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Deviance as an historical artefact: a scoping review of psychological studies of body modification

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Body modification is a blanket term for tattooing, piercing, scarring, cutting, and other forms of bodily alteration generally associated with fashion, identity, or cultural markings. Body modifications like tattooing and piercing have become so common in industrialised regions of the world that what were once viewed as marks of abnormality are now considered normal. However, the psychological motivations for body modification practices are still being investigated regarding deviance or risky behaviours, contributing to a sense in the academic literature that body modifications are both normal and deviant. We explored this inconsistency by conducting a scoping review of the psychological literature on body modifications under the assumption that the psychological and psychiatric disciplines set the standard for related research. We searched for articles in available online databases and retained those published in psychology journals or interdisciplinary journals where at least one author is affiliated with a Psychology or Psychiatry programme ($N = 94$). We coded and tabulated the articles thematically, identifying five categories and ten subcategories. The most common category frames body modifications in general terms of risk, but other categories include health, identity, credibility/employability, and fashion/attractiveness. Trends in psychology studies seem to follow the shifting emphasis in the discipline from a clinical orientation regarding normality and abnormality to more complex social psychological approaches.

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Introduction

Body modifications in general and tattooing in particular have increased in popularity steadily over the last 50 years in England, the United States, and other industrialised countries (Burns, 2019; DeMello, 2000; Statista Research Department, 2021). The culture around tattooing and other body modifications in the developed and developing countries has shifted rapidly; however, attitudes can be resistant to change. Moreover, while pictures of tattoos and other body modifications populate Instagram and other visually oriented social media platforms, a recent opinion piece from *The Times* that enjoyed a wide circulation during the writing of this article (“Seeing tattoos makes me feel physically sick: Ubiquity of body art is born out of an existential crisis of humanity in the post-religious world” by Melanie Phillips, 2022) supports the notion that mainstream attitudes may lag behind cultural portrayals.

There are numerous means to permanently modify the body (Table 1), so this is potentially a vast literature. The contemporary history of all body modifications is beyond the scope of this article, but we recommend interested readers consult Pitts-Taylor (2003), Eubanks (1996), Vale and Juno (1989) as but a few examples. However, the body modification literature focuses primarily on tattooing, so a short history at least of tattooing may be illustrative.

Tattooing and body modifications in general are likely as old as the human species based on multiple lines of circumstantial evidence. The oldest evidence of permanent modification comes from the teeth of a Late Pleistocene hominid from Olduvai Gorge in Tanzania, Africa (12–20 k years old) (Willman et al., 2020), while the tattooed mummy commonly known as Ötzi is currently the oldest definitive evidence of tattooing (Deter-Wolf et al., 2016). Tattooing has been practiced around the world and was well-known to Europeans before colonial navigators began exploring the world’s oceans but appears to have waned in popularity with the rise of nation-states (Buss and Hodges, 2017). Nevertheless, when Captain James Cook encountered tattooed peoples throughout the Pacific, the facial tattooing and patterns observed were so striking that the Polynesian word *tatau* (meaning, “to strike”) was picked up by Cook’s sailors to describe what they had seen and in some cases experienced (Douglas, 2005). Missionaries and other colonial agents suppressed tattooing as non-Christian in many parts of the world, but some tattooing traditions were maintained through this period and have resurged

in popularity (Buss and Hodges, 2017; Caplan, 1997, 2000b; DeMello, 2000).

Tattooing in Europe and North America were popular as both exotic collections of the wealthy or the souvenirs of soldiers and sailors until the invention of the electric tattoo machine (Caplan, 1997; Lodder, 2013). In the nineteenth century, Thomas Edison’s newly invented electric pen was modified by Samuel O’Reilly in the United States to patent the first electric tattooing machine. The further development of tattoo machines prompted the appearance of tattoo parlours in major cities throughout Europe and North America, where tattoos became affordable for the working classes and extremely popular (Lodder, 2013). As tattooing flourished among the poor and penal populations swelled, especially among urban poor, attitudes toward tattooing shifted. Criminologists began collecting the skin of deceased tattooed people, which were used to categorise and diagnose tendencies toward criminality and mental illness (Angel, 2017; Lodder, 2013). Though multiple competing models of deviance were developed, the focus in the writings of nineteenth century criminologists on “the soldier, seaman, or ‘recidivist’” belies the fact that British royal military figureheads may have played a part in reinvigorating interest in pilgrimage and souvenir tattoos that persisted beyond the era (Angel, 2017).

The effort to taxonomically categorise criminal tendencies was a failure in terms of identifying deviance, but it may have helped create the stigma it sought to describe, along with associations being made between tattooing and lower social classes in Europe and North America (Bradley, 2000; Caplan, 2000a). The working-class popularity of tattooing waxed during the twentieth century with the two world wars, as military and non-military alike collected patriotic emblems, but popularity waned after the wars. The uniforms of working-class professions increased the visibility of tattoos, and such visible tattooing also became negatively associated with groups adjacent to the working class, like bikers and gang members (DeMello, 2000). These were not the first concerns and class, as fears about tattooing among minors and erotic designs appearing on women led to efforts to legally suppress tattooing in Germany in the 1910s and in the United States in the 1930s (Govenar, 2000; Oettermann, 2000). Negative associations with tattooing finally led to a complete ban in New York City in 1961 due to a purported concern over hepatitis transmission, which had a ripple effect across the United States that

Table 1 Invasive, voluntary body modifications beyond tattoos and piercings.	
Type	Description
Scarification (e.g., cutting or branding)	Producing a scar on the skin. There are many methods that may be used to scar the skin, but most common is the use of a sharp implement, such as a scalpel, to remove portions of the skin; or burning the skin.
Tongue splitting	Splitting the tongue down the centre, usually with a scalpel.
Ear shaping (e.g., cropping or pointing)	Modifying the ear by either removing part of it, usually at the top, or cutting, reshaping, and stitching the top so it resembles a point.
Subdermal implants	Inserting implants underneath the skin so they are completely subsumed. Examples include ridged or otherwise textured implements that give this impression on the skin; and magnetic implants.
Transdermal implants	Implants are inserted underneath the skin with a portion still visible above the surface of the skin. These implants may have changeable attachments, for example, horns or spines.
Eyeball tattooing	The insertion of ink beneath the cornea using a needle, which spreads across the surface of the sclera.
Temporary piercings	Piercings conducted in the usual way, which are then removed after a short period of time. Sometimes these piercings may be threaded together and gently pulled.
Flesh hooks and suspension	Temporary piercings wherein the weight of the individual is used to tug and pull on the piercings. This may involve being suspended in the air, or it may involve anchoring the ropes attached to the piercing to a fixed structure, such as a wall, allowing the individual more control over the weight applied to the pulling.
Amputations or removal of body parts	The removal of parts of the body. More common parts that are removed are nipples, the navel, and sometimes digits or portions of digits.

persisted until the ban was lifted in New York in 1997 (McCabe, 1997).

Pressure from city health departments all over North America led to innovations in tattooing by artists seeking to revitalise the industry. As a study of legal dynamics of tattooing in Vancouver, Canada makes clear, the pressures from health departments led to changes that, over the succeeding decades, have become local law (Jelinski, 2018). These innovations set the stage for what Rubin (1988) called the “second tattoo renaissance,” a resurgence in the popularity akin to the uptick after the electric tattoo machine was invented. As one of us (Lynn) observed first-hand, tattooing seemed to explode in popularity in New York City and throughout North America and Europe after New York City’s ban was lifted, though speculation and stigma about the psychology of modified individuals remains.

The mystery around tattooing and body modifications in general is not why people engage in them—the real enigma is how and why the symbolic importance of body modifications (or any cultural practice) changes societies over time or in response to sociocultural factors. Don Ed Hardy, one of the foremost tattoo artists of the second tattoo renaissance, points out that tattoos are windows into the psyche but also like “Geiger counters for people’s fears” (Vale and Juno, 1989, p. 51), telling more about the viewer of the tattoo than the wearer. Given social and technological changes that have fuelled the body modification renaissance of the past 50 years, it is important that the granularity of our research questions and designs follow similar evolutions.

As body modifications have increased in global popularity, so too have studies of body modifications proliferated in a way that is theoretically and methodologically diverse. Despite this, we were surprised to find recent studies that seemed to take antiquated theoretical perspectives by framing research in terms of correlations with risk behaviour (e.g., Broussard and Harton, 2018). Why do researchers continue to revisit the notion that people with body modifications represent or are from stigmatised groups despite the overwhelming number of studies indicating that body modifications more accurately reflect prosocial rather than anti-social means of social communication (examples of significant treatments include Atkinson, 2004; Lingel and Boyd, 2013; Pitts, 2003)? To address this question, we conducted a scoping review of the psychological literature on body modifications.

Methods

First, we established which body modifications were relevant to this review. The term “body modifications” is broad and can include everything listed in Table 1, as well as extreme dieting, bodybuilding, cosmetic procedures (e.g., lip fillers and muscle relaxing injections) and surgeries (e.g., breast augmentation and fat removal or displacement), and even hair dying. However, for this scoping review, we opted to include only invasive, voluntary body modification processes done outside of medical contexts. To focus on discipline-specific approaches that might explain the persistence of stigmatisation in the literature, further inclusion criteria were: (1) research published in peer-reviewed psychology journals or multidisciplinary journals; (2) where papers are published in multidisciplinary journals, at least one of the authors is a psychologist or psychiatrist (deduced by affiliation); (3) papers published in English; and (4) research is empirical or theoretical (primary source, not a review). Research was excluded if these criteria were not met. Qualitative and quantitative research was eligible, and all years of publication were included in the search.

We searched the following databases on 13 April 2020 and updated on 17 May 2021: Embase Ovid, Web of Science,

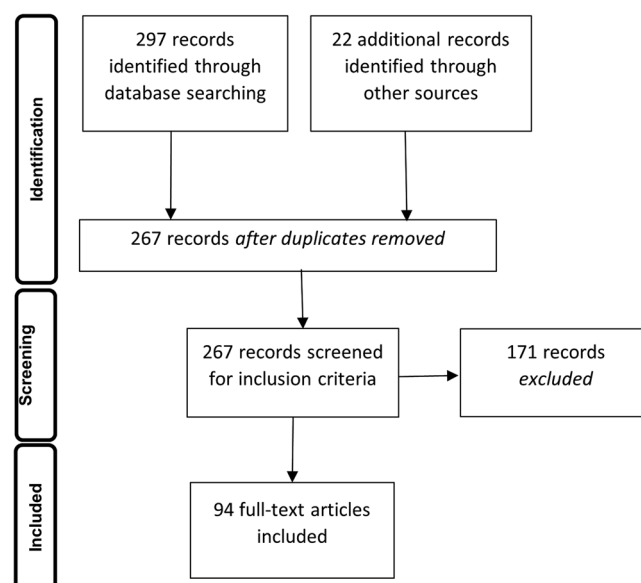


Fig. 1 PRISMA flow diagram of the scoping review process.

EBSCOhost and PubMed. The search specified tattoo* OR piercing OR scarification in the title AND feeling OR motivation OR attitude OR perception in the abstract. Further searches across these databases were conducted for “extreme modification” in the title OR in the abstract to try and identify any relevant journal articles regarding less popular forms of body modification. Search results were filtered to journal articles only and limited to relevant academic disciplines (for example, psychology, psychiatry, social sciences). We conducted a final search of Google Scholar on 7 April 2022 for any new relevant publications. Finally, ad hoc articles were found in the course of research through miscellaneous means, such as through being referenced in another article.

Through title screening, we identified 297 articles from the four databases and 21 from other sources (Fig. 1). We removed 54 duplicate articles identified in multiple databases. We used the inclusion/exclusion criteria for final sample determination. Articles for which study objectives or author affiliations were unclear were examined closely by all five co-authors and discussed further. For instance, several articles on body modification appear in the interdisciplinary journal *Deviant Behaviour* by authors from various disciplines, so only those by authors with express affiliations to psychology or psychiatry were retained. Other close-but-no cases were an article in the journal *Art Therapy* by an art therapist and several articles in nursing journals by nursing faculty exploring tattooing motivations and identity-formation. Art therapists are sometimes psychologically trained, so we examined the credentials of the author, and, since the degrees were in counselling and therapy but not psychology or psychiatry explicitly, the article was excluded. The nursing articles are like the psychology/psychiatry journal articles thematically in their focus on motivations and stigma, but they do not meet inclusion criteria for author affiliations. This process led to the exclusion of 171 articles, leaving 94 eligible for analysis.

Our team of five co-authors met weekly over the course of a year to read and discuss coding of articles. First, we divided the articles up among our team, read 5–10 each, and identified salient themes. We then met to discuss the themes we had identified and repeated this process multiple times. Through this iterative process, we determined that the best way to assess the corpus of psychological studies of body modifications would be to categorise them based on their stated or implied study objectives.

Therefore, we reshuffled the articles and divided them evenly among the five team members, and each team member categorised the articles based on the specific or apparent objectives of each article's authors. We then met as a team and discussed the coding of each article; if the team was not in agreement, we discussed until we reached consensus on the final set of categories and subcategories and the categories to which each article should be assigned. Ad hoc articles discovered during the process were reviewed together and assigned categories by the entire team.

In addition to themes, we coded articles based the demographic focus of the study (e.g., college students, women, prisoners, etc.), what country the study took place in and whether they were in-person or online studies, the methods used, and gaps or critiques of the literature identified by the authors. After coding the articles, we reread the articles within each section in order of publication date to see what theory authors were drawing on and, a task which elicited some additional articles and shed light on temporal changes in Psychology as a discipline.

Results

We identified 69 articles about tattooing only, 18 about tattooing and piercing, 6 about piercing only, and one article about multiple forms of body modifications, including scarification, tattooing, piercing, and other forms.

Table 2 outlines the categories that most appropriately characterise the objectives of each article. The most common sample among psychology articles examining body modifications was a general Euro-American population ($n = 33$), followed by college students ($n = 22$), women only ($n = 9$, including one that sampled women only but asked about men), prisoners or convicts ($n = 7$), patients ($n = 6$), youth ($n = 4$), specific job roles ($n = 4$), general tattooed population ($n = 3$), case studies ($n = 2$), men only ($n = 2$, one sampled men but asked about women only), and multiple populations ($n = 2$).

The most common objective among psychology articles about body modifications ($n = 36$ or 38% of total sample) was to test for underlying dysfunction or tendencies toward deviant behaviour associated with body modifications. Among those, 25% examined correlations between past behaviours or experiences and body modifications, whereas 41% examined current behaviours or sought to predict future behaviour.

The second most common objective was an effort to assess how *tattooed* (not body modifications in general) people are perceived, characterised, and treated by others ($n = 31$ or 32% of total sample). Within this category, we identified six sub-objectives, including perceptions for employment or when at work (32% of category), if tattooing impacts trustworthiness (12% of category), if tattooed people are worth helping (9% of category), and if tattooing influences perceived attractiveness (6% of category).

The third most common objective was a general exploration of why people engage in body modifications ($n = 18$ or 19% of total sample). Among those, five articles (27% of category) explored the possibility that tattooed people are fundamentally different from non-tattooed people.

The fourth most common objective of psychological studies of body modifications was to explore if tattoos impact health ($n = 15$ or 16% of total sample). Two articles (13% of category) concluded that tattoos help health, whereas authors of nine articles (67% of category) investigated whether tattoos indicate poor health.

The least common objective among psychological studies of body modifications was to explore them as aspects of identity ($n = 9$ or 9% of total sample). We identified one subcategory for those focused on subjective feelings of attractiveness vis-à-vis their body modifications with two articles in this subcategory (22% of category).

Discussion

In this article, we provide an overview of peer-reviewed, primary source articles on voluntary, invasive body modifications published in psychology journals or journal articles that featured one or more authors whose affiliation was a Psychology or Psychiatry programme. Our search was intended to be a comprehensive assessment of sources available through online databases. The identified studies range widely in terms of study characteristics, methodologies, and locations. A notable finding was that there were few psychological/psychiatric studies of body modifications beyond those related to tattooing. Most of the body modifications outlined in Table 1 are rare, so, if the objective of the studies was to identify aberration, it might seem intuitive to study the rates and motivations for engaging in rare body modifications. However, our main finding is that psychological/psychiatric studies of tattooing have been rooted in traditional abnormal psychology and have tended to reify stigma through their research design. This is true even when the author objectives are to demonstrate that modified people are not deviant or stigmatised. There were very few psychological studies of body modifications outside of clinical or penal settings until the twenty-first century, suggesting changing perspectives in the fields of psychology and psychiatry.

Body modifications and deviance. Most psychological studies of body modifications seem to derive from the field of abnormal and clinical psychology. The earliest publications in our sample (Duncan, 1989; Edgerton and Dingman, 1963; Ferguson-Rayport et al., 1955; Taylor, 1974) are studies of prisoners and psychiatric patients that provide clues as to the shift from popular practice to stigma. Ferguson-Rayport et al. (1955) review numerous studies indicating, for instance, that tattooed people were more likely to be denied military enlistment or that tattooing was linked with homosexual behaviour in correctional institutions and reform schools. Furthermore, the authors hold “that the tattoo expresses masochistic-exhibitionistic drives and directly illustrates and encourages homosexual activity...tattoos are often compensatory in individuals poorly adjusted, especially in the sexual sphere” (Ferguson-Rayport et al., 1955, p. 116). Such studies appear to reconstitute or extend earlier criminological efforts to taxonomically categorise potential for deviance. Edgerton and Dingman (1963), by contrast, conducted a qualitative exploration of tattooing among mental hospital patients to determine if, as suggested by anthropological studies of non-Euro-american tattoo practices, marking oneself permanently is an important aspect of identity-formation.

Though several standardised methods for assessing personality were developed in the first half of the twentieth century (Butcher, 2009), they do not appear to have been used in body modification research until the 1970s, when research sought to determine if tattooed prisoners and psychiatric patients were psychologically different than non-tattooed counterparts. For example, Taylor (1974) indicates significant differences between tattooed and non-tattooed individuals but does not provide any statistics to support this. By contrast, Duncan (1989) and other forensic studies (e.g., Birmingham et al., 1999) find negative or unhealthy behaviour associated variously with both modified and non-modified inmates.

Within the clinical psychology literature, penal or forensic studies seem to highlight body modifications as potential indicators of deviance or mental disorder, whereas studies relating to outpatient disorders (e.g., Bui et al., 2013; Caplan et al., 1996; Claes et al., 2005) suggest that body modifications may be sublimations of tendencies toward self-harm or other negative behaviour. Cardasis et al. (2008) notes a justification for this approach, pointing out that a primary feature of anti-social

Table 2 Peer-reviewed research articles about body modification by psychologist/psychiatrists or published in psychology/psychiatry journals (N = 94).

Broad objective	Specific objective	Percent of total sample	Articles included
1. Test for underlying dysfunction/deviancy/risk-taking tendencies		12.76%	Cardasis et al. (2008); Ceylan et al. (2019); Claes et al. (2005); Dillingh et al. (2020)*; Drews et al. (2000)*; Duncan (1989); Edgerton and Dingman (1963); Ferguson-Rayport et al. (1955); Koch, Roberts, Armstrong, et al. (2005); Pirrone et al. (2020)*; Skegg et al. (2007)*; Vizgaitis and Lenzenweger (2019)*
	1.1. Correlations between past behaviour and current body modifications	9.57%	Aizenman and Jensen (2007); Birmingham et al. (1999); Bui et al. (2013); Caplan et al. (1996); Dhossche et al. (2000); Stirn and Hinz (2008)*; Stirn et al. (2011)*; Swami et al. (2015); Taylor (1974)
	1.2. Using body modifications to predict future behaviour	15.95%	Anderson and Sansone (2003); Carroll and Anderson (2002); Ekinci et al. (2012); Guéguen (2012a); Guéguen (2012b); Guéguen (2013); Jennings et al. (2014); Manuel and Retzlaff (2002); Roberts et al. (2004); Ruffle and Wilson (2019); Sagoe et al. (2017)*; Schlösser et al. (2020)*; Skoda et al. (2020); Solís-Bravo et al. (2019); Stirn et al. (2006)
2. Determine how modified people are perceived, characterised, treated by others		12.76%	Broussard and Harton (2018); Drews et al. (2000)*; Galbarczyk and Ziomkiewicz (2017); Galbarczyk et al. (2020); Hawkes et al. (2004); Martino (2008); Martino and Lester (2011); Miłkowska et al. (2018); Resenhoeft et al. (2008); Wohlrab et al. (2009a); Wohlrab et al. (2009b); Zestcott et al. (2018)
	2.1. Perceptions for employment or when at work	10.63%	Burgess and Clark (2010); Dillingh et al. (2020)*; Flanagan and Lewis (2019); Hauke-Forman et al. (2021); Tews et al. (2020); Thielgen et al. (2020); Timming (2015); Timming (2017); Timming et al. (2017); Wiseman (2010b)
	2.2. If body modifications impact trustworthiness	4.25%	Funk and Todorov (2013); Wiseman (2010a); Seiter and Hatch (2005); Timming and Perrett (2016)
	2.3. If modified people are worth helping	3.19%	Wasarhaley and Vilks (2020); Wiseman (2010a); Zestcott et al. (2017)
	2.4. If modifications influence perceived attractiveness	2.12%	Molloy and Wagstaff (2021)*; Seiter and Hatch (2005)
3. Explore motivations for engaging in body modifications		13.82%	Antoszewski et al. (2010); Buss and Hodges (2017); Jaworska et al. (2018); Kalanj-Mizzi et al. (2019); Martin (1997); Naudé et al. (2019); Pirrone et al. (2020)*; Sagoe et al. (2017)*; Schlösser et al. (2020)*; Stirn and Hinz (2008)*; Stirn et al. (2011)*; Tate and Shelton (2008); Thomas and Copulsky (2021)
	3.1. Determine if modified people are fundamentally different from non-modified people	5.31%	Forbes (2001); Skegg et al. (2007)*; Swami (2012); Swami et al. (2012); Swami et al. (2016)
4. Assess impacts of body modifications on health		3.19%	Dillingh et al. (2020)*; Pajor et al. (2015); Zestcott and Stone (2019)
	4.1. If modifications benefit health	2.12%	Hill et al. (2016); Maxwell et al. (2020)
	4.2. If modifications indicate poor health	10.63%	Geller et al. (2020); Huxley and Grogan (2005); Kertzman et al. (2013); Kertzman et al. (2019a); Kertzman et al. (2019b); Koch, Roberts, Cannon, et al. (2005); Mortensen et al. (2019); Roberti and Storch (2005); Thompson (2015); Vizgaitis and Lenzenweger (2019)*
5. Role of body modifications in identity development		7.44%	Bergh et al. (2017); Dillingh et al. (2020); Mun et al. (2012); Skegg et al. (2007)*; Swami (2011); Tiggemann and Golder (2006); Tiggemann and Hopkins (2011)
	5.1. How modifications influence personal sense of attractiveness	2.12%	Ball and Elsner (2017); Molloy and Wagstaff (2021)*

*Appear under more than one category/subcategory.

personality disorder is a need to seek immediate gratification and external stimulation to alleviate anxiety or discomfort. Buss and Hodges (2017) suggest the search for associations between body modifications and deviance is rooted in religious proscriptions against marking one's body (see Scheinfeld, 2007 for examples) that were employed in the colonial era of empire-building to distinguish the "civilised" from "savage". Multiple studies (e.g., Aizenman and Jensen, 2007; Ceylan et al., 2019; Stirn and Hinz, 2008; Stirn et al., 2011; Swami et al., 2015; Vizgaitis and Lenzenweger, 2019) conflate body modifications and non-suicidal self-injury or trauma and suggest that body modifications may be indicators of other anti-social tendencies.

Others (e.g., Drews et al., 2000) simply choose to emphasise terms like "risky" behaviour over analogous but differently valenced terms like "adventurous" or to emphasise the potential risks of tattooing (e.g., Koch, Roberts, Cannon, et al., 2005). Though poor-quality tattooing can certainly be dangerous (Kluger, 2015; Kluger and Koljonen, 2012), the chances of encountering tattoo-related medical complications in the current era is low, and there is some evidence to suggest that past fears over blood-borne pathogen transmission have been greater than the actual incidence of such tattoo-related medical complications (Jelinski, 2018; Lynn et al., 2019).

Body modifications and social interactions. All other psychological studies seem to wrestle with the changing status of body modifications as an emerging or "new" normal. We identified what could be called a "general" category of social psychology studies of body modifications, seeking explanations for how modified people are perceived and how people with modifications are treated (e.g., Drews et al., 2000; Galbarczyk et al., 2020; Galbarczyk and Ziolkiewicz, 2017; Hawkes et al., 2004; Martino, 2008; Martino and Lester, 2011; Miłkowska et al., 2018; Resenhoeft et al., 2008; Wohlrab et al., 2009a, 2009b). An *a priori* assumption undergirding these studies is that body modifications have been historically stigmatised, and stigma may persist in interpersonal interactions.

A paradigm shift in body modification research seems to have occurred from the 1970s through the 2000s, with psychology the last to come around. This shift makes the fields of psychology and psychiatry appear to be out of step, but it is worth remembering that clinical psychology is historically grounded in the deficit-oriented biomedical model, which is focused on healing illness and diagnosing disfunction (Sheridan and Radmacher, 1992). Whereas body modifications as normal behaviours have long been subjects of study for allied social sciences like anthropology and sociology, social psychology was still developing as a discipline in the 1950s and 1960s (Stangor, 2014); social psychology research on body modifications seems to have only gotten underway beginning in the twenty-first century.

Three areas within social psychology seem particularly focused on body modifications: industrial, health, and evolutionary psychology. Industrial or occupational psychology is a subfield of social psychology concerned with human relations in work-related settings. A common theme in the concern over body modifications is how visible modifications will influence employability (e.g., Burgess and Clark, 2010; Dillingh et al., 2020; Flanagan and Lewis, 2019; Hauke-Forman et al., 2021; Tews et al., 2020; Thielgen et al., 2020; Timming et al., 2017; Timming, 2015; 2017; Wiseman, 2010b). Some studies relate to particular circumstances wherein bias toward body modifications could undermine interactions beyond employment status, such as in the courtroom (e.g., Funk and Todorov, 2013) or classroom (Wiseman, 2010b) or based on the specific imagery of a person's tattoos (e.g., Timming and Perrett, 2016).

Among health psychologists, there is concern that the association of body modifications with abnormality might lead to people in marginal groups being in "double jeopardy" (e.g., Zestcott et al., 2017; Zestcott and Stone, 2019; Zestcott et al., 2018). Another line of research taking the opposite tack comes out of evolutionary psychology, arguably a subfield of social psychology (Kruglanski and Wolfgang, 2012). The evolutionary perspective suggests that well-healed modifications may function as external indicators of good underlying health. This hypothesis is tested by exploring how modifications are perceived by observers in terms of attractiveness and health as adaptive indicators of partner suitability (e.g., Galbarczyk et al., 2020; Galbarczyk and Ziolkiewicz, 2017; Miłkowska et al., 2018; Wohlrab et al., 2009a, 2009b).

Body modifications and health. Most studies of body modifications and health do not focus on the double jeopardy of marginalised groups or evolutionary signalling theory. Most are grounded in abnormal psychology studies of the 1980s and 1990s and therefore collect data on mental/physical health and substance use even when their study objective is ostensibly about body modifications and other topics (e.g., Dillingh et al., 2020). Some reframe the focus on abnormality and instead use body modifications as indications of "impulsivity" or tendencies toward "sensation-seeking", which are themselves considered risk factors for some abnormalities (e.g., Kertzman et al., 2013; Mortensen et al., 2019). One study uncritically claims that tattoos and premarital sex are "categorically deviant in a traditional sense but are typical among college students" as justification for a correlational study (Koch et al., 2005, p. 887). Another study by the same group of authors (Koch et al., 2005) explores beliefs about the health and social dangers of tattoos, as though tattoos are more dangerous than current evidence suggests (cf. Jelinski, 2018; Lynn and Medeiros, 2017). Some studies note that, not only are body modifications different in how they are adopted and used, but each type of body modification also has variation. Tattooing varies by design, extent, body location and other factors that are "read" by interlocutors and observers in the explicit and implicit communication of social interactions (Geller et al., 2020). Furthermore, as body modifications become more popular in developing countries due to media exposure, psychological studies conducted by researchers in those countries replicate the type of mental health studies conducted previously in Europe and the United States (e.g., Geller et al., 2020; Kertzman et al., 2019a, 2019b; Kertzman et al., 2013; Pajor et al., 2015).

By contrast, other psychological studies acknowledge that, among body modifications, piercing and tattooing is "becoming mainstream" (Hill et al., 2016, p. 246) and explore body modifications from developmental psychology perspectives. Some such studies explore body modifications as means of improving self-esteem or one's own body image (e.g., Hill et al., 2016; Kertzman et al., 2019a), as a form of healing from trauma (e.g., Maxwell et al., 2020), or as an option for healthy lifestyles (Huxley and Grogan, 2005). One unique study (Thompson, 2015) explored associations between tattooing and "generativity", a concept associated with prosocial behaviour.

Tattooing and identity. Beyond the importance of deviance, health, and the social roles of tattoos, researchers identified the role and materiality of body modifications in identity and personal aesthetics. We note two general trends concerning the role of body modifications specifically in emerging identities and perceptions of attractiveness. We distinguished studies of identity as those in which researchers largely ask questions that explore how those with body modifications view themselves. Within these

articles, there are two further distinctions of identity, where researchers identify the underlying meanings attributed to body modifications (e.g., Mun et al., 2012; Tiggemann and Golder, 2006; Tiggemann and Hopkins, 2011) and modifications as identity signalling to social others (e.g., Bergh et al., 2017; Dillingh et al., 2020; Molloy and Wagstaff, 2021; Mun et al., 2012; Skegg et al., 2007).

Neither identity nor the meanings people attribute to their tattoos are fixed in time (Howson, 2013), and researchers try to convey this complexity by collecting diachronic information pertaining to the meaning of tattoos (the narrative story behind the tattoo), though the recurrent theme within these studies concerns *change* to meanings (e.g., Mun et al., 2012; Tiggemann and Golder, 2006; Tiggemann and Hopkins, 2011). For example, Mun et al. (2012) note that some tattoo meanings shift over time, reflecting life transitions, such as tattoos that commemorate past relationships or affiliations (e.g., gang imagery) (e.g., Mun et al., 2012). The through line of these identity-oriented articles largely point to individuals using tattoos as markers of individuality that reflect multi-faceted, densely layered meanings.

Tattoos can also be the material manifestations of certain types of communal (e.g., Edgerton and Dingman, 1963), ethnic (e.g., Skegg et al., 2007), or gender identities (e.g., Galbarczyk and Ziomkiewicz, 2017). Within this scoping review, several of the developmental psychology articles focus largely on tattoos as materialising and signalling identity (e.g., Dillingh et al., 2020; Mun et al., 2012; Skegg et al., 2007). Although many individuals use tattoos to signal identity through self-presentation (e.g., Molloy and Wagstaff, 2021; Mun et al., 2012; Tiggemann and Golder, 2006; Tiggemann and Hopkins, 2011), this requires understanding the meaning of a tattoo's visibility (can it be seen by casual observer or only in intimate circumstances?) (Dillingh et al., 2020). People present themselves in myriad situations and environments in their everyday lives, requiring different "selves" to be presented accordingly; tattoos signalling identity can therefore take many forms, and psychologists suggest that people make these decisions based on life experiences, social settings, and other reasons in order to embody the identities they want to present (e.g., Dillingh et al., 2020; Mun et al., 2012; Tiggemann and Golder, 2006; Tiggemann and Hopkins, 2011).

Limitations. Our analysis unfortunately reinforces the "siloeing" of academic disciplines for a subject that is in fact very interdisciplinary in nature and has been studied from numerous vantages we did not address. However, the historical trend we have noted was not apparent until we conducted this analysis, and it is important to distinguish the contributions various disciplines can make to body modification research and what strengths and weaknesses may be inherent to respective disciplinary approaches. This analysis may also suggest that psychologists and psychiatrists are alone in drawing parallels between body modification and risk behaviour or stigma, but this is also far from true. Nevertheless, forensic research conducted by psychologists, psychiatrists, and criminologists prevails among early body modification studies. Future research should include similar treatments for other relevant disciplines (e.g., anthropology, sociology, biology, criminology, nursing, dermatology, etc.).

Conclusions

The psychological studies examined in our review span the period 1955–2021. Early studies imply moral parallelisms by comparing body modification tendencies to religiosity, sexual activity, sexuality, alcohol or drug use, etc. This approach seems to derive from the legacy of nineteenth century criminology, which in turn appears based on a previous stigmatisation of irreversible body

alterations among European cultures (Caplan, 1997). Lane (2014) makes a similar observation, suggesting that nineteenth century criminologists thought of criminals as atavistic and tattoos as indications of their reversion to primitiveness. This approach is continued in contemporary research when studying body modification in clinical populations, as well as among adolescents, seeking explanations for past behaviours and for "tells" of future tendencies (Lane, 2014).

In conclusion, we found no legitimate motivation for the inherent stigma towards individuals who voluntarily modify their bodies. Instead, this is an historically particular legacy of the social sciences and their various developments. Continued focus on deviance or risk regarding body modifications directly (i.e., not including intervening assessments of personality traits) seems a desperate assertion of an antiquated or atypical moral stance that now rings as somewhat absurd. Future research should continue to integrate perspectives from allied disciplines to gain a more accurate and nuanced view of the psychology of body modifications. The psychobiosocial approach taken in several twenty-first century health psychology studies—e.g., "double jeopardy" among marginalised populations or how tattoos are used by some people to help heal from past traumas—are promising research directions. The psychological study of modified people has primarily focused on tattooing, and future research should also acknowledge the variation of invasive voluntary modifications as they become more popular and available. Furthermore, technological advances are making tattoos less permanent while opening biomedicine to other forms of tattooing, which promise further shifts in how we study the psychology of body modifications. Emerging research using new methods and technology and that acknowledges how past research design reify the stigma they purport to study promises suggests a new paradigm of body modification investigations on the horizon.

Data availability

Data sharing is not applicable to this research as no data were generated or analysed.

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Author contributions

RO: conceptualisation, data curation, methodology, visualisation, writing (original draft and editing). MS, LL, and SF: data curation, formal analysis, writing (review & editing). CL: Project administration, formal analysis, supervision, writing (review & editing).

Competing interests

The authors declare no competing interests.

Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

Informed consent

This research did not require informed consent as it is a review paper.

Additional information

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