplistic thinking. We suspect that having aspects of both extraversion and introversion may be adaptive in different contexts. Introversion may facilitate a long-term mating orientation leading to staying at home, protecting offspring, and mate-guarding. Extraversion may facilitate seeking new mates. Humans are likely to have the capabilities to pursue dual strategies in mating and we would expect humans to have the psychological plasticity to pursue either strategy both based on present ecological conditions. In that vein, we diverge from modern Evolutionary Psychology, and lean more towards a Behavioral Ecological perspective espoused by Life History Theory (see Figueredo et al., 2006).

We viewed personality traits as tools to solve adaptive tasks. We argued that because personality traits are heterogeneous in nature, they likely provide both fitness enhancing and fitness suppressing characteristics. We hypothesized that only those traits that had a net positive balance are likely to provide positive fitness outcomes. It appears that extraversion provides positive fitness outcomes unlike the other measures of the Big Five. One might say: extraversion “does not come out in the wash.”

Received September 5, 2009; First revision received December 9, 2009; Second revision received January 13, 2010; Third revision received March 26, 2010; Accepted June 27, 2010

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