



Tattooed men: Healthy bad boys and good-looking competitors

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ARTICLE INFO

Article history:

Received 6 September 2016

Received in revised form 25 October 2016

Accepted 26 October 2016

Available online xxxx

Keywords:

Tattoo

Handicap hypothesis

Evolutionary psychology

Contest competition

Mate choice

ABSTRACT

Tattooing, even in modern societies, is painful and may lead to multiple health problems. It has been hypothesized that having a tattoo might honestly signal a man's immunocompetence and good health. However, to date this hypothesis has largely been untested. Here we report the results of a large population-based study, where photos of real, non-tattooed men were digitally modified to add a tattoo and presented to 2584 men and women. Pictures with and without tattoo were rated in several categories. Women rated tattooed versions of the pictures as healthier, but not more or less attractive than the originals. Inversely, men rated tattooed versions of pictures as more attractive, but not more or less healthy than the originals. Both men and women rated pictures of men with a tattoo as more masculine, dominant and aggressive. Women but not men assessed tattooed men as worse potential partners and parents than non-tattooed men. Moreover, effect size comparison demonstrated that adding tattoos has a greater impact on men's than on women's ratings. Our results confirm that adding tattoos changes others' perception of men. They also demonstrate that tattoos not only influence female preference, but they may be even more important in male-male competition.

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1. Introduction

Invasive body modifications such as tattooing have a long history in many cultures (Krutak, 2015) and in some populations were used to attract potential mates (Ludvico & Kurland, 1995). It has been hypothesized that such decorations are honest signals of genetic and phenotypic quality, especially of increased pathogen resistance (Singh & Bronstad, 1997).

In preindustrial societies, tattooing was a life-threatening experience (e.g. McLean & D'Souza, 2011) but even in modern societies tattooing is painful and may lead to multiple health problems occurring immediately after the process of tattooing or with some time lag (Kazandjieva & Tsankov, 2007). Most common health problems associated with tattooing result from various, often severe, infections (Kotzen et al., 2015; LeBlanc, Hollinger, & Klontz, 2012). Therefore, tattoos may not only signal a man's high pain tolerance, but also good health and immunocompetence. In fact, it has been postulated that tattoos in men may act as a handicap signal (sensu Zahavi, 1975) and influence how they are perceived by others (Singh & Bronstad, 1997). So far, the only attempt to verify these hypotheses has been done using virtual human characters (Wohlrab, Fink, Kappeler, & Brewer, 2009). This study

showed that having a tattoo may signal both biological and behavioural traits: tattooed male characters were perceived as healthier by women than by men, and more dominant both by men and women. Virtual human characters only weakly represent natural variation in human body appearance, thus, it is unclear if results of such studies can be extrapolated to judgments of real people. To our knowledge, effects of tattooing using pictures of real men have been studied only once (Seiter & Hatch, 2005). This study found that male model attractiveness ratings were not affected by adding a tattoo. However, this study was small ($n = 74$) and results were not adjusted for sex of the person evaluating the pictures.

Here we report results from large ($n = 2584$) population-based study, where photos of real men were modified by adding a tattoo. Based on hypothesis by Singh and Bronstad (1997), we predicted that adding a tattoo to photos of real, non-tattooed men will alter their perceived personality and physical appearance.

There are two mechanisms of sexual selection: mate choice and contest competition between males, and it has been hypothesized that male contests are the main forms of sexual selection in humans (Puts, 2010). Given that women assess men as potential partners, while men assess other men as potential same-sex rivals, we predicted that adding a tattoo will differently and with varying intensity affect ratings by female and male participants. Specifically, we hypothesized that female participants should rate tattooed versions of the pictures as more attractive, healthy, masculine, dominant and aggressive but less suitable as partners or fathers than the originals. Simultaneously, male participants

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should rate pictures of men with tattoo as more masculine, dominant and aggressive than pictures of men without tattoo. Moreover, adding tattoos should have a greater impact on men's than on women's ratings.

2. Methods

We photographed nine shirtless men from the waist up (mean age = 25.1, standard deviation [SD] = 6.15, range 19–35 years). For each picture, the lighting and background were kept constant. Each model stood in the same pose with a neutral, non-smiling facial expression. None of the models had a tattoo. A professional photographer digitally modified the pictures by adding a black arm tattoo with an abstract, neutral design in Adobe Photoshop CS6 (Fig. 1).

Data were collected by an online survey advertised in social media (e.g. Facebook) as a “male attractiveness study.” We included in the analysis responses obtained from 2369 exclusively heterosexual woman (mean age = 24.6; SD = 4.59) and 215 exclusively heterosexual men (mean age = 25.5; SD = 5.39) from Poland. Participants viewed each of the 9 models once. We asked participants to rate a randomly selected version of each pictures. Each participant rated at least one original and one modified version. Participants rated each pictures for attractiveness, health, masculinity, dominance, aggression, good potential partner and good potential father on a five-point semantic differential scale (e.g. 1 = very unattractive; 5 = very attractive).

For each participant, we calculated the mean scores of original and modified versions of pictures in each category. We analysed differences between mean ratings of original versions pictures of men without tattoos and modified versions with tattoo in each category in dependent samples t-tests. For each significant outcome we have additionally calculated an effect size (Cohen's *d*) and the associated 95% confidence intervals (CI). In a meta-analysis (the fixed-effect model) we have compared mean effect sizes of men and women ratings. All analyses were performed in Statistica version 12.0. The research protocol was approved by the Bioethics Committee of Jagiellonian University.

3. Results

Women rated tattooed versions of the pictures as healthier, but not more or less attractive than the original. Inversely, men rated tattooed versions of pictures as more attractive, but not more or less healthy than the original. Both men and women rated pictures of men with a tattoo as more masculine, dominant and aggressive. Women assessed

tattooed men as worse potential partners and parents than non-tattooed men, but having a tattoo did not influence men's ratings in those categories (Table 1).

Mean effect size, calculated from the absolute values of Cohen's *d* of each significant difference, was greater for men (mean Cohen's *d* = 0.26, 95% CI from 0.18 to 0.35) than for women (mean Cohen's *d* = 0.15, 95% CI from 0.15 to 0.17). Moreover, differences between these two mean effect sizes for men and for women were statistically significant ($Q = 5.78, p = 0.01$), which means that the effect size was related to the sex of the participant.

4. Discussion

Our results demonstrate that women interpret tattoo ornamentation as a signal of better health. Similar results have been demonstrated in the study on virtual human characters (Wohlrab et al., 2009) where women rated virtually created 3-D silhouettes of males. Their ratings on the dimension of health were significantly higher when silhouettes had added tattoos.

It has been previously shown that, among men, individuals with tattoos and/or nonconventional body piercings are more symmetrical than individuals without invasive body modifications (Kozziel, Kretschmer, & Pawlowski, 2010). Low level of asymmetry is proposed as a signal of good health, developmental stability and genetic quality (e.g. Jones et al., 2001), thus this finding suggests better health and higher biological quality of tattooed or pierced men. Furthermore, given that tattooing may still be a challenge for health and consequential for survival, a tattoo may be considered as a handicap signal (Zahavi, 1975). Women may favour tattooed men as more valuable partners with potentially better health. Interestingly, it has also been shown that repeated tattooing may be related to potential health benefits, by strengthening immunological responses (Lynn, Dominguez, & Decaro, 2016).

We have also shown that women rated tattooed men as more masculine, dominant and aggressive. These testosterone related characteristics are commonly associated with good health (reviewed in Scott, Clark, Boothroyd, & Penton-Voak, 2013). According to the immunocompetence hypothesis, since testosterone suppresses immune function (Grossman, 1985), only immunocompetent individuals can afford high levels of testosterone and are capable of exhibiting exaggerated testosterone-related features (Folstad & Karter, 1992; Muehlenbein & Bribiescas, 2005).



Fig. 1. Two versions of one of stimulus pictures, original (A) and modified (B).

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