



Brief Report

Castration and personality: Correlation of androgen deprivation and estrogen supplementation with the Big Five factor personality traits of adult males

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ABSTRACT

Genetic males may receive androgen deprivation therapy for reasons ranging from sexual reassignment to treating prostate cancer. We investigated the relationship of androgen deprivation to personality for voluntarily castrated males in a large-scale online survey. Based on the historical social positions of androgen-deprived males and contemporary research on testosterone, we predicted that modern day androgen-deprived males ($n = 122$) would differ on several axes of the Big Five factor personality inventory compared to eugonadal controls ($n = 1229$). Though not statistically significant, an increase in agreeability for the androgen-deprived group was observed. The role of estrogen on the personality of castrated males was also explored through androgen-deprived participants taking supplemental estrogen ($n = 33$). Estrogen was found to correlate with significantly higher agreeability scores.

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1. Introduction

In this study we explore the relationship of androgen deprivation to the personality of men who have been castrated; i.e., had their testicles removed or chemically shut down. There are a variety of well-studied physical side effects associated with androgen deprivation in adult males, including hot flashes, reduced libido, osteoporosis, weight gain, and impotence. There is also a general understanding that testosterone deprivation can affect an individual's mood. However, the precise way in which castration affects personality has not been objectively explored. This lack of information is surprising considering that any time in North America approximately 600,000 men are on androgen deprivation therapy (ADT) as a treatment for prostate cancer (PCa) (Smith, 2007).

While treating PCa is by far the most common reason for a man to be androgen-deprived, some men voluntarily seek castration for

reasons unrelated to cancer. Some do so as part of male-to-female sexual reassignment; others may have a male-to-eunuch gender dysphoria; i.e., a desire to be free of male thought processes (e.g., high libido), without a desire to be female (Wassersug, McKenna, & Lieberman, 2012). Regardless of the reason they seek castration, androgen deprivation may affect not only the body and libido of these men, but also their personality.

Here we examined the personality of voluntarily androgen-deprived men. We did not include men who had undergone ADT to treat PCa because their health status as cancer patients was seen as a potentially large and uncontrolled variable. Indeed many factors other than hormones can affect a male's psychological state (e.g., age, health status, and associated physical and psychological stress). The results of this study and any further research it inspires however may assist men on ADT for PCa by helping them recognize and adapt to any changes in personality that they might experience.

1.1. Historical background

Although contemporary research on the psychological impact of androgen deprivation is rare, there are accounts of the impact of castration on the personalities of males in the historical literature (reviewed in Aucoin & Wassersug, 2006). Authors have written

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specifically about the personality of eunuchs (i.e., castrated individuals) in the Chinese, Byzantine, and Ottoman empires (e.g., Aucoin & Wassersug, 2006). Though there are a few positive descriptions, emphasizing characteristics such as loyalty, many of the historical accounts are contemptuous and inconsistent with the social positions that eunuchs held in those societies. Even today the stigma surrounding castration forces men to hide the psychological impact of androgen deprivation, regardless of what that impact may be (Cushman, Phillips, & Wassersug, 2010).

Penzer (1936) reports that eunuchs in the Ottoman Empire were perceived as cruel, morose, and arrogant. Elsewhere though, he labels them as credulous, fawning, and generous. Reports from the Byzantine Empire state that eunuchs were considered irritable, envious, and overly sensitive. However, negative descriptions of eunuch personality are hard to reconcile with the high status they often had. Indeed eunuchs were commonly diplomats, senior government officials, and military officers in the large dynastic governments of Eurasia for the last 4000 years (references in Aucoin & Wassersug, 2006). It seems unrealistic that eunuchs would have consistently held such elevated posts in disparate societies if they displayed the negative personality traits attributed to them by contemporaries and by modern historians.

1.2. Contemporary research

Contemporary literature reveals several findings regarding the effects of testosterone on personality. Dominance behavior – intended to achieve or maintain high status – of both aggressive and non-aggressive nature, is associated with higher levels of testosterone (Mazur & Booth, 1998). Higher salivary and prenatal (as suggested by 2D:4D ratios) testosterone levels have been found to be related to poorer performance in social/intergroup competitions (Mehta, Wuehrmann, & Josephs, 2009; reviewed in van Honk et al., 2011). van Honk, Montoya, Bos, van Vugt, and Terburg (2012) and others cited therein, show that supplemental testosterone may increase cooperative behaviors in individuals with low prenatal testosterone exposure, however, decreasing cooperation in those with high prenatal testosterone exposure. Additionally, testosterone administration in women has been found to decrease empathy (van Honk et al., 2011) and trust (Bos, Terburg, & van Honk, 2010). Aggressive emotions, attitudes and violent behavior have been negatively associated with the trait of agreeability (Barlett & Anderson, 2012).

Research into the effect of testosterone on personality traits other than dominance and aggression is becoming more common (reviewed in Alvergne, Joleka, Faurie, & Lummaa, 2010). Whereas a negative correlation between the exposure of prenatal testosterone and agreeability has been reported in women, a similar association has not been shown for men. Another study found that men who are highly extroverted have significantly higher levels of salivary testosterone (Alvergne et al., 2010). Using salivary testosterone samples, Sellers, Mehl, and Josephs (2007) found a negative correlation between testosterone and conscientiousness in women, but no relationship to neuroticism or openness. Among adult males, no single personality factor has consistently been found to correlate with testosterone levels, however a positive correlation has been repeated between testosterone level and self-reported dominance for both men and women.

1.3. Sex differences and the role of estrogen

There is substantial research exploring differences between males and females on the Big Five factor personality inventory (BFI). However, higher estrogen and lower testosterone baseline levels in females complicate these comparisons. Two meta-analyses (reviewed in Schmitt, Realo, Voracek, & Allik, 2008) found that

across cultures neuroticism was significantly higher among females than males and women also scored higher in agreeableness. Data on openness were more mixed across cultures. Conscientiousness though was higher among women than men to varying degrees. On extraversion, Schmitt et al. (2008) reported that women are significantly higher than men, though the older literature found less consistent difference on that axis.

1.4. Aim and hypotheses

To better understand the relationship of testosterone and estrogen to personality, we investigated the correlation of testosterone deprivation and estrogen supplements in a group of self-reported, voluntarily castrated adult men. Based on the findings of Alvergne et al. (2010) and on the roles that eunuchs held in historical societies, we hypothesized that androgen-deprived males would have lower levels of extraversion than eugonadal individuals. We also hypothesized that the androgen-deprived males would exhibit more agreeability. Since no previous research reported a strong relationship between testosterone levels and the personality traits of neuroticism and openness, we did not speculate on potential differences between the androgen-deprived and control groups for these traits.

When considering castrated individuals taking supplementary estrogen, we hypothesized they would report even higher scores of agreeability than the castrated group not on supplementary hormones. This is based on the higher agreeability typically reported for females in comparison to males. We also hypothesized higher neuroticism and conscientiousness would be observed in the supplementary estrogen group based on established gender differences.

2. Methods

2.1. Materials and survey

Our data were obtained from a survey posted for four months in 2008 on the Eunuch Archive website (www.eunuch.org). This survey received approval from the Institutional Research Board of Dalhousie University. Respondents were provided with the purpose of the study, although the hypotheses surrounding the BFI were not given. We allowed respondents to skip any questions that they wished, which resulted in questions with varying sample size.

Additional questions addressed gender identity, sexual orientation, sexual history, medical history, and general demographics (age, country of residence, education level, etc.) to ensure comparability of our control group to those who had been castrated.

Individuals, who had been physically castrated, were also asked about their current use of exogenous hormones. For hormone use, choices included 'replacement level testosterone', 'low/minimal dose testosterone', 'low/minimal dose estrogen', 'high levels of estrogen for Male-to-Female transition' or 'no exogenous hormones'. Individuals on high dose testosterone were understood to be ones who did not like the psychological or physical impact of androgen deprivation but sought castration for other reasons (see citations in Vale, Siemens, Johnson, & Wassersug, 2013). Low dose hormones were understood to be taken to dampen the more bothersome (e.g., hot flashes) or medically serious (e.g., osteoporosis) non-sexual side effects of abrupt androgen deprivation in males.

2.2. Big Five factor personality inventory (BFI)

The BFI is a well-validated research instrument, which asked respondents to indicate if 44 statements apply to them using a

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