

World Journal of *Psychiatry*

World J Psychiatr 2017 September 22; 7(3): 133-196





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World Journal of Psychiatry is now indexed in PubMed, PubMed Central.

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I-IV Editorial Board

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NAME OF JOURNAL
World Journal of Psychiatry

ISSN
ISSN 2220-3206 (online)

LAUNCH DATE
December 31, 2011

FREQUENCY
Quarterly

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Help Desk: <http://www.f6publishing.com/helpdesk>
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7901 Stoneridge Drive, Suite 501,
Pleasanton, CA 94588, USA
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<http://www.wjgnet.com>

PUBLICATION DATE
September 22, 2017

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Tattoos as a window to the psyche: How talking about skin art can inform psychiatric practice

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Author contributions: All authors equally contributed to this paper with regard to conception and determination of scope, literature review and analysis, drafting and critical revision and editing, and final approval of the final version.

Conflict-of-interest statement: No potential conflicts of interest. No financial support.

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Manuscript source: Invited manuscript

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Received: February 8, 2017

Peer-review started: February 12, 2017

First decision: May 10, 2017

Revised: May 18, 2017

Accepted: July 7, 2017

Article in press: July 9, 2017

Published online: September 22, 2017

Abstract

Tattooing the skin as a means of personal expression is a ritualized practice that has been around for centuries across many different cultures. Accordingly, the symbolic meaning of tattoos has evolved over time and is highly individualized, from both the internal perspective of the wearer and the external perspective of an observer. Within modern Western societies through the 1970s, tattoos represented a cultural taboo, typically associated with those outside of the mainstream such as soldiers, incarcerated criminals, gang members, and others belonging to marginalized and counter-cultural groups. This paper aims to review the more recent epidemiology of tattoos in Western culture in order to establish that tattooing has become a mainstream phenomenon. We then review psychological and psychiatric aspects of tattoos, with a goal of revising outmoded stigmas about tattooing and helping clinicians working with tattooed patients to facilitate an exploration of the personal meaning of skin art and self-identity. We suggest that as a kind of augmentation of the physical exam, looking at and talking to patients about their tattoos can provide a valuable window into the psyche, informing clinical practice.

Key words: Tattoos; Military psychiatry; Deviance; Skin art; Psychopathology; Psychology

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Core tip: Although traditionally associated with deviance and psychopathology in modern Western culture, tattoos have evolved into a mainstream phenomenon, especially among younger adults. While there are myriad motivations for obtaining a tattoo, most individuals seek tattoos as a means of personal expression that provides a potential window into the psyche that can be used to facilitate psychiatric treatment. By reviewing the literature on psychological and psychiatric aspects of tattooing, we suggest that tattoos should be viewed not as signs of

pathology, but as opportunities to explore core aspects of self-identity that can be valuable in clinical work.

Roggenkamp H, Nicholls A, Pierre JM. Tattoos as a window to the psyche: How talking about skin art can inform psychiatric practice. *World J Psychiatr* 2017; 7(3): 148-158 Available from: URL: <http://www.wjgnet.com/2220-3206/full/v7/i3/148.htm> DOI: <http://dx.doi.org/10.5498/wjp.v7.i3.148>

CASE STUDY

Mr. A is a 31-year-old Caucasian United States Army veteran with post-traumatic stress disorder (PTSD) based on military combat experiences while deployed to Iraq and Afghanistan. He is a divorced father of two, currently in law school, with overall high functioning despite significant life challenges. A tumultuous childhood, including neglect and trauma at the hands of his mother and within the foster care system, led to several suicide attempts as a pre-teen and one psychiatric hospitalization where he was diagnosed with intermittent explosive disorder, bipolar disorder, and obsessive compulsive disorder. While medication titration was attempted during that hospitalization, he was never followed consistently by mental health as a child or adolescent, nor did he take psychiatric medication. Despite these developmental barriers, Mr. A was considered a gifted child with an intellectual capacity well beyond his years and background. At the age of 31, he presented for treatment of PTSD with bilateral full arm tattoos along with visible tattoos on his hands, knuckles, and the back of his neck. Later, he revealed that most of his body was covered with tattoos.

Discussions in psychotherapy revealed that he started getting tattooed at the age of 11, when his father forced him to learn how to fight, subjecting him to physical beatings in order to prepare him for the violent realities of his neighborhood. His first tattoos declared affiliation with his ethnic background, depicting themes of racial affiliation and violence that reflected long-time engagement with racially-based groups for the purpose of enhancing survival on the dangerous streets of his childhood home and within the juvenile corrections system. Other tattoos, including women in bondage, wizards, and skulls, were described as "filler", while others displaying religious symbols, weapons, references to Greek philosophy, and military themes seemed to be more personal. One tattoo referenced the names of fellow soldiers who were killed in action during the wars in Iraq and Afghanistan.

When asked about his motivation for joining the military he replied, "I needed to find a way to maintain masculinity without being a convict". Although he claimed to have thrived within military culture, he often clashed with superiors when he felt disrespected.

During deployments, he accumulated extensive combat experience where he expected to die. However, he ultimately completed his military service and after an initial period of instability that included intoxicated fighting and divorce, he obtained sobriety and decided to go to law school. At the time of enrolling in treatment, he was living with a long-time girlfriend while maintaining partial custody of two children from his previous marriage. As psychotherapy began, he demonstrated notable difficulty discussing his emotions and was resistant to the therapist's attempts to delve further into past and current relationships and his symptoms of PTSD.

REVIEW METHODOLOGY

An online search of PubMed and PsycInfo databases was performed using the search terms "tattoos", "tattooing", "tattoo", "skin art", "epidemiology", "stigma", "psychiatric disorders", "psychology", "perception", "self-perception", "removal", "depression", "anxiety", "self-harm", "deviance", "psychopathology", "prison", "military", and "veterans". Criteria for inclusion were original research involving human subjects, meta-analyses, reviews, published in the English language between January 1, 1990 and February 1, 2016 (with the exception of reference 7 which was included for historical purposes). The bibliographies of articles identified through electronic search were also reviewed for additional relevant publications including online resources such as the Harris Poll and military service regulations. Dissertations were excluded. Articles with a primary focus on dermatological/physical/physiological reactions to tattooing and tattoo removal or on diagnosis and treatment of the infectious sequelae of tattoos were excluded.

EPIDEMIOLOGY

Until recently, tattoos have represented a cultural taboo in modern Western societies, typically associated with those outside of the mainstream such as sailors, soldiers, incarcerated criminals, gang members, prostitutes, and others belonging to marginalized and counter-cultural groups^[1,2]. Over the past two decades however, epidemiologic studies have demonstrated that tattooing has become more of a mainstream phenomenon, with decreasing associations with stigma.

A survey of 500 population-representative United States respondents age 18-50 years old performed in 2004 revealed that 24% ($n = 120$) had tattoos with an additional 21% reporting that they had considered obtaining one^[3]. Overall, 65% of tattooed respondents reported obtaining their first tattoo by age 24, with women more likely than men to be > 30 years old when they obtained their first tattoo. Tattooed respondents mostly had their tattoos done within the United States (98%), usually in professional tattoo parlors (80%),

with tattoos obtained *via* homemade tattooing devices or sewing needles more likely to have been obtained at < 18 years of age. No tattooed respondents ever had a tattoo removed. Very few tattooed respondents reported being treated differently in work or social settings due to tattoos, suggesting that stigma surrounding tattoos has faded along with increasing popularity.

A more recent Harris poll of 2225 United States respondents performed in 2015 found that 29% of Americans had at least one tattoo, an increase from 14% in 2008 and 21% in 2012^[4]. Tattoos were slightly more common among United States women (31%) than men (27%). Younger respondents were more likely to have tattoos, with nearly half (47%) of those 18-35 years old reporting that they had a tattoo. Regret about having a tattoo was reported in 23% of respondents, an increase from 14%-17% in previous years. Based on limited sample sizes from these two surveys, it therefore appears that tattooing has become much more common in the United States, particularly among young adults where rates may approach 1 in 2.

Looking more globally at industrialized Western societies, Kluger published a review of epidemiologic studies performed in the United States, Canada, Australia, Europe, and South America, reporting that the prevalence of tattooing is around 10%-20%^[5]. Consistent with data from the United States, tattooing is more common among younger people globally, with the "tattooed generation" born in the 1970s and early 1980s. Being in a tattooed peer group or having a tattooed family member was linked to higher rates of possessing tattoos (75% and 29% respectively). Although tattoos have been traditionally more common among men, gender divides have lessened to the degree of extinction in recent decades in some countries, with tattooing now more common in women overall compared to men in the United States and more common among women 20-29 years old in Australia. However, women tend to have smaller and less visible tattoos overall and prevalence data might be skewed by the inclusion of cosmetic or "permanent make-up" tattoos.

In addition to general prevalence data, Kruger noted that tattoos remain common in groups most traditionally associated with tattooing^[5]. For example, the prevalence of tattoos among United States Navy personnel in World War II was 65%, while the modern prevalence of tattoos among those in the military is cited as ranging widely from 10%-44%. Differences in rates may reflect variations in sanctioning within separate settings, with peer group pressure playing a significant role. In Brazil for example, tattooing was not introduced until 1959 and the practice is illegal for minors in some states^[6]. A survey conducted among a sample of 18-year-old Brazilian military recruits ($n = 1968$) revealed that about 11% of recruits had tattoos, of which 66% had a single tattoo and 21% had two tattoos, with the remainder having > 2 tattoos^[6]. A large majority of tattooed recruits (80%) had obtained

their first tattoo before the age of 18.

Despite the illegality of getting tattooed in most prisons worldwide, tattooing remains a common practice among inmates, with prevalence rates ranging from 9%-70%, depending on location, and some 40% of all inmates obtaining a tattoo while incarcerated^[5]. Tattoos in the incarcerated population serve to align the wearer with a specific group, as a remembrance, as a sign of strength or aggressiveness, or to simply help to pass the time. Due to the makeshift nature of prison tattooing, inmates are at high risk for obtaining blood borne illnesses such as hepatitis C and human immunodeficiency virus (HIV).

WHAT DO TATTOOS TELL US ABOUT THEIR WEARERS?

Evolutionary and historical perspectives

Tattooing has been a human practice for more than 5000 years, leading Carmen *et al.*^[2] to examine tattoos through an evolutionary lens. They hypothesized that, regardless of the proximal motivations for getting a tattoo (*e.g.*, commemorating an event or relationship, designating group affiliation, or serving as a marker of individuality), the ultimate evolutionary purpose is by definition rooted in sexual selection. The authors offered two hypotheses to explain how tattooing might have been favored in evolution that they call the "human canvas" and the "upping the ante" theories. The former postulates that tattooing is an expression of human culture based in "symbolic thought", with the artistic canvas as a means to illustrate one's personal story and to document history, moving from cave walls to the skin over time. The "upping the ante" theory suggests that tattoos evolved as a fitness indicator, enhancing one's appearance in the context of intersexual competition, similar to a peacock's tail. In tracing the evolution of tattooing across history starting from its ritualistic tribal origins, the authors note that the modern rise in the popularity of tattoos within Western culture emerged from individual niches such as military culture during World Wars I and II, the subsequent countercultural movements of the 1960s and 1970s, and the current cultural mainstream as a status quo. Over time, social stigmas have lessened and technical innovations have reduced the infectious risk of tattooing, such that it has become a less "costly" and therefore more common fitness indicator.

Psychoanalytic perspectives

Like Carmen *et al.*^[2], Grumet^[7] tracked the development of tattoos throughout history, but did so through a lens of psychodynamic psychiatry as opposed to evolution. Although he acknowledged that tattoos could proclaim identity and group allegiance (as with military tattoos), he argued that "tattoo analysis" ought to be used as a kind of "dermal diagnosis", with tattoos almost uniformly serving as a sign of psychopathology. For example, he

suggested that tattoos are rooted in antisociality and exhibitionism and that “outcasts and outlaws” obtain tattoos in order to bolster low self-esteem. He concluded that tattoos should be viewed as “a psychic crutch aimed to repair a crippled self-image, inspire hope, keep noxious emotions at bay, and reduce the discrepancy between the individual and his aspirations”^[7].

In a more recent analytic summary of unconscious motivations for tattoos, Karacaoglan^[8] utilized a case series to illustrate that “the painful penetration of the skin in the process of tattooing... is a form of acting out” and that tattoos symbolize “an attempt to actively represent and recompense, as it were, an early deficiency” and a “dialectical record of the mother-father relationship”. Highlighting the masochistic nature of tattooing, the author interprets tattooing as an alternative form of expression that patients “resort” to when unable to verbalize “unendurable affect” through language. Like Grumet^[7], Karacaoglan^[8] ultimately concluded that tattooing is a “form of perversion”.

While we agree on the potential value “dermal diagnosis” in exploring unconscious motivations for obtaining tattoos, these uniformly pathologic interpretations now seem, in light of the ubiquity of tattoos in mainstream culture, like antiquated generalizations. While an individual’s tattoos could indeed be used to inform psychodynamic psychotherapy by tapping into personal self-representation through symbolism, their interpretation need not be restricted to the realm of psychopathology.

Motivations for tattooing

In keeping with the view that tattoos should not be solely regarded as reflections of psychopathology, Wohlrab *et al.*^[1] reviewed studies exploring the myriad motivations for obtaining tattoos. The desire to create and maintain a distinct self-identity by controlling one’s appearance is cited as one of the most common reasons for tattooing. This motivation may be especially age-relevant and helps to explain the desire to obtain a tattoo during adolescence and young adulthood. In addition to the more identity-based, personal narrative, and group-oriented motivations for getting tattoos, some studies suggest that tattoos can also be viewed as a means to embellish the body as a fashion accessory or piece of art to wear on the body. Others have noted that tattooing can serve as a kind of badge that reflects pain tolerance and physical endurance, as a means of emphasizing sexuality, and as an affiliation with a religious or spiritual tradition, while tattoos are also sometimes obtained impulsively for no specific reason.

Based on a literature review, Dickson *et al.*^[9] likewise enumerated a variety of motivations for getting tattoos, including body adornment and personal decoration, expressions of individualism and markers of identity, and overcoming difficult emotions as a means of affect management. Motivations for tattooing vary between genders, with women more likely to seek tattoos for

personal decoration and to feel more independent, and men more likely to use them as symbols of group identity. Contrary to traditional stereotypes, most adults with tattoos do not associate them with rebelliousness or cultural alienation, do not usually obtain them impulsively or while intoxicated, and do not regret getting them afterwards.

In order to test these generalizations, Dickson *et al.*^[9] administered a survey about tattoos to 458 United States college students, including 43% with at least one tattoo. The survey results confirmed that most tattooed respondents had taken months to decide what tattoo to get, obtained the tattoo in a reputable tattoo parlor, spent a significant amount of money on it, and tended to have been ≥ 18 years old at the time of their first tattoo. Respondents tended to view their tattoos as a means of self-distinction, rating them as having significant personal meaning as opposed to symbols of rebelliousness. While respondents reported very high levels of satisfaction with their first tattoo, those with multiple tattoos (60% of the tattooed sample) tended to rate their second or third tattoos, typically obtained a few years after their first, as favorites. This suggests that the process of obtaining multiple tattoos reflects a self-concept that continually evolves with time. For the majority of survey respondents who didn’t have tattoos, reasons cited to forgo tattooing included not liking tattoos, concerns about permanency, anticipated disapproval from family, fear of pain, and not knowing what kind of tattoo to get.

Psychopathology and personality traits in tattooed individuals

Although several studies have indicated a greater prevalence of tattoos among psychiatric samples compared to the general population, the data to support this conclusion are largely drawn from older studies based on comparisons of cross-sectional measures of psychopathology among tattooed individuals in either non-psychiatric settings or psychiatric settings with inadequate controls between samples^[10]. For example, Birmingham *et al.*^[11] reported an association between tattoos and a diagnosis of schizophrenia, but their study was based on a limited sample of male prisoners with visible tattoos. Two studies have reported an association between tattoos and a history of abuse, but both included individuals with body piercings^[12,13] and one was based on responses to a survey published in a German body modification magazine^[12]. Studies of such specialty populations may have limited generalizability due to other confounds that might better explain associations with psychopathology. Similarly, reported associations between tattoos and risk-taking behaviors such as drug use, early sexual activity, gang affiliation, and violent behavior have typically been drawn from small studies of adolescents, with methodological problems related to sample population and size, survey techniques, and the potential for type I error^[5,14]. Taken in aggregate,

now that tattooing has become more common and is well-represented amongst adults, any associations with psychopathology are much less clear.

Looking again at recent epidemiologic data from the United States cited above, Laumann *et al.*^[3] reported that compared to non-tattooed individuals, tattooed respondents were more likely to use recreational drugs, more likely to have spent ≥ 3 d in jail, and less likely to claim religious affiliation, even when controlling for age^[3]. The percentage of tattooed respondents was lower among those who had never consumed alcohol. Among current drinkers, those with tattoos drank significantly more alcohol, although only a small minority of those tattooed had ever obtained their tattoos while intoxicated. Beyond the United States however, Kluger^[5] noted that an association between tattoos and alcohol usage has not been detected in surveys from other countries and is therefore not well established. On the other hand, associations between tattoos and both cigarette smoking and recreational drug use (especially cannabis) may be more consistent.

A number of studies have used psychological rating scales to explore potential personality differences between tattooed and non-tattooed individuals, with mixed results^[15]. Swami *et al.*^[15] administered a battery of inventories measuring various personality traits to a sample of 540 subjects from the southern German-speaking region of central Europe and found that those with tattoos only scored higher on measures of extraversion, experience seeking, and need for uniqueness. Although effect sizes were small to moderate, these results highlight that, if personality differences do exist among those with tattoos compared to the general population, they may not necessarily be dysfunctional or pathological. This conclusion is in keeping with recent findings from the United States in which the Community Body Modification Checklist was given to 213 adult subjects with and without tattoos or non-ear body piercings^[16]. Defying hypothesized expectations, Giles-Gorniak *et al.*^[16] reported that the only significant difference in mental health history and behavioral choices between the two groups was that those with body modifications were more likely to engage in social and healthy behaviors. Likewise, an Australian study employed the Loyola Generativity Scale to assess "concern for and commitment to the next generation" among 710 adult women and found that those with and without tattoos had equivalent levels of psychosocial health according to this measure^[17].

In contrast to these studies involving adults across the lifespan, much of the work to date on personality differences between tattooed and non-tattooed individuals has been performed in samples of college students, with limited generalizability. In order to avoid the methodological limitations of earlier studies, Tate and Shelton measured personality traits with validated scales that assessed for the Big Five Factors of personality (neuroticism, extraversion, openness to experience, agreeableness, conscientiousness), the need

for uniqueness, and the desire to be perceived favorably by others^[14]. Tattooed participants, as compared to their non-tattooed counterparts, scored significantly lower on agreeableness and conscientiousness and higher on need for uniqueness. However, while these differences were statistically significant, effect sizes were small and personality scores found among tattooed individuals were, with a single exception among women, within published norms. The authors therefore concluded that "it is untenable to refer to tattoos, per se, as signs of social deviance or personality and character flaws"^[14].

Suicide, self-injury, and tattoos

Tattooing is an inherently painful ritual that is usually voluntary, with a history of other acts of self-injury and of suicidal ideation sometimes noted anecdotally by recipients. A survey of 432 German adults with tattoos or non-ear body piercings found that 27% of respondents had a history of self-cutting during childhood^[18]. Comparing those with and without a history of self-cutting, self-cutters had the same average number of tattoos, but significantly more piercings. Curiously, some respondents reported feeling "healed" and stopping self-injurious behavior following body modification, leading the authors to hypothesize that some use body modification as a "therapeutic substitute" for "autoaggressive acts"^[18]. However, the inclusion of those with body piercings and the lack of a control group without body modification limits the generalizability of this conclusion to those with tattoos.

A possible association between eating disorders, self-injury, and tattoos was explored in a study of 65 female patients referred to a specialized unit for the treatment of anorexia, bulimia, and binge eating disorder^[19]. In this sample, a history of self-injury was reported in 51% of patients, while 27% had at least one tattoo. Having a tattoo was significantly associated with a history of burning, supporting the authors' conclusion that body modification might represent a form of self-punishment among those with eating disorders. However, 27% of the sample had tattoos and/or piercings without a history of self-injury and this subgroup had more positive feelings towards their bodies, higher levels of self-esteem, and less impulsivity, depression, anxiety, and social dysfunction than those with a history of self-injury. Therefore, tattoos may sometimes represent positive modifications of body image as opposed to markers of self-injurious behavior.

An association between tattoos and suicide was suggested in a study of 134 completed suicides over a 3-year period in Mobile County, Alabama^[20]. In this sample, 21% had one or more tattoos at time of death, with 57% of "young, white suicide" completers having tattoos compared to only 29% for matched accidental deaths. Another study involving a larger series of 438 autopsies in Linn County, Iowa over a 15-year period included 32% subjects with tattoos^[21]. Having a tattoo was associated with a significantly younger age at death and greater risk of death by an unnatural manner

(e.g., gunshot wound or drug overdose), but not suicide. Taken together, these small, regional studies offer conflicting evidence for tattoos being associated with suicide. Both studies did speculate that tattoos might be a potential marker of risk-taking behaviors and substance use that could in turn be associated with early mortality, but larger, epidemiologic studies are needed to more clearly elucidate associations between tattoos, self-injury, and early death.

Self-perception in tattooed individuals

Given the intimate and relatively permanent nature of tattooing, a tattoo is expected to alter the new wearer's perception of their body and their identity. However, the effect of the tattoo could depend on motivations for tattooing and the type and meaning of the tattooed image. A 2015 Harris Poll found that although most respondents did not feel that tattoos made them feel more sexy, attractive, rebellious, or spiritual, having a tattoo also did not make them feel less intelligent, respected, employable, or healthy^[4]. However, a substantial minority did report that having a tattoo made them feel more sexy (33%), attractive (32%), and rebellious (27%). Tattoos therefore seem to have the ability to positively impact one's sense of self, with individual variation and many aspects of identity potentially affected.

In an attempt to examine effects of tattoos on self-perception, Swami conducted a prospective study of adults from London who were planning to get their first tattoo by recruiting them in a tattoo shop^[22]. Participants ($n = 82$) were assessed before and after getting their first tattoo and asked to rate or provide information about the following aspects of self-perception: Their own overall physical appearance, anxiety about 16 different body sites, measures related to a positive body image, self-attributed need for uniqueness, social physique anxiety, self-esteem, desire to stand out with appearance, reasons for obtaining the tattoo, schematic outlines of the front and back of their bodies to ascertain tattoo visibility and percentage of body covered by the new tattoo, satisfaction with the tattoo, and likelihood of obtaining future tattoos. Assessments were conducted immediately before and after obtaining the tattoo, and then again after 3 wk. Immediately after getting the tattoo, both men and women reported reduced anxiety and less dissatisfaction around their appearance, effects that were sustained at 3-wk follow up. On 3-wk follow up, both genders also reported an overall increase in self-esteem. This suggests that tattoos can mitigate negative attitudes a wearer might hold about one's appearance. However, while men demonstrated a sustained decrease in social physique anxiety after obtaining a tattoo, female participants had higher social physique anxiety after 3 wk. The reason for this gender difference is unclear, but may be related to more negative perceptions towards women with tattoos in society. Still, no differences were found

between participants with visible tattoos and those easy to conceal, such that "corporeal meaning" appeared to be a more important predictor of self-perception than appearance, or how others might view them.

While this survey reported individuals' experiences and self-perception immediately before and after being tattooed, it did not examine self-perception in a more longitudinal fashion. It therefore remains unclear whether tattoos truly fulfill one's need for self-expression or if this need remains unfulfilled over time for some, leading them to find other means, or more tattoos, to validate uniqueness. Collectively however these findings suggest that at least in the short-term, tattoos have the power to improve self-esteem and satisfaction, with their appearance providing fertile ground for exploration in the therapeutic setting.

Tattoo removal

The data presented thus far give lie to the ever-present stereotype of tattoos being obtained by intoxicated youth who regret the act the next day, with up to 83% of wearers satisfied with their tattoos^[23]. Still, that leaves an estimated 20% of wearers who are dissatisfied with their tattoos and 6% who eventually opt for removal *via* surgical excision, dermabrasion, cryosurgery, chemical peels, and laser ablation with scarring, hypopigmentation, and incomplete removal as potential risks.

Armstrong *et al.*^[23] surveyed a sample of 196 subjects who sought tattoo removal from 4 clinics across the United States and found that the average person waited 10 years to do so. Frequent reasons for removal included "just decided to remove it", "suffered embarrassment", "got tired of it", "just grew up", and the need to hide the tattoo due to workplace stigma. Issues surrounding stigma were especially prevalent among women (see below for additional discussion).

Tattoo removal may be on the decline as societal acceptance of tattoos increases, with a 23% reduction in tattoo removal procedures reported by The American Society for Aesthetic Plastic Surgery between 2012 and 2013^[24]. This decrease is in contrast to a 52% increase reported by the American Society of Dermatologic Surgery over the same time period. However, tattoo removal does not necessarily reflect an overall dissatisfaction with tattoos. In the study by Armstrong *et al.*^[23], a third of subjects seeking removal were interested in getting more tattoos in the future, suggesting that for some the desire of ablation is more about specific tattoos rather than tattoos in general.

TATTOOS IN SPECIFIC POPULATIONS

Adolescents and tattoos

It is important to distinguish between tattoos among adolescents and adults, since motivations for obtaining tattoos may be significantly different between the two groups. In addition, while tattoos have become a more mainstream phenomenon among adults, considerable

stigma remains with tattooing as an adolescent^[25]. Significant research has been devoted to the study of tattoos in adolescents, highlighting negative associations with risk-taking behaviors such as substance abuse, smoking, sexual activity, violent behavior, and problems in school^[5]. However, such associations in adolescents < 18 years old are confounded by the fact that it is illegal for a minor to obtain a tattoo in all 50 of the United States. This suggests that tattooing may indeed be a signal of risk among minors, but those risks should not necessarily be extended to those obtaining tattoos as adults^[25].

With these demographic differences in mind, a prospective, longitudinal study followed a national sample of 13101 United States 7th-12th graders over 12 to 18 mo, looking at predictors of getting a tattoo^[25]. In their sample, adolescents who reported lower levels of parental and/or school attachment, lower grade point averages, and lower religiosity levels were more likely to have tattoos on follow up approximately 1-2 years later. The study also found that adolescents who used alcohol or marijuana and engaged in violent behavior were more likely to be tattooed at follow up. A history of violent victimization was also a significant antecedent of getting a tattoo, suggesting that some adolescents obtain tattoos as a method of self-protection. The authors conceded that the number of adolescents surveyed who later acquired tattoos was small (only 3.6% of sample), precluding any analysis of interaction effects^[25]. In addition, they did not take tattoo size, type, or location into account, which is potentially salient since such specifics might reflect different motivations for getting a tattoo (e.g., tattoos signaling affiliation with "conventional institutions" such as a sports team or school likely have very different meanings compared to a gang tattoo on one's neck). This caveat highlights that specific features of tattoos may have different implications about an individual, such that asking wearers about their tattoos may be a valuable source of information in terms of risk assessment, diagnosis, and general understanding. Methodological limitations aside however, it does appear that tattoos in adolescents can be thought of as representing a potential signal of risk among American adolescents.

Tattoos in the military

In modern Western culture, tattoos have been associated with soldiers for nearly a century, dating back to World Wars I and II^[2]. This may have contributed to early associations with tattoos as symbols of machismo or with tattooed individuals being tougher or more dangerous. Among current soldiers, the motivations for getting tattoos and their meanings are varied and diverse, with some important potential distinctions from the general population.

Recent data indicate that about a third of United States soldiers enter the military with pre-existing tattoos^[26], potentially reflecting character traits such as

increased novelty seeking, extraversion, and a drive for self-individualization that might be associated with both getting a tattoo and joining the military. A survey of tattooed soldiers ($n = 122$) in the United States Armed Forces found a wide variety of tattoo types, including tattoos reflecting themes of self-identification (military branch or unit designations, patriotic images, ethnic/cultural/tribal symbols), martial themes (weapons, symbols of death), spirituality (religious symbols and quotations, angels, devils), and nature (animals, trees/flowers/plants, and moon/sun/planet/stars)^[26].

Gadd conducted a survey of 445 British soldiers who presented to a military-run health clinic in 1990 and found that almost half had tattoos^[27]. Peer influence, moreso from male than female friends, was frequently cited as a motivating factor (64%). Nearly a third of tattooed soldiers reported regret associated with their tattoo and considered its removal, with such sentiments significantly more likely among those ≥ 26 years old. These findings suggest that military personnel may face peer pressure to get tattoos that results in higher levels of regret than is reported in the general public. Regret among older soldiers might likewise reflect a change in identity with which the tattoo did not keep pace, or represent reminders of military experiences one might prefer to forget. Tattoos among military personnel and veterans seeking psychiatric treatment might therefore offer especially valuable avenues to gain access to self-identities transformed by war and personal loss.

The United States military has a long history of maintaining strict standards about personal appearance and grooming, with exacting guidelines governing proper attire and hair length. With the modern frequency of tattoos among potential recruits and the evolution of tattoos away from a sign of rebellion, the United States Armed Forces have recently revised their rules about tattoos, representing a shifting balance between codes of discipline or uniformity and evolving societal views about tattoos.

No branch of the United States Armed Forces allows tattoos that are sexist, racist, extremist, or derogatory in content. The United States Army recently provided general rules prohibiting tattoos on the neck, head, face, or wrists, but personnel are allowed to have tattoos everywhere else on their bodies, including the arms and legs, which were historically forbidden^[28]. Hand tattoos are only permitted in the form of one ring on each hand in order to allow for tattooed wedding rings. The United States Marine Corps is currently updating its rules, but Marines are still not allowed to have tattoos covering the whole arm ("sleeves")^[29]. The United States Navy's regulations specify that no tattoos are allowed on the face, neck, scalp, or head^[30]. Tattoos exposed by wearing a short sleeve navy uniform shirt may be no larger in size than the wearer's hand with fingers extended and joined with the thumb touching the base of the index finger. In contrast to the other branches of the United States Armed Forces, the United States Air Force has relatively

strict rules, prohibiting excessive tattoos (partially defined as any tattoo that exceeds ¼ of the exposed body part) from being exposed or visible while in uniform^[31].

Concerns about tattoos in the United States Armed Forces seem to reflect an emphasis on discipline, uniformity, and a respect for command that might be compromised by obvious external markings that set an individual apart. However, as tattoos have become increasingly common and more societally acceptable, the military has in turn become more tolerant, allowing that tattoos might provide an acceptable symbol not of defiance, but individuation and a potential source of group cohesion.

HOW DO OTHERS PERCEIVE THOSE WITH TATTOOS?

General perceptions

Despite the rapidly changing societal views of tattoos, explicit and implicit biases continue to affect how tattooed individuals are perceived. A 2015 Harris Poll revealed that the majority of respondents stated that there was no difference in perceptions of rebelliousness, sexiness, spirituality, respectability, intelligence, or health for people with or without tattoos^[4]. However, for the substantial minority of respondents who did perceive a difference, people with tattoos were rated as more rebellious, but less attractive, sexy, spiritual, respectable, intelligent, and healthy.

Tattoo perceptions appear to vary according to the profession of the wearer, with more discomfort associated with visible tattoos on presidential candidates, judges, primary school teachers, and doctors compared to athletes, information technology technicians, and chefs^[4]. Due to the persistent disapproval of visible tattoos in some professional settings, some individuals might forgo tattooing altogether or hide their tattoos at work in order to avoid stigma. In the reverse direction, a 1998 survey found that physicians and registered nurses demonstrated negative biases against those with tattoos^[32]. Although the survey did not measure providers' actual attitudes towards their patients, it is important to be aware of the potential for negative bias as a clinician working with individuals with tattoos.

In reviewing the literature on tattoo perception, Burgess and Clark^[33] have noted that most tattoo perception studies to date have failed take into account the type of tattoo a participant possessed. This is an important omission that has likely contributed to generalizations about tattoos that are misleading in current society, where tattoos of all sizes, locations, and thematic imagery can be found. Tattoos can range from those that are concealed or visible only in more casual or intimate settings to prominent markings on the face, neck, and extremities. Designs can range from "small, trendy, and fun"^[33] fashion accessories to more complex tattoos displaying more provocative or sexual themes covering large portions of the wearer's body. Intuitively,

such widely varying differences in tattoos are expected to be salient in terms of impacting the perceptions of others. Such perceptions would also be expected to vary based on the gender or age of a wearer.

In order to test such hypotheses, Burgess and Clark^[33] performed a study in which 300 British university students were shown images of hypothetical male and female job applicants with either "cute" tattoos, "tribal" tattoos, or no tattoos. No tattoos and cute tattoos were associated with applicants being rated as more friendly and therefore suitable for the job in comparison to those applicants with tribal tattoos, who were perceived as more aggressive and less well suited. Negative dispositional characteristics were attributed exclusively to tribal tattoo wearers, which in turn negatively affected their perceived job suitability. This perception was more strongly held in respondents without tattoos compared to those with tattoos, or those who had considered getting one. This study therefore confirms that the content of a tattoo affects how the wearer is perceived, while also highlighting that tattooed individuals are generally less likely to infer negative attributes about another tattooed person. Therefore, while certain types of tattoos continue to trigger inferences about aggression and deviance, such attitudes may be shifting as more of the populace becomes tattooed.

Gender specific perceptions

Despite the increasing acceptance of tattoos in modern Western culture, women with tattoos still tend to be more negatively perceived than tattooed men. A 2004 survey of Canadian undergraduates reported that both male and female respondents had negative attitudes towards descriptions of women with visible tattoos, and that tattoo size was a predictor of disapproval for respondents who did not have tattoos themselves^[34]. Swami *et al.*^[35] extended upon this research by using line drawings of women with tattoos that allowed manipulation of tattoo location and the number of tattoos to assess effects on an observer's ratings of attractiveness, sexual promiscuity, and alcohol consumption. Based on a study sample of 160 British undergraduates, 14% of whom had tattoos, depictions of women with tattoos were rated as significantly less attractive, more sexually promiscuous, and heavier drinkers compared to women without tattoos. The likelihood of these perceptions increased with the number of tattoos, with figures bearing 3 tattoos estimated to drink more than twice the amount of alcohol as those without any tattoos. While the study was limited by the artificiality of the line drawings and the lack of a male figure control, it appears that tattoos among female college undergraduates may signal an increased likelihood of drinking alcohol and sexual activity. Despite these associations, 73% of the sample indicated that they would consider getting a tattoo in the future, and 53% of the sample was female. These caveats might therefore reflect not only less stigmatizing views of tattoos, but

also of alcohol and sexual activity (e.g., casual sex and multiple partners) among undergraduates.

Resenhoeft *et al.*^[36] similarly used color photographs in two different experiments to assess United States undergraduates' perception of tattooed women. Participants viewed a photograph of a woman with or without a tattoo and then rated her on 13 personality traits including attractiveness, caring, athleticism, honesty, religiosity, and intelligence. The first experiment found that a photograph of a woman with a large, visible dragon tattoo on her upper arm was perceived as less attractive, fashionable, athletic, caring, intelligent, but more creative compared to a control photograph of the same woman without a tattoo. These differences were not significant in the second experiment that used a photograph of a woman with a smaller, less visible tattoo of a pair of dolphins, with the exception of higher ratings of honesty and religiosity for the non-tattooed control. Although the study findings may have been influenced by using photos of different women dressed in different clothes in the two experiments, the results again seem to indicate negative biases against women with tattoos, even among young college students who might be expected to be more accepting of tattoos.

In an attempt to examine the impact of tattoos on sexual attraction between genders, Wohlrab *et al.*^[37] performed an experiment using computer generated virtual images depicting both women and men wearing bathing suits that revealed tribal tattoos in various locations. German university students ($n = 278$) were asked to rate these images on measures of attractiveness, dominance, aggression, masculinity or femininity, and health. In this study, images of tattooed women were rated as less healthy than women without tattoos, whereas images of men were rated as more dominant than those without. Sex differences among raters were important, with men rating images of women with tattoos as more attractive, while women rated them as more dominant. Conclusions about these findings may be limited to heterosexual perceptions of tribal tattoos among young people, but when considered along with other studies, they support the possibility that ratings of female attractiveness by men reflect biases about tattoos signaling sexual availability.

This conclusion was reinforced by a study performed in France using real women who were rated as highly attractive and who, under experimental conditions, displayed a temporary butterfly tattoo on their lower back while lying on a beach in a swimsuit. The field experiment measured how long it took for anonymous men to approach them^[38]. Compared to non-tattooed controls, women with tattoos were more likely to be approached by men and were approached within a shorter time. Subsequent interviews with the men revealed that although tattooed women were not rated as more attractive compared to controls, men gave higher probability estimates of being able to get a date with a tattooed woman and to have sex on the first encounter.

Drawing firm conclusions based on these studies is difficult, given that each utilized different methodologies and featured different women with different clothing and different tattoos. Within-study controls suggest that tattoos in young women have the potential to be interpreted as a signal of sexual availability to young men, but across studies, and in reality, visible tattoos are only one of many aspects that might influence female attractiveness. In addition, the use of different types of tattoos across various studies highlights that different tattoos seem to carry different meanings for both wearers and observers, and cautions against overgeneralization.

Looking beyond the narrow scope of the tattoo effects on ratings of female attractiveness in young people, tattoos may have different implications in other contexts, such as within older populations or professional settings. For example, one study found that female nurses with tattoos were perceived more negatively and rated as less caring, skilled, and knowledgeable than their tattooed male colleagues^[39]. Observers' perceptions of tattoos in women are therefore influenced by a large number of variables, including setting, age, and other aspects of a woman's appearance, along with tattoo size, location, and content. While such variables are important in considering perceptions about tattoos in both men and women, the impact of such variables can be very different between genders.

CASE STUDY

As psychotherapy progressed, the value of discussing Mr. A's tattoos first emerged when the therapist asked about the tattooed faces of his children which had been embellished to appear more sinister. With prompting, Mr. A admitted that this was intended to maintain a look of stoic masculinity while still bearing reminders of his children on his body, and he agreed that this reflected a strong aversion to vulnerability. Once this was interpreted, he opened up further. The tattoo referencing fellow soldiers killed in combat, visible on the back of his neck, later proved to be a useful topic of exploration when he explained that it was placed in that location so that he would keep the reminder on his body but would not have to see it unless he wished to do so. He admitted that he felt deep, intolerable grief for the loss of these friends and used the tattoo to project this loss out onto the world because he felt incapable of dealing with it in any other way. This facilitated an actual discussion of Mr. A's grief, allowing him to share his feelings for the first time. He reported to the therapist that her interest in his tattoos and non-judgmental questioning increased his sense of a therapeutic alliance and his overall engagement in treatment for PTSD. With additional work in therapy, it appeared that for Mr. A tattooing represented a kind of outward manifestation of intellectualization as a defense that prevented others from having emotional access to the fragile and sensitive person beneath his adorned skin.

In further interpreting Mr. A's tattoos in the context of the modern literature on tattooing, his skin art can be viewed as a "human canvas" which tells the story of his childhood and subsequent formative military experiences. His tattoos overwhelmingly demonstrate dark themes of violent masculinity and pain tolerance, suggesting the need to portray an outward appearance of danger-seeking fearlessness that serves to intimidate or ward off others and that provides some insight into why he was drawn to military service. Now, as a law student and father trying to reconstruct his life with the help of psychotherapy, his tattoos represent a visual depiction of themes relevant to both his past life and present inner existence. While tattoos offer a window into the psyche, it is a window that only tells a partial story. Ultimately, tattoos represent what the patient purposefully reveals on the surface, inviting the therapist to explore that portal in order to access deeper emotions, motivations, and meanings contained within.

CONCLUSION

Over the past century in Western society, tattoos have evolved from cultural taboo to mainstream fashion. Accordingly, historical biases and pathological implications about tattoos warrant revision for present-day tattoo wearers. Although the literature to date on tattooing is informative, the available data are limited to subpopulations drawn from Western industrialized cultures and offer a narrow perspective on the interactions of other characteristics of tattoo wearers (e.g., age, ethnicity, socioeconomic status) on public perception. Clinicians are therefore cautioned against over-generalization, and are instead encouraged to explore the personal meaning associated with individual patients and their different tattoos. We suggest that as a kind of augmentation of the physical exam, doing so with individuals who are engaged in psychiatric treatment provides a valuable window to the psyche that can reveal core aspects of self-identity and hidden emotions with the potential to facilitate and enhance clinical work.

REFERENCES

- 1 **Wohlrab S**, Stahl J, Kappeler PM. Modifying the body: motivations for getting tattooed and pierced. *Body Image* 2007; **4**: 87-95 [PMID: 18089255 DOI: 10.1016/j.bodyim.2006.12.001]
- 2 **Carmen R**, Guitart A, Dillon H. Ultimate answers to proximate questions: the evolutionary motivations behind tattoos and body piercings in popular culture. *Rev Gen Psychol* 2012; **16**: 134-143 [DOI: 10.1037/a0027908]
- 3 **Laumann AE**, Derick AJ. Tattoos and body piercings in the United States: a national data set. *J Am Acad Dermatol* 2006; **55**: 413-421 [PMID: 16908345 DOI: 10.1016/j.jaad.2006.03.026]
- 4 **Shannon-Missal L**. Tattoo takeover: three in ten Americans have tattoos and most don't stop at just one. Harris Poll 2016: 12. Available from: URL: http://www.theharrispoll.com/health-and-life/tattoo_takeover.html
- 5 **Kluger N**. Epidemiology of tattoos in industrialized countries. *Curr Probl Dermatol* 2015; **48**: 6-20 [PMID: 25833619 DOI: 10.1159/000369175]
- 6 **Bicca JF**, Duquia RP, Breunig Jde A, de Souza PR, Almeida Jr HL. Tattoos on 18-year-old male adolescents--characteristics and associated factors. *An Bras Dermatol* 2013; **88**: 925-928 [PMID: 24474101 DOI: 10.1590/abd1806-4841.20132192]
- 7 **Grumet GW**. Psychodynamic implications of tattoos. *Am J Orthopsychiatry* 1983; **53**: 482-492 [PMID: 6349373]
- 8 **Karacaoglan U**. Tattoo and taboo: on the meaning of tattoos in the analytic process. *Int J Psychoanal* 2012; **93**: 5-28 [PMID: 22320133 DOI: 10.1111/j.1745-8315.2011.00497.x]
- 9 **Dickson L**, Dukes R, Smith H, Strapko N. To ink or not to ink: the meaning of tattoos among college students. *Coll Student J* 2015; **49**: 106-120
- 10 **Kholsa V**, Verghese J, Gordon H. Tattoos: what is their significance? *Adv Psychiatric Treatment* 2010; **16**: 281-287 [DOI: 10.1192/apt.bp.108.006205]
- 11 **Birmingham L**, Mason D, Grubin D. The psychiatric implications of visible tattoos in an adult male prison population. *J Forensic Psychiatry* 1999; **10**: 687-695
- 12 **Stirn A**, Oddo S, Peregrinova L, Philipp S, Hinz A. Motivations for body piercings and tattoos - the role of sexual abuse and the frequency of body modifications. *Psychiatry Res* 2011; **190**: 359-363 [PMID: 21705093 DOI: 10.1016/j.psychres.2011.06.001]
- 13 **Liu C**, Lester D. Body modification sites and abuse history. *J Aggress Maltreat T* 2012; **21**: 19-30 [DOI: 10.1080/10926771.2012.630340]
- 14 **Tate J**, Shelton B. Personality correlates of tattooing and body piercing in a college sample: the kids are alright. *Pers Individ Diff* 2008; **45**: 281-285 [DOI: 10.1016/j.paid.2008.04.011]
- 15 **Swami V**, Pietschnig J, Bertl B, Nader IW, Stieger S, Voracek M. Personality differences between tattooed and non-tattooed individuals. *Psychol Rep* 2012; **111**: 97-106 [PMID: 23045851 DOI: 10.2466/09.07.21.PR0.111.4.97-106]
- 16 **Giles-Gorniak AN**, Vandehey MA, Stiles BL. Understanding differences in mental health history and behavioral choices in a community sample of individual with and without body modifications. *Dev Behav* 2016; **37**: 852-860 [DOI: 10.1080/01639625.2105.1060798]
- 17 **Thompson K**. Comparing the psychosocial health of tattooed and non-tattooed women. *Pers Individ Diff* 2015; **74**: 122-126 [DOI: 10.1016/j.paid.2014.10.010]
- 18 **Stirn A**, Hinz A. Tattoos, body piercings, and self-injury: is there a connection? Investigations on a core group of participants practicing body modification. *Psychother Res* 2008; **18**: 326-333 [PMID: 18815984 DOI: 10.1080/10503300701506938]
- 19 **Iannaccone M**, Cella S, Manzi SA, Visconti L, Manzi F, Cotrufo P. My body and me: self-injurious behaviors and body modifications in eating disorders--preliminary results. *Eat Disord* 2013; **21**: 130-139 [PMID: 23421696 DOI: 10.1080/10640266.2013.761087]
- 20 **Dhossche D**, Snell KS, Larder S. A case-control study of tattoos in young suicide victims as a possible marker of risk. *J Affect Disord* 2000; **59**: 165-168 [PMID: 10837885]
- 21 **Carson HJ**. The medium, not the message. How tattoos correlate with early mortality. *Am J Clin Pathol* 2014; **142**: 99-103 [PMID: 24926092 DOI: 10.1309/AJCPDOI32FWQLUEO]
- 22 **Swami V**. Marked for life? A prospective study of tattoos on appearance anxiety and dissatisfaction, perceptions of uniqueness, and self-esteem. *Body Image* 2011; **8**: 237-244 [PMID: 21641893 DOI: 10.1016/j.bodyim.2011.04.005]
- 23 **Armstrong ML**, Roberts AE, Koch JR, Saunders JC, Owen DC, Anderson RR. Motivation for contemporary tattoo removal: a shift in identity. *Arch Dermatol* 2008; **144**: 879-884 [PMID: 18645139 DOI: 10.1001/archderm.144.7.879]
- 24 **American Society for Aesthetic Plastic Surgery**. Cosmetic surgery national data bank, 2013. Available from: URL: <http://www.surgery.org/sites/default/files/Stats2013.pdf>
- 25 **Silver E**, VanEseltine M, Silver S. Tattoo acquisition: a prospective longitudinal study of adolescents. *Dev Behav* 2009; **30**: 511-538 [DOI: 10.1080/01639620802467771]
- 26 **Lande RG**, Bahroo BA, Soumoff A. United States military service members and their tattoos: a descriptive study. *Mil Med* 2013; **178**: 921-925 [PMID: 23929056 DOI: 10.7205/MILMED-D-13-00131]

- 27 **Gadd MC.** A survey of soldiers' attitudes to tattooing. *J R Army Med Corps* 1992; **138**: 73-76 [PMID: 1640415]
- 28 **Department of the Army.** Wear and appearance of army uniforms and insignia. Army Regulation 670-1; 2015. Available from: URL: http://www.apd.army.mil/pdffiles/r670_1.pdf
- 29 **U.S. Marine Corps.** Marine Corps tattoo policy. MARADMIN 198-07. Available from: URL: [http://www.marines.mil/Portals/59/Publications/Marine Corps Tattoo Policy.pdf?ver=2012-10-11-163526-213](http://www.marines.mil/Portals/59/Publications/Marine%20Corps%20Tattoo%20Policy.pdf?ver=2012-10-11-163526-213)
- 30 **U.S. Navy.** Uniform regulations, Chapter 2: Grooming standards. Available from: URL: <http://www.public.navy.mil/bupers-npc/support/uniforms/uniformregulations/chapter2/pages/2201personalappearance.aspx>
- 31 **U.S. Air Force.** Tattoo, brands and piercings. Available from: URL: <https://www.airforce.com/how-to-join/prepare-for-success/meet-requirements>
- 32 **Stuppy DJ, Armstrong ML, Casals-Ariet C.** Attitudes of health care providers and students towards tattooed people. *J Adv Nurs* 1998; **27**: 1165-1170 [PMID: 9663867]
- 33 **Burgess M, Clark L.** Do the savage origins of tattoos cast a prejudicial shadow on contemporary tattooed individuals? *J Appl Soc Psychol* 2010; **40**: 746-764 [DOI: 10.1111/j.1559-1816.2010.00596.x]
- 34 **Hawkes D, Senn CY, Thorn C.** Factors that influence attitudes toward women with tattoos. *Sex Roles* 2004; **50**: 593-604 [DOI: 10.1023/B:SERS.0000027564.83353.06]
- 35 **Swami V, Furnham A.** Unattractive, promiscuous and heavy drinkers: perceptions of women with tattoos. *Body Image* 2007; **4**: 343-352 [PMID: 18089280 DOI: 10.1016/j.bodyim.2007.06.005]
- 36 **Resenhoeft A, Villa J, Wiseman D.** Tattoos can harm perceptions: a study and suggestions. *J Am Coll Health* 2008; **56**: 593-596 [PMID: 18400674 DOI: 10.3200/JACH.56.5.593-596]
- 37 **Wohlrab S, Fink, B, Kappeler, P, Brewer, G.** Perception of human body modification. *Body Image* 2009; **46**: 202-206 [DOI: 10.1016/j.paid.2008.09.031]
- 38 **Guéguen N.** Effects of a tattoo on men's behavior and attitudes towards women: An experimental field study. *Arch Sex Behav* 2013; **42**: 1517-1524 [PMID: 23657810 DOI: 10.1007/s10508-013-0104-2]
- 39 **Thomas CM, Ehret A, Ellis B, Colon-Shoop S, Linton J, Metz S.** Perception of nurse caring, skills, and knowledge based on appearance. *J Nurs Adm* 2010; **40**: 489-497 [PMID: 20978418 DOI: 10.1097/NNA.0b013e3181f88b48]

P- Reviewer: Chakrabarti S, Hosak L, Gordon J **S- Editor:** Ji FF
L- Editor: A **E- Editor:** Lu YJ





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