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Ultimate Answers to Proximate Questions: The Evolutionary Motivations Behind Tattoos and Body Piercings in Popular Culture

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Numerous studies have found that piercing and tattooing the body is an increasingly prevalent trend in modern popular culture; however, this is not only a modern practice. Evidence of various forms of body ornamentation has been found in human societies dating back thousands of years. Although prior research has focused on the potential relationships between various personality traits and the likelihood of piercing or tattooing the body, few have approached this topic from an evolutionary perspective. For instance, the general motivations for getting tattoos and piercings have tended to fall into the same three categories for hundreds of years: (a) a symbol of an important past event, love, or friendship, (b) group membership, and/or (c) a marker of individuality. We argue that these motivations are simply proximate behaviors for an ultimate evolutionary reason: the perpetuation of one's genes. In this article, we propose two new theories about the origins of body ornamentation. First, in our "human canvas" hypothesis, we propose a link between body ornamentation and the human species' historical use of symbolic thought. Second, in our "upping the ante" hypothesis, we suggest that the steady rise in popularity of tattooing and piercing in Western culture has come about due to larger population densities and advancements in healthcare, which has led individuals to seek new and unique displays of fitness (i.e., body ornamentation). We then conclude with proximate examples in popular culture to display the proposed ultimate evolutionary reasoning behind body ornamentation.

Keywords: tattoo, evolution, human canvas hypothesis, upping the ante hypothesis, popular culture, body ornamentation, body piercing

The practice of tattooing and piercing the body is found in almost every subsection of Western popular culture (and arguably throughout the world). In the entertainment industry, actors and actresses from every genre of film from action adventure (e.g., Angelina Jolie, Johnny Depp) to romantic comedy (e.g., Scarlet Johansen, Ben Affleck), ignore the potential risk these permanent marks may have on their ability to land future roles. Furthermore, musicians from every genre imaginable (e.g., Pink, Britney Spears, David Bowie, Nas, and yes, even Justin Bieber) don tattoos and body piercings. In other realms of pop culture, athletes varying from "bad boys" (e.g., Mike Tyson), to "heartthrobs" (e.g., David Beckham), to something that can only be described as extreme (i.e., Dennis Rodman) have become recognized for their body art. Once reserved for specific subgroups within our culture (e.g., sailors, punks, bikers), body piercing and tattooing have seen an exponential increase in popularity in the last 30 or so years (Sweetman, 1999; van der Meer, Weijmar Schultz, & Nijman, 2008), which we propose is due to an increased pressure to stand out within a group. Generally, the motivations for getting tattoos and piercings tend to fall into three categories: (a) a symbol of an important past event, love, or friendship, (b) group membership, and/or (c) a marker of individuality (Antoszewski, Sitek, Fijalkowska, Kasielska, & Kruk-Jeromin, 2010). We argue that these motivations are simply *proximate* behaviors for an *ultimate* evolutionary reason: the perpetuation of one's genes. Most studies of modern motivations for body ornamentation use *proximate causation*, which refers to the immediate cause of a behavior (Alessi, 1992) for example, a person gets a tattoo or piercing because he or she wants to be more unique. Motivations for body ornamentation could in fact be understood using *ultimate causation*, which explains the *origin* of the behavior (Alessi, 1992) for example, a person gets a tattoo or piercing to increase his or her unique identity leading to a higher likelihood of reproductive success.

In this article, we present the general definitions behind various types of body ornamentation. Then we discuss the evolutionary origins of the human species, in which we explain our "human canvas" hypothesis in relation to a proposed link between body ornamentation and the human species' use of symbolic thought. We subsequently address the rise in popularity of tattooing and piercing within the last 300 years, leading finally to our second hypothesis—a term we refer to as *upping the ante*—in which we propose that the combination of advancements in health care and larger populations has led individuals to seek new and unique displays of fitness (i.e., body ornamentation). We conclude with proximate examples from popular culture to display the proposed ultimate evolutionary reasoning behind body ornamentation.

What Is Body Ornamentation?

For our purpose, tattooing and piercing the body fall under the umbrella term of *body ornamentation*. We have chosen to include both of these acts under one term because both are forms of (semi)permanent *visual aesthetics* (see Miller, 2001a, for a review

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of the concept) that involve some type of physical risk, as well as display some type of aesthetic quality.

Originating from the Tahitian term *ta tatau*, meaning "appropriate, balanced, and fitting" (Kaatz, Elsner, & Bauer, 2008, p. 35), tattooing is defined as "the insertion into the skin of any coloring materials designed to leave a semipermanent or permanent mark" (Chalmers, 2009, p. 102). Body piercing is another form of skin modification in which a section of the skin (and, in some cases, underlying tissue) is pierced to create a hole for jewelry to be inserted (Chalmers, 2009).

What is Popular Culture?

According to Dictionary.com, *popular culture* is defined as: "cultural activities or commercial products reflecting, suited to, or aimed at the tastes of the general masses of people" (Popular culture (n.d.), para. 1). This definition accurately encapsulates body ornamentation for several reasons. First, body ornamentation has become part of the mainstream media, as demonstrated by several successful reality television shows (i.e., "commercial products") that follow the happenings of tattoo studios (i.e., "cultural activities") such as *Miami Ink*, *LA Ink*, *NY Ink*, and even a British version—*London Ink.* These series have had enormous success over the last few years; for example, in August 2007, *LA Ink* was the highest-rated series premiere in the history of the TLC network among the demographic of adults 18–34 years (Claustro, 2007). Second, the increase in popularity of tattoos and body piercings in recent decades (Sweetman, 1999; van der Meer et al., 2008) demonstrates body ornamentation's growing popularity among "the general masses."

Sexual Selection

Several evolutionary themes emerge when looking at the history and evolution of body ornamentation. Sexual selection is one mechanism of evolution that some have argued has had the most influential role in our most distinctly human behaviors (e.g., poetry, music, art; Kaufman, Kozbelt, Bromley, & Miller, 2007; Miller, 2001b). Sexual selection theorists suggest that due to the disproportionate investment required by one sex in any given species (i.e., energy required for gamete production and child rearing), the sex that invests more is unable to reproduce as often, resulting in differing reproductive strategies (Kaufman et al., 2007; Miller, 2001b). In short, the greater the investment, the more selective the mating strategy. Because one sex is more discriminate than the other (generally females), the opposite sex is likely to go to great lengths to attract the limited attention of potential mates (Kaufman et al., 2007; Miller, 2001b).

Specific attraction techniques vary from species to species, however, certain basic principles can be witnessed across males and females throughout the animal kingdom. As we will show, body ornamentation has been used throughout human history to garner attention from a mate.

Extended Phenotype

Ornamentation in general is not specific to humans; in fact, many species of birds display elaborate ornaments in the form of feather structures, such as plumage and crests (Jones, Hunter, & Fraser, 2000). The most well-known bird species to display elaborate plumage are peacocks. In this species, a male's tail is positively associated with aspects pertaining to health and heritable fitness (Miller, 2001a). Another example of these ornaments, and the benefits often associated with them, can be seen in the Crested Auklets (*Aethia cristatell*), whose long crests are maximally preferred by females and grant a high dominance status (Jones et al., 2000). Although these examples demonstrate biological ornamentation, humans take this a step further by creating external ornamentation, an act that can be considered a display of their *extended phenotype*. An extended phenotype is the idea that a phenotype (i.e., the physical outcome of gene expression) is not simply limited to biological processes (e.g., a bird's plumage), but instead can be extended beyond genes, past the confines of one's own body, and into the environment itself (Dawkins, 1999). Nonhuman examples of extended phenotypes include beaver dams, bird's nests, and the bowerbirds' bower (Dawkins, 1999). Human examples include items such as clothes, cars, or houses, and we propose that tattooing and piercing the body should be considered an extended phenotype as well. By ornamenting one's own body either temporarily (e.g., clothing), permanently (e.g., tattooing), or somewhere in between (e.g., piercing), that individual is using an extension of her or his genes (via behavior) to increase that person's ability to stand out in a sea of possible mates.

In concordance with the extended phenotype, it seems that all forms of body ornamentation are used to display genetic quality to potential mates or rivals (Koziel, Kretschmer, & Pawlowski, 2010). These signals of fitness are used when individuals compete in *intrasexual selection*—the competition between same-sex individuals for the attention of the opposite sex (Boyd & Silk, 2006; Rhodes, 2006). Intrasexual competition consists of same-sex rivals using various techniques such as "driving away, intimidating, derogating, or killing" a same-sex adversary (Kaufman et al., 2007, p. 231), ultimately resulting in the individual demonstrating fitness to potential mates. Individuality is a particularly relevant point in the discussion of body ornamentation. Many individuals use intrasexual competition through tattooing and piercing in an attempt to portray an image of "something special." This idea is exemplified by Antoszewski et al.'s (2010) study, which found that 67% of pierced individuals and 43% of tattooed individuals reported the motivation behind their body ornamentation was to mark their individuality.

Given the reproductive advantage body ornamentation may provide, *intersexual selection* (the process of selecting mates based on traits that are found attractive; Boyd & Silk, 2006) may explain how body art has achieved the status of a fitness indicator. We ask then, what makes a trait attractive? Generally, traits that convey some form of genetic quality are considered attractive and consequently increase in prevalence (Kaufman et al., 2007). Body piercings and tattoos expose the individual to disease and infection that only healthy individuals would be able to fight off (Bengualid, Singh, Singh, & Berger, 2008; Koenig & Carnes, 1999); thus, they represent markers of genetic quality. Furthermore, body ornamentation can be seen as a marker of social quality because it is often used as a social identifier (Koziel et al., 2010).

Group Membership

Some have argued that body ornamentation is used in terms of group membership (and we agree), but this explanation only addresses the issue at a proximate level. Bingham and Souza (2009) explained that humans evolved because of their unique ability to throw projectiles, resulting in large-scale group cooperation. For humans to get their individual needs met, they formed groups to regulate various social behaviors, and used their ability to throw projectiles to enforce this regulation (Bingham & Souza, 2009). *Coercive management* is the idea that humans, like all other animals, are self-interested and, in most cases, will use coercion to benefit their individual needs (Bingham & Souza, 2009). On an individual level, our behavior is due to our very basic need for survival, so we argue that tattooing and piercing the body can do two things: increase ones phenotypic fitness or signify group membership. The first possibility leads to a direct ultimate answer: successful reproduction. The second possibility, though seemingly different, is virtually the same in light of Bingham and Souza's (2009) hypothesis: body ornamentation does convey group membership—but group membership is just a consequence of our drive for survival. All biological creatures have conflicts of interest (including us), and these conflicts are what drive individuals to compete for various resources, ultimately resulting in inter- and intrasexual competition (Bingham & Souza, 2009). Bingham and Souza (2009) explained that group advantage almost never determines an evolutionary outcome—and what may seem like a group advantage (i.e., symbolic ornamentation to convey group membership or ideals) is merely the result of coercive group suppression of *individual* conflicts (i.e., conspecific competition for resources—which can include mates). Thus, natural selection favors self-interested behaviors, and what may seem to be group mentality is actually beneficial at the individual level. This leads us to explain body ornamentation that conveys various group identities as a way to increase one's fitness, ultimately leading to reproductive success.

Although prior studies have focused on the potential relationships between various personality traits and the likelihood of body ornamentation (Caliendo, Armstrong, & Roberts, 2005; Skegg, Nada-Raja, Paul, & Skegg, 2007), few have approached this topic from an evolutionary perspective. We believe that as the medical realm of Western society (i.e., science, delivery, and access) has become more advanced and as populations across countries have become generally healthier, costly signaling—or handicapping—must also increase to be seen as a cue of fitness; thus, the recent increase in tattoos and body piercings may be displays of fitness (i.e., the risk involved in the process of obtaining body ornamentation) and resources (e.g., jewelry, the expense associated with large tattoos). Ancestrally, these fitness displays would have been conveyed differently (e.g., skills at trapping game, farming ability); however, we are currently living in a time when those who aim to attract the opposite sex through use of costly signals may have to implicitly amplify their displays (i.e., "up the ante").

Costly Signaling

One of the most salient themes found in mate attraction is costly signaling. Costly signaling refers to the idea that individuals who possess some form of high-quality trait will benefit from advertising their genetic quality in various ways that are too costly for inferior individuals to display (Zahavi, 2003). This can best be illustrated with a classic example from another species: the gazelle. When a gazelle is presented with a potential predator, a select number of gazelles begins to repeatedly leap into the air with all of their legs held stiff—an act termed *stotting* (FitzGibbon & Fanshawe, 1988). Research has indicated that gazelles who display this seemingly careless act of energy consumption when faced with a threat are actually more likely to outrun predators; therefore, stotting may serve as an honest indicator of fitness in this species, something that predators take into account as witnessed by the likelihood of predators avoiding chasing stotting gazelles (FitzGibbon & Fanshawe, 1988). Costly signaling not only refers to investments involving energy, risk, or material, but it also refers to investment in the form of information or social status (Zahavi & Zahavi, 1997; Zahavi, 2003). This point will be especially important when we discuss the social ramifications that have oftentimes historically coincided with many practices of body ornamentation.

One of the most fundamental, and simple, aspects of the concept of costly signaling is the idea that there must be some reasonable relationship between a signal and its intended message (Zahavi, 1977; Zahavi & Zahavi, 1997; Zahavi, 2003). For instance, the gazelles' stotting would not be an effective indicator of parental investment or fertility, so it can be assumed that this is not the purpose behind the signal. Furthermore, a gazelle that is not physically able to outrun a predator after stotting would not use this behavior because it is not an honest signal and could easily be disproved by a predator's attention. In much the same way, temporary tattoos and piercings are often looked down on by those with permanent body art, because the process for getting semipermanent adornments does not involve the same commitment and risk that is associated with a real tattoo. This attitude is encompassed in remarks on a webpage devoted to band tattoos: "though tats and rock have taken on a tamer tone since their inception several decades ago (Avril Lavigne even sports some, though we're pretty sure they come off with water), the two remain joined at the hip" (Lohnes, n.d.). The website's author has illustrated the negative perception that many individuals with tattoos or body piercings hold for those who "pretend" to have body ornamentation but have not gone through the actual process involved (i.e., a dishonest signal).

Risks Associated With Tattoos and Piercings: A Costly Signaling Lens

Adverse reactions to materials (i.e., needles, ink, and jewelry) used for body ornamentation and blood-borne diseases are now generally avoided because of the increase in general knowledge about sterile procedures (in industrialized countries); however, there are still instances of life-threatening issues among individuals whose attempts at body ornamentation have gone horribly awry (Koenig & Carnes, 1999; Stirn, 2003). Botched, or self-inflicted, piercings and tattoos have a high likelihood of leaving the body open to infection (Koenig & Carnes, 1999). Bacterial infection, if not addressed properly, can lead to soft tissue infections, perichondritis (cartilage infection), sepsis, and even toxic shock syndrome (Koenig & Carnes, 1999). Once infection begins to spread beyond the localized site, an individual's life is at risk if he or she does not seek immediate medical attention. Additionally, people with any

immunodeficiency issues are predisposed to acquiring life-threatening infections from piercing or tattooing (Koenig & Carnes, 1999). In this case, it does not simply mean there is discomfort and swelling of the infected area; the wound is severe enough to warrant hospitalization and intravenous antibiotics (Koenig & Carnes, 1999). In addition to infectious risks, there are also risks of tattoo ink reactions, metal allergies, and hypertrophic scars and keloids (i.e., raised scar tissue around the infected site; Koenig & Carnes, 1999).

Despite the aforementioned health hazards, piercing and tattooing are particularly interesting in light of evolution: physical cues of infection could decrease one's attractiveness, possibly resulting in the cessation of one's genetic material. The possibility of dying from complications of a tattoo or piercing before passing on one's genes seems like a cost that greatly outweighs the benefits. Granted, some people will have had children before they receive a tattoo or piercing; however, body ornamentation is well entrenched in young adult culture (Mayers & Chiffriller, 2008; Suris, Jeannin, Chosis, & Michaud, 2007). Thus, if young adults are threatening their lives through body ornamentation before they reach reproductive age, they are decreasing the likelihood of passing on their own genes. This is relevant in light of a somewhat new conception of the developmental period between adolescence and adulthood: emerging adulthood (Arnett, 2000). According to Arnett (2000), people in industrialized urban areas between the ages of 18−25 are distinctly different from people who are considered adolescents or adults. The unifying feature for this developmental period is that, during this time, individuals test out various possibilities in love and work and renegotiate their worldviews (Arnett, 2000). Unprotected sex, substance use (i.e., drugs and alcohol), and reckless driving behaviors are most prevalent during this time—and it seems that the tendency to ornament one's body through tattoos and piercings are as well. Mayers and Chiffriller (2008) found that, in a sample of 661 undergraduate students, 51% of students were pierced and 21.8% were tattooed. This difference makes sense in light of removal—many piercings, once removed, typically close up with a minor scar—tattoos, on the other hand, take significantly more effort to remove (i.e., laser removal). In essence, there is a difference between commitment to tattoos and piercings, and this difference seems to be reflected by the percentages given by Mayers and Chiffriller (2008). Regardless of the percentage difference, it still seems as if there is an increased prevalence of body ornamentation. This is interesting, for the following reason: despite obvious health concerns (and the possibility of a reproductive dead end) piercing and tattooing are increasing in popularity in our society, especially among young adults. Emerging adulthood (Arnett, 2000) is typified by an increase in experimental behaviors (including, possibly, piercing and tattooing), which are risky and could lead to death. More people who go through emerging adulthood put off having children in their early 20s due to increased demands for higher diploma attainment (Arnett, 2000). Evolutionarily speaking, the cultural phenomenon of emerging adulthood could be pushing reproduction into the early 30s, expanding the number of years during which individuals experiment with tattooing and piercing while figuring out their adult identity. Because the costs (i.e., death before reproduction) seem to outweigh the benefits (i.e., increasing one's attractiveness in the mating market), it compels us to ask why humans risk possible death to ornament their bodies, and why this propensity to do so has become increasingly popular in Western culture. As is the case with most questions, it seems that there is an evolutionary answer.

The Human Revolution

Symbolic thought has always been part of the battery of concepts that makes us human (Boyd & Silk, 2006; Mcbrearty & Brooks, 2000). Here we argue that body ornamentation (specifically tattooing and piercing the body) is related to the birth of symbolic thought due to its appearance early on in our cultural history (Pabst et al., 2009). We propose that body ornamentation is an extension of the human species' ability for symbolic thought. After individuals began painting symbols on the walls of caves, it was only a matter of time before early humans looked to a new medium to display their inner most thoughts. And it was not long before the projections of human thought turned to our own bodies, resulting in the use of our skin as a canvas. It is thought that by about 200,000 years ago, anatomically modern *Homo sapiens* were roaming much of the Old World, but signs of modern human behavior did not arise until approximately 150,000 years later, during the human revolution (Mcbrearty & Brooks, 2000). Most reconstructions of human evolution claim that there was a brief, yet extraordinary shift about 40,000–50,000 years ago that marked the beginning of behaviorally modern *Homo sapiens* (Mcbrearty & Brooks, 2000). Being able to effectively plan, acquire and use resources, and symbolize one's inner thoughts was found in the form of bone tools and objects used for art (Mcbrearty & Brooks, 2000). However, there is much debate about when and where the first examples of these materials were found in the fossil record. Proponents of the human revolution model claim that modern human behaviors came about abruptly (approximately 40,000 years ago), while opponents believe that modern human behaviors actually came about much earlier and slower, beginning between 250,000 and 300,000 years ago (Mcbrearty & Brooks, 2000). Regardless of when these behaviors emerged, behavioral instances of symbolic thought dates back to at least 40,000 years ago. Mcbrearty and Brooks (2000) explained that the human revolution most likely arose as a consequence of existing hominids using the cognitive abilities of generations before them and transmitting them through cultural, not genetic processes. But ultimately, culture is an extension of our genes. Along with the birth of behavioral modernity (whether it was 40,000 or 200,000 years ago), we also see this driving need to express ourselves through various means. Our self-expression was first displayed on cave walls and transferred through the generations via culture, proximately ending in various types of body ornamentation to increase one's fitness. Humans have always turned to some medium to express ourselves, but when did this need to express oneself through art turn inward and ultimately lead to using our body as a canvas?

Early Body Modification

Evidence for the earliest known individual with signs of body modification dates back to approximately 5,300 years ago, to a mummy that was found between Italy and Austria (Pabst et al., 2009). Ötzi, also referred to as "the iceman," is the only well preserved mummy to be found in Europe dating to the Neolithic or New Stone Age (Pabst et al., 2009). Ötzi showed unmistakable evidence of tattoos along his spine, suggesting that body ornamen-

tation may have already been a common practice 5,300 years ago (Cronin, 2001; Pabst et al., 2009). However, the tattoos were in nonobvious places (the spine), which leads to the possibility that these tattoos might have originated as acupuncture as opposed to ornamentation. This idea was supported by a recent analysis that proposed that the markings found on Ötzi were medicinal in origin due to the similarities between the markings' locations and Chinese acupuncture points (Pabst et al., 2009). In light of these findings, is it possible that our ancestors initially discovered body ornamentation through medicinal use?

A more concrete example of body ornamentation dates to a mummy that lived 4,300 years after Ötzi. The remains were found in Peru and showed more extensive tattooing than Ötzi; she/he had birds and reptiles tattooed on their hands, arms, and lower leg, along with other symbols (Pabst et al., 2009). Due to the combination of the showy placement of these tattoos and the symbolic nature of the subject matter, this individual seems more likely to be the first true candidate to display body ornamentation in our evolutionary history.

Ritualistic Tribal Origins

Aside from the earliest evolutionary origins of body ornamentation, tattooing and piercing has its modern-day roots in various subcultures, beginning with tribal societies. With regard to body piercing, piercing the ears, mouth and nose seem to be the oldest practiced tradition (Stirn, 2003). This raises the question: Why have these areas been selected time and time again by independent societies? Could this have something to do with the high visibility of these areas? There are many proximate motivations behind why different tribal societies have adopted body ornamentation; however, we believe that all of these examples still speak to increased individuality, leading to a higher likelihood of reproductive success.

In many historical (and contemporary) tribal societies, tattooing and piercing the body has been a common practice. The ability to withstand the pain of body tattooing and piercing is often linked to a passage into adulthood (Stirn, 2003)—something that could be seen as a fitness indicator because it demonstrates both strength and reproductive viability. Genital piercings are more rare in tribal societies (most likely due to the risks associated with piercing that area; Edlin et al., 2010), yet there are instances of some tribes in Borneo wearing bone implants in the glans (Stirn, 2003). In ancient Mesoamerica, body ornamentation was used as a sex-specific adulthood ritual: as boys became men, and girls became women, their body art began to tell a story of gender and adulthood (Joyce, 2000), another example of signaling one's reproductive age. Similarly, many African cultures use scarring to display important life events: for girls, scarring occurs for life developments such as first menstruation and marriage, and for boys scarring occurs for their first kill in battle (Cultural Research Services, 2000). In New Guinea, the Roro people are extensively tattooed, so much so that those who are lacking in tattoos are referred to as "raw" (Elbin, 1979). A tattooed man is considered "cooked meat," meaning that he had been transformed by life experience, resulting in a new social identity (Elbin, 1979). "Ta moko" or taking moko is a form of tattooing in the Maori culture of New Zealand in which pigment is inserted by chiseling the skin (Nikora, Rua, & Awekotuku, 2007). Moko can often include large sections of an individual's body, including the face, leading to an increase in uniqueness. The Maori strongly identify with autonomy and self-determination, which was expressed through their version of tattooing: "moko was perceived as an aesthetic and individual self-presentation; it embodied the self" (Nikora et al., 2007, p. 479). This (often) extensive form of tattooing is a symbol of life experience, and is considered a great honor.

Piercings can also often have a religious or otherworldly connotation, which some argue is a ritualistic behavior meant to encourage group bonding. Royalty in ancient Mayan civilizations (700 A.D.) pierced their tongues and genitals as part of religious rituals, while Native American populations like the Mandan and the Lakota underwent ritual suspensions from chest piercings to reach an altered state of consciousness (Stirn, 2003). Thus, at a very basic level, a ritual in which one pierces or tattoos the body is in fact a physical display of life experience. Additionally, with the lack of access to modern health care, these behaviors seem particularly risky when thinking about healing after the ritual; therefore, body ornamentation in tribal societies can be thought of as costly signaling. Piercing, tattooing, encumberments (e.g., wearing heavy bracelets, neck ornamentation, penile rings), or binding the limbs (Stirn, 2003) are all forms of signaling ones genetic fitness. Thus, the ability to successfully display (i.e., no infection) potentially harmful body ornamentation is a signal to genetic fitness and behavioral identity.

The Spread of a New Culture

In the 17th and 18th centuries, tattooing spread through the Royal Navy as a result of colonization of the tattooed and pierced people of the Pacific (DeMello, 2000). Though the earlier origins of body ornamentation hinted to possible roots thousands of years ago, the integration of tattoos into mainstream society did not begin until the exploration of Borneo, the Philippines, New Zealand, and New Guinea (DeMello, 2000). When the Royal Navy began colonizing these lands they were met by individuals whose bodies were often (at least partially) covered in ornate black ink tattoos (DeMello, 2000). Surprisingly, during the 1600s, members of the Royal Navy noted that the most common subjects of tattoo designs were stylized lines that often symbolized various life events ("tribal designs"), stars, animals, and humans (portraits)—which is not very far from what we tend to see most in our society today (DeMello, 2000). Why would these images have remained prevalent throughout the evolution of body art? As previously discussed, signifying life events can be seen as a fitness indicator because it displays experience, which can be an attractive mate quality. Furthermore, images such as stars and animals might demonstrate an awareness of the environment, which could also be found attractive because it relates to survival skills. Finally, portraits of humans might be a social identifier because they symbolize a connection to another individual. Although these are merely our own speculations for the evolutionary motivations behind selecting these images, one thing is known: by 1784, crewmen on naval ships began receiving tattoos in Polynesia and subsequently spread the acceptance and popularity of tattoos throughout Europe (DeMello, 2000).

Though the popularity of tattooing was on the rise, many members of English society were still reluctant to receive a tattoo because tattooing was a slow, painful process that was done by

manually piercing the skin multiple times with a needle. The technological advancements of the industrial revolution made it possible for Samuel O'Reilly to create the first tattoo machine in 1890, reducing the time and pain associated with more traditional tattooing techniques (McCabe, 1995). It was nearly the 20th century before humans finally received a modern tool to express symbolic thought:

> Early mechanical tattooing dove-tailed smoothly with the principles of the emerging pop culture dynamic in the age of the machine . . . Patrons who were engaged in the most ancient of corporeal rituals were seduced by the mechanical aura of modernity to physically interact with the visual elements of their changing society. (McCabe, 1995, p. 50)

The increased prevalence of tattooing and piercing seemed to coincide with the increase in modernity (i.e., the tattoo machine and sterile environments and needles). On a very basic level, we see body ornamentation, and its subsequent integration into popular culture, as a result of our symbolic thought.

The Impact of War on Body Ornamentation Culture

The period between the First and Second World Wars was coined the "Golden Age of Tattooing" because of the increase in tattoo popularity among servicemen (DeMello, 2000). Soon, the focus turned from simply having a tattoo to the content of the tattoo itself. Military personnel began getting the signature "sailor" tattoos that had two common themes: patriotism and/or a loved one's name (e.g., mom, girlfriend) (DeMello, 2000). From an evolutionary perspective, a patriotic tattoo is a permanent insignia of group membership, while a loved one's name could signify kin or sexual selection. By getting a "mom" tattoo, sailors were trying to make a statement that they appreciated women, especially their mothers. By getting a tattoo of a girlfriend or wife's name, a man was showing an outward permanent display to other women that he was in a committed, monogamous relationship (a possible testament to his sticking around to raise potential offspring).

The simple act of receiving a tattoo seemed to whisper tones of group membership because it became increasingly social: the older, retired sailors would reminisce about their younger years, and young servicemen would compete with each other to see who could get the biggest, most ornate tattoos (DeMello, 2000). Here, we can see more evolutionary themes being expressed through body ornamentation culture. First, older ex-servicemen were getting tattooed as an ornate display of their experience and wisdom, seemingly to signal their status. Second, younger servicemen were using an interesting mixture of inter- and intrasexual competition through their tattoos: intersexual because each individual was getting tattooed to increase his attractiveness and status in the eyes of possible sexual partners, and intrasexual because each individual was competing with other members of his sex to get the most ornate display (in a nonviolent way). Today, competition to get various tattoos or piercings could still exist within groups, but this behavior seemed more prevalent when tattooing was novel.

Early Integration Into Pop Culture

The 1960s marked the beginning of the modern resurgence in popularity of body ornamentation. We can see that the rise of tattooing and piercing in postmodern society seems to map on to sociocultural movements. We first saw this trend among sailors, then military servicemen in general, and, interestingly enough, a subculture that seemed to be the military's antithesis: the hippie generation of the 1960s (DeMello, 2000). Though hippies are credited mostly for their strong connection with music, peaceful nature, drug usage, and antiwar sentiment, they also helped bring body ornamentation to popularity. Typical hippie tattoos consisted of symbols from the aforementioned sentence: favored bands, peace signs, and various drugs (psychedelic mushrooms and marijuana leaves were common). During the 1960s, another subculture began transforming the cultural conception of who got tattoos and piercings. The stereotype of the patriotic tattooed sailor faded as the biker subculture became infamous for its new genre of antisocial tattoos (DeMello, 2000). The contrast seen here between the image of the peaceful hippy and the intimidating biker are a reminder of how these forms of ornamentation appeal to such a widespread and varying demographic. Bikers used body ornamentation as an outward statement about society, often donning tattoos of Harley-Davidson emblems, skulls, marijuana leaves, and text (DeMello, 2000). In this case, the text was almost always a negative statement, like "Born to Lose," yet we see this negative statement as having an underlying evolutionary theme. Here, it seems that physically tattooing a negative statement on oneself would decrease one's chances in the mating market, but that is not the case. This form of costly signaling is particularly interesting because it is not only a permanent symbol; it is a permanent statement about a supposed genetic and social disadvantage. In a way, this statement is saying, "Despite my uncontrollable shortcomings, I'm still no one to mess with" (which could be interpreted as an attempt to convey fitness as a mate through strength). Furthermore, the typical biker tattoos were insignias of group membership.

The 1970s Lasting Effects on Body Ornamentation Culture

The 1970s were filled with cultural movements, namely, second-wave feminism, the gay movement, and punk culture. Each of these subcultures was responsible for helping body ornamentation eventually integrate into mainstream society.

Though some women practiced piercing and tattooing previous to the 1970s, it was not until the second-wave feminism movement that body ornamentation became more integrated into popular culture (DeMello, 2000). Due to the cultural advancements of second-wave feminism, society finally started to accept the individuality of females and to appreciate them as separate entities from their (usually male) counterparts. Though the 1960s helped to warm the public up to the idea of body ornamentation in women, it was rare to find a woman outside the subculture (e.g., hippies, and later, punks) that had tattoos or piercings (DeMello, 2000). In fact, in the 1950s, many tattoo artists refused to tattoo women because it would lead to irate lovers or parents (DeMello, 2000). Some artists did work on women, but there were rules put in to place that a women had to be over 21, married (with documented proof), and she would have to have her husband present at the time of tattooing (DeMello, 2000). Granted, lesbians were seemingly excused from the "bring your husband" part of the rule, but they were generally met with fear from servicemen because queer

individuals were still stigmatized in American society. Because servicemen were the number one clients of tattoo shops at that time, lesbians were often refused service (DeMello, 2000). By the 1970s, many lesbians who were part of both the second-wave feminism movement and the gay rights movement began using body ornamentation as a display of liberation (Pitts, 2003). Around the same time as second-wave feminism, the gay rights movement and punk culture were also contributing to the increased popularity of body ornamentation.

Midway through the 1970s, the punk movement was born (DeMello, 2000). In this culture, tattoos and piercings were oftentimes self-inflicted: safety pins and needles were used for piercing various body parts and giving stick-and-poke tattoos (i.e., manual tattoos in which a sharp object is dipped in ink and inserted into the skin; DeMello, 2000). Here we see costly signaling in a more extreme form—a visible signal of self-mutilation. Unlike previous subcultures that intended to make statements through symbols or text, punks took tattooing and piercing one step further and attempted to display their ideals through self-inflicted physical harm displays, we believe, due to the adaptive benefits of displaying biological quality. A person would have to have a good immune system to withstand an infection from an open wound, especially if proper sanitary precautions were not taken at the time of the piercing or tattoo. Though “scarification” (scarring one’s own body for decorative purposes) had its origins much earlier, punk culture popularized this practice in Western society (Gay & Whittington, 2002). Some iconic punk artists even went as far as public self-mutilation: Iggy Pop cut himself on stage with drumsticks and broken glass at a 1969 concert (Gay & Whittington, 2002). We see this act as an outward display of biological quality (i.e., “healthy” immune system), ultimately increasing Iggy Pop’s bid in the mating market (in addition to other qualities, of course, the fact that he was a famous musician was helpful too).

But by the mid 1980s, the cultural artifacts (e.g., tattooing or piercing the body a certain way, wearing leather studded jackets) that had typified punk culture began to become more and more popularized, ultimately integrating into mainstream ideals. While originally attempting to defy the establishment with “shocking” displays of body ornamentation in candid places (e.g., the knuckles and hands, and overtly obvious piercings like septum rings, and gauged ears), these looks melted into the mainstream, against all original ideals of the punk rocker (Clark, 2003). Punk’s piercings, tattoos, and studded leather jackets were then considered a point of “uberstyle” (which is defined as the outrageousness that punks were generally known for; Clark, 2003). Because of body ornamentations’ integration into mainstream society, it would seem that having a tattoo or piercing would decrease one’s individuality, but we argue that the increased acceptance only levels the playing field in the mating market. More and more individuals can turn to tattooing or piercing the body to display aspects of their symbolic thought via a proposed increase in their aesthetic fitness.

Body Ornamentation’s Integration Into the Status Quo

By the 1990s, second-wave feminism, the gay rights movement, and punk culture became mainstream. The movements of the 1970s and 1980s became interwoven into mainstream culture in the 1990s and 2000s, becoming (what we argue) prominent artifacts of our popular culture today (Pitts, 2003). What was once something solely practiced within various subcultures began to emerge as a status symbol in popular culture. The trend of mainstream body ornamentation increased well into the 1990s; evidence for this can be seen in the acceptance of a contestant in the 1997 Miss America contest donning a navel ring (Koenig & Carnes, 1999). “Pop” icons such as Britney Spears showcased navel piercings in her 1998 debut video “Hit Me Baby One More Time” and popular boy bands (e.g., ’N Sync, Backstreet Boys) displayed ear and facial piercings and various tattoos. As acts marketed as “family friendly” began to move into the realm of body ornamentation, the hard-edged stigma previously associated with piercings and tattoos began to fade. These pop-icons, whose images were broadcast in all forms of media from music videos to magazine covers, softened the image of body ornamentation and encouraged droves of fans to follow in their signaling footsteps. Tattoos were also given a nicer image when the children’s toy and cultural icon Barbie released Butterfly Art Barbie in 1999, a version of the doll with a permanent tattoo on her stomach (JR, 2009). Barbie continues to explore body ornamentation, as witnessed by the release of Totally Stylin’ Tattoos Barbie in 2009 to better-than-expected sales (JR, 2009). The increased typicality of body ornamentation has even been documented in research articles such as Mayers and Chiffriler’s (2008), whose finding was that “piercing and tattooing were ‘mainstream’ among the 18–23-year-old population” (p. 202).

The Popularization of Navel Piercings

Navel piercing, a piercing located at a traditionally concealed location on the human body, became so common in the 1990s that bare-midriff shirts, or shirts that exposed the stomach and waist area, became popular in order to better display the adornment. Furthermore, Mayers and Chiffriller (2008) found that of the 381 female students surveyed, the body site with the highest number of reported piercings was the navel (35%), beating out the ears (30%). This popularity was not seen in the male sample, where only 1.5% of male students reported a navel piercing. So why would this gender discrepancy exist? Drawing attention to the abdomen may serve as an adaptive benefit for women because it displays several aspects of reproductive availability. First, piercing this area may draw attention to an individual’s waist-to-hip ratio, an indicator of reproductive viability (Gallup & Frederick, 2010; Singh, 1993). Second, attracting attention to the abdominal area may display that the signaler is not currently pregnant and is available for mating. Third, the stomach is also an important display of past reproductive activity because stretch marks and other characteristics of pregnancy often remain after childbirth and can signal age, another marker of fertility (or lack thereof). Fourth, and most important, displaying a noticeable navel piercing can often be interpreted as a display of sexuality meant to excite the opposite sex and garner attention from potential mates, a form of intersexual competition. Given these predictions, one would expect to see some type of sex difference in tattoo locations—as we do (Koziel et al., 2010).

In a recent study of Poles recruited from two tattoo salons in two cities (Wroclaw and Leszno), the most common locations for women to display tattoos were the back (50%) and stomach (76%), while for men it was the upper (46.5%) and lower (44.2%) extremities; furthermore, piercings were most often located on the

abdomen (45.8%) of women and the face (76%) of men (Koziel et al., 2010). Although these results lack cross-cultural reliability, it is still interesting to note that women tended to draw attention to their abdomens, as previously discussed, and men applied ornamentation to highly visible areas, much in the same way that the peacock displays his plumage. But why do these sex differences in body ornamentation exist? We speculate that this trend might be explained because mates tend to assess females based on their waist-to-hip ratio while male attractiveness is often judged by shoulder-to-hip ratio (Gallup & Frederick, 2010; Singh, 1993); thus, females tend to draw attention to their abdomens and males tend to accentuate their arms. More sex differences were revealed in another recent study conducted in Poland, where it was found that of the nearly 500 individuals surveyed, only 36.8% of females had tattoos as opposed to 63.2% males, while 78.8% of females had piercings and only 21.2% of males did (Antoszewski et al., 2010).

These sex-related body modification trends can also be seen in television shows from pop culture in the last 20 years. One episode of *Friends*, a popular television show from the 1990s, centered on the character, Rachel, who was getting a tattoo of a heart on her abdomen (Borns, 1996). Similarly, a more recent 2007 episode of the popular television show *How I Met Your Mother* featured an episode in which the main character, Ted, finds himself with a tattoo of a butterfly on his lower back after a night of heavy drinking (a location often referred to as a “tramp stamp” on females because of its sexually suggestive location) (Bays & Thomas, 2007). The episode openly mocks the location of the tattoo because the character is male, and he eventually has it removed. These examples reinforce the idea that the location of body ornamentation is used by members of the opposite sex according to their particular mating strategy.

Body Ornamentation in the Entertainment Industry

A growing trend in recent popular culture is body ornamentation displayed by professional sports players. *Sports Illustrated* noted that “Tattoos have become the sport’s world most flaunted form of self-expression. Ten years ago, only boxers or wrestlers had visible tattoos; today, they are everywhere, in every sport” (as cited in Lohnes, n.d.). This trend initially gained momentum in the 1990s, with 35.1% of NBA players reporting having tattoos in a preseason survey that was conducted in 1997 (Lohnes, n.d.). Furthermore, tattoos could be interpreted as displays of social status in athletes who use body ornamentation as a form of intimidation. For instance, Mike Tyson, a famous American boxer has a signature tattoo on his face that has increased his unique identity in popular culture: one of the most memorable moments in the movie *The Hangover 2* takes place when one of the main characters gets a similar facial tattoo right before his wedding (Mazin, Armstrong & Phillips, 2011). Piercing and tattooing is possibly more interesting in actors and actresses whose primary goal is to portray a versatile range of characters, some of whom may not opt for body ornamentation. Thus, when an Academy award-winning actress such as Angelina Jolie presents numerous visible tattoos, she is displaying her social status in the form of her importance in the acting community because it can be costly and time consuming to conceal tattoos with makeup when a character does not require that specific tattoo.

Conclusion

The motivations for getting tattoos and piercings seem to fall into three broad, and, at first glance, inclusive categories: individuality, group membership, or a symbol of an important past event, love, or friendship (Antoszewski et al., 2010). We proposed two hypotheses to explain these trends in pop culture based on an evolutionary perspective: the human canvas hypothesis and upping-the-ante hypothesis. First, the human canvas hypothesis proposes that body ornamentation is an example of an extended phenotype intended to demonstrate symbolic thought, which can be a marker of individuality or a group identifier. Second, the upping-the-ante hypothesis states that because of modern factors, such as increases in population density and better health care, individuals are increasing their individuality by increasing their costly displays. Furthermore, we have demonstrated that the act of getting a tattoo or piercing can be seen as an honest indicator of fitness, because both processes expose the individual to health risks (Koenig & Carnes, 1999; Stirn, 2003). These proximate explanations for why body ornamentation exists in popular culture hint at the more ultimate explanation that humans are driven to pass on our genes through reproduction. Our lives are not only about reproduction; but because we are animals who face the challenges of sexual selection, most aspects of our existence encapsulate searching for solutions to problems faced in maximizing reproductive effort. Individuality makes us unique, and separate from others, and, ultimately, increases the likelihood of getting noticed as someone special. Group membership, on the other hand, can still be beneficial, even though the individual is not necessarily standing out. In some environments, it is best to be accepted into a group to receive all the possible benefits, such as safety and a sense of importance or self-worth. For instance, in groups which are hierarchical in nature (e.g., gangs, soldiers), body ornamentation serves as a cultural indicator of one’s own status in that group (Koziel et al., 2010). Symbolizing one’s love for an individual through a tattoo could either be a sign of kinship (e.g., mom) or a sign of monogamy—both of which may indicate the ultimate factor of mate quality through proximate signs (i.e., social status or dedication). Finally, a symbol to commemorate an important life event—be it good or bad—can indicate experience and, in a way, bolster one’s status in the eyes of others (ultimately increasing one’s value in the mating market).

Even within the various motivations, it still seems that there must be a deeper drive that causes us to ornament our bodies when there are many potential costs. To risk one’s own life seems counterintuitive in evolutionary terms, yet we see tattooing and piercing becoming more and more popular (Sweetman, 1999; van der Meer et al., 2008). According to Koziel et al. (2010), tattoos and piercings can serve as indicators of underlying fitness. They have argued that tattoos and piercings (and probably all forms of body modifications) take a toll on the body, and thus, if the individual can successfully get a tattoo or piercing without an infection, it signals that person’s underlying genetic quality. More fit individuals can afford to modify their bodies with holes and art because their systems are able to put up with the additional strain, whereas those who are not in a position to deal with extra strain demonstrate this through visible infection, indicating a lack of genetic fitness.

Koziel et al. (2010) also noted that, in men, having tattoos can potentially heighten their perceived masculinity, ultimately increasing their likelihood of finding a mate. Additionally, piercings and tattoos are expensive. According to Tattooinfo.net, the average cost of a tattoo artist's time is $80–$100 per hour. Intricate and large tattoos in particular take many sessions and can cost thousands of dollars. Because we see men getting more tattoos (63% in one study; Antoszewski et al., 2010), this seems to be a testament to the fact that they had enough money to spend on big, ornate displays. Women, on the other hand, are more likely to get piercings (78% in one study; Antoszewski et al., 2010), which could be due to the eye-catching nature of body jewelry. Piercings in various places can draw attention to sensual areas like the mouth, ears, and stomach. In both cases, it seems that body ornamentation is used to speak to some aspect of reproduction.

Because of the reproductive benefits one could potentially receive, extreme versions of body ornamentation seem like an extreme version of costly signaling. In the last decade, we have seen very old piercing and tattoo traditions resurface in modern-day society. Specifically, there has been a resurgence of gauging (stretching), hanging, and full body tattoos (as demonstrated by the countless number of websites devoted to this practice). The size of the gauge is a cultural indicator of the determination and pain tolerance of the individual. At tattoo conventions, there are presentations of body suspension using temporary deep tissue piercing, similar to what was initially practiced by the Native Americans, the Mandan and Lakota (DeMello, 2000). And just like the peoples of the Pacific, we see more and more people with large areas of their bodies covered in tattoos. We propose that because of the increase in population size and overall health of various societies, some people have taken this a step further and gone to the extreme end of body ornamentation. For example, people like the "Lizardman" are covered head to toe in elaborate tattoos and piercings, an act that pushes society's limits of what is acceptable, and that seems to speak to our evolutionary need to stand out to potential mates.

The cave paintings recovered in Le Chauvet 31,000 years ago transmitted ancient narratives of our need to express our uniquely human psyche. Symbolic thought drove our need to come up with increasingly novel ways to express ourselves, ultimately ending in the human species using our own skin as a means to represent our innermost thoughts and desires. Since its inception, body ornamentation has evolved along with humans for thousands of years (Pabst et al., 2009). Interestingly enough, the subject matter of the earliest tattoos is still top ranking in modern society—RankMyTattoos.com lists tribal designs, stars, and birds as the top 10 most-popular tattoo designs. Piercing and tattooing the body is a universal phenomenon that can be found in virtually all cultures (Stirn, 2003) despite the fact that doing so can lead to infection and other potentially life-threatening conditions (Kaatz et al., 2008; Koziel et al., 2010). Though the associated costs seem to greatly outweigh the benefits, piercings and tattoos have become widespread among popular icons. We see these trends across various genres of music (e.g., Travis Barker, Lil Wayne, Lady Gaga), films (e.g., *The Girl With the Dragon Tattoo*), and fashion (e.g., Ed Hardy). There is even a piercing modeled after the sex symbol of the 1950s, Marilyn Monroe, whose signature beauty mark became an iconic piercing in recent popular culture.

Though it may not appear so at first glance, it seems that the drive to get one's body ornamented is piloted by our most basic evolutionary need for perpetuation of one's genes, via sexual reproduction. This is not a conscious process, but it seems that we are all driven to increase our individuality through cultural gateways to our evolutionary core. Some people become musicians or athletes, some become doctors or artists, but at the end of the day, they could all have a tattoo or piercing. Tattooing and piercing have deep ancestral roots that are expressed through our popular culture. The need to express oneself through body ornamentation transcends all cultural and social barriers. We are all children of symbolic thought; the only difference between us is how we choose to express our deepest evolutionary need.

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