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Tattooed men: Healthy bad boys and good-looking competitors

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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.

Keywords: Tattoo; Handicap hypothesis; Evolutionary psychology; Contest competition; Mate choice

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, Sell, Mathes, Dentinger, Lee, Schiff, & Weiss, 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=2 584) 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 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 (Figure 1).

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

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.

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).

Table 1 Differences between mean ratings of original versions pictures of men without tattoos and modified versions with added tattoo (dependent samples t-tests).

	Women's ratings (n=2 369)						Men's ratings (n=215)					
	Males with tattoo	Males without tattoo					Males with tattoo	Males without tattoo				
	Mean (SD)	Mean (SD)	t	p	Cohen's *d*	95% CI	Mean (SD)	Mean (SD)	t	p	Cohen's *d*	95% CI
Attractiveness	2.53 (0.72)	2.53 (0.72)	-0.01	.996			**2.80 (0.64)**	**2.66 (0.68)**	**2.66**	**.008**	**0.23**	**0.06 – 0.39**
Health	**3.43 (0.53)**	**3.39 (0.56)**	**3.13**	**.002**	**0.07**	**0.03 – 0.12**	3.42 (0.57)	3.40 (0.53)	0.51	.608		
Masculinity	**3.56 (0.54)**	**3.52 (0.56)**	**2.71**	**.007**	**0.07**	**0.02 – 0.12**	**3.62 (0.48)**	**3.54 (0.49)**	**2.01**	**.045**	**0.16**	**0.00 – 0.33**
Dominance	**2.92 (0.51)**	**2.77 (0.52)**	**10.04**	**<.001**	**0.29**	**0.23 – 0.35**	**3.02 (0.51)**	**2.84 (0.49)**	**3.84**	**<.001**	**0.36**	**0.17 – 0.55**
Aggression	**2.45 (0.50)**	**2.29 (0.51)**	**12.55**	**<.001**	**0.31**	**0.26 – 0.37**	**2.65 (0.55)**	**2.47 (0.52)**	**3.91**	**<.001**	**0.34**	**0.15 – 0.52**
Good partner	**3.01 (0.69)**	**3.09 (0.70)**	**-5.73**	**<.001**	**-0.12**	**0.07 – 0.16**	3.25 (0.53)	3.30 (0.58)	-1.06	.289		
Good father	**3.11 (0.63)**	**3.19 (0.64)**	**-5.54**	**<.001**	**-0.13**	**0.08 – 0.17**	3.28 (0.55)	3.28 (0.57)	-0.13	.900		

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 (Koziel, Kretschmer, & Pawlowski, 2010). Low level of asymmetry is proposed as a signal of good health, developmental stability and genetic quality (e.g. Jones, Little, Penton-Voak, Tiddeman, Burt, & Perrett, 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).

Besides good health, testosterone-related characteristics may also be associated with other male qualities potentially desirable by women. For example, women who face an elevated risk of violence and crime prefer aggressive and dominant males for a long-term relationship, since they can provide protection for them and their offspring (Snyder, Fessler, Tiokhin, Frederick, Lee & Navarrete, 2011). It has been also shown that dominance in men is a good predictor of success in some hierarchies (Mueller & Mazur, 1996) and therefore may guarantee better access to resources.

Because a strong correlation between health and attractiveness should be expected (see Grammer, Fink, Møller, & Thornhill, 2003), it may seem surprising that women in our study did not find tattooed men more attractive. However, in our study, only general attractiveness was assessed. Women may perceive tattooed men as more attractive only when evaluating attractiveness for short-term relationships, as it was shown for masculinity preferences (e.g. Little, Connely, Feinberg, Jones, & Roberts, 2011). This is supported by a study showing that women found men with posttraumatic facial scarring as more attractive for short-term relationships but not for long-term relationships (Burriss, Rowland, & Little, 2009).

On the other hand, higher perceived masculinity, aggression and dominance in tattooed men may explain why those men are not perceived as more attractive. Although aggression might be a signal of better general biological quality that allows for successful competition and resource acquisition, it might also constitute a threat for a female and her future offsprings' survival. For example, men with high testosterone levels more often have extramarital sex and more often exhibit aggressive behaviour towards their wives (Booth & Dabbs, Jr., 1993). More masculine men are judged as those who spend more time and resources on mate acquisition than on paternal investment (Kruger, 2006). Given that there is no clear

correlation between testosterone-related traits and attractiveness (reviewed in Scott et al., 2013), it is understandable why women in our study ignore the presence of the tattoo during the evaluation of the attractiveness. However, the dark side of testosterone-related features perfectly explains why women assessed tattooed men as worse potential partners and parents.

Moreover, our finding that women did not find tattooed men more or less attractive is in agreement with previous studies showing that women from healthier populations have weaker preferences toward male masculinity (DeBruine, Jones, Crawford, Welling, & Little, 2010). Women are willing to pay costs associated with choosing a masculine partner only if they are outweighed by benefits of having a healthier partner and healthier offspring in an environment where health, in general, is poor. Further analyses have shown that cross-cultural variation in women's preferences for masculinity is better predicted by national income inequality, which is an important determinant not only of national health status but also male–male competition and violence (Brooks, Scott, Maklakov, Kasumovic, Clark & Penton-Voak, 2011). Poland is a country with relatively low health risks and where competitive aggression between males is not crucial for their wealth and status, thus it is not surprising that the presence of tattoo in Polish men does not influence their attractiveness in the eyes of women.

What may seem surprising is that male participants of our study rated tattooed men not only as more masculine, dominant and aggressive, but also as more attractive. Since all participants were exclusively heterosexual, we could assume that they judged the photographed men as potential same-sex rivals. We may, thus, hypothesize that men believe that tattoos are attractive to women. Thus, men’s judgment of other men’s attractiveness may be based more on cultural stereotypes regarding women’s perception of men attractiveness. Moreover, this belief may even work for them: it has been shown in the prospective study, that men have significantly higher body appreciation and self-esteem after obtaining their first tattoo (Swami, 2011).

It has been postulated that human males possess several traits which function is to threaten and exclude rivals from mating opportunities. This may indicate that male contests have been very important in human evolution (reviewed in Puts, 2010). For instance, dominance and the traits favoured by male contests predicted men's mating success, but the traits favoured by female choice did not (Hill et al., 2013). Men have very good ability to estimate the physical strength and fighting ability of other men based on photos of their bodies or even from photos of their faces (Sell, Cosmides, Tooby, Sznycer, von Rueden & Gurven, 2009). It is thus possible that men's tattoos may not only attract the opposite sex as a signal of good health, but also intimidate rivals of the same sex as a signal of fitness and physical preponderance.

In our study the presence of a tattoo influenced men's ratings only in those categories that could be related to intrasexual competition. The presence of a tattoo did not influenced men's ratings of health and whether judged males would be good potential fathers or potential partners. Considering men's reproductive strategies, we would expect they should not pay attention to if a tattooed man would be a good partner or a good father, who would pass good health to his children. However, it would be important to assess if a tattooed man would be a threat and competition for them.

Our results support that tattoos may have a dual function: they influence female preference, but also are likely to be important in male-male competition. Very often those two functions cannot be separated (Zahavi, 1975). However, effect size comparison demonstrated that tattoos have a greater impact on men's than on women's ratings. Given that, we can assume that a role of tattoos in male-male competition is more important than their role in the female choice, at least in the population studied. It seems that men are tattooing themselves to compete with other males rather than to be chosen by potential mates.

It is worth noticing that most of the differences between ratings of tattooed and non-tattooed men, while statistically significant, are relatively small. This may be related to our method of

modifying pictures. We have added only one relatively small and neutral arm tattoo. It is likely that more spectacular body modifications and/or its different body localisation would result in higher differences in ratings. Further, testosterone-related characteristics such as better (presumably heritable) health and higher aggression and dominance may no longer be essential in developed societies. Our findings may be just a remnant of evolutionary strategies from the past, when these traits were much more important and tattooing was much more risky without modern sanitary practices. We believe that our results show relatively weak but evolutionarily-based and still important patterns. Further research is needed to clarify if cross-cultural variation in perception of tattooed men exists, for example similar to the previously mentioned variation in women's preferences for masculinity (DeBruine et al., 2010). Moreover, the limitation of this study was that we did not obtain information from participants whether they had tattoos themselves. Future research can also extend the present findings by examining whether participants' dominance level, self-judged attractiveness or relationship status had an effect on perception of tattooed men.

In conclusion, our results identified two important sexual selection mechanisms that may support tattooing in men. First, intersexual selection mechanism: women perceive tattoos as a signal of good health, masculinity, aggressiveness and dominance. In certain ecological conditions they may thus favour tattooed men as more valuable partners with potentially better health and higher social rank. Second, intrasexual selection mechanism: men perceive tattoos of other men as a signal of attractiveness, masculinity, aggressiveness and dominance. Therefore, they may assess those traits as indicators of higher threat of the same-sex rival. Our results provide stronger evidence for the second, intrasexual selection mechanism, as the presence of a tattoo affected male viewers' perceptions of a male subject more intensely than female viewers' perceptions.

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