

Research

Men's use of cosmetic surgery and the role of traditional masculinity ideologies

A. Walther¹ · A. Möllmann² · S. Reppenhagen³ · U. Ehlert¹ · B. Watzke⁴ · M. Drüge⁴ · M. Schneeberger¹ · L. Eggenberger^{5,6}

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Abstract

In western countries, men are increasingly using cosmetic surgery. However, despite this trend, there remains a dearth of information on the prevalence, acceptance, and motivations behind men's use of cosmetic surgery. Furthermore, the potential association between men's use of cosmetic surgery and in particular male-specific cosmetic surgery procedures such as head hair transplant or penis enlargement and traditional masculinity ideologies (TMI) has not been investigated so far. For this purpose, a cross-sectional anonymous online survey was conducted among 241 self-identifying men aged 18 years or older from the German-speaking part of Europe. Participants responded to questions about cosmetic surgery use and experiences, and completed the Conformity to Masculine Norms Inventory—Short Form (CMNI-SF) and the Male Role Norms Inventory—Short Form (MRNI-SF) questionnaires to assess conformity with and endorsement of TMI. Of the 241 men investigated, 47 (19.5%) had undergone cosmetic surgery. The most common types of cosmetic surgeries reported were wrinkle treatment, eyelid correction, and head-hair transplant. Penis enlargement procedures were reported by three (6.4%) of the 47 men who had undergone cosmetic surgery. The main reasons for undergoing surgery were to feel better (72.3%) and look better (55.3%), while to increase sexual success (17.0%) and to increase manliness (14.9%) were also reported. Logistic regression models showed that higher conformity to TMI (CMNI-SF) was associated with higher odds of having undergone cosmetic surgery. The results highlight the overall increase in men's cosmetic surgery use and its specific characteristics. The significant positive association between conformity to TMI and men's use of cosmetic surgery suggests that men increasingly use cosmetic surgery as a means to assert power, success, dominance, and sexual success.

Keywords Men · Masculinities · Cosmetic surgery · TMI · Plastic surgery

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✉ A. Walther, a.walther@psychologie.uzh.ch; A. Möllmann, anne.moellmann@uni-bielefeld.de; S. Reppenhagen, simon.reppenhagen@stud.uni-greifswald.de; U. Ehlert, u.ehlert@psychologie.uzh.ch; B. Watzke, b.watzke@psychologie.uzh.ch; M. Drüge, marie.druege@psychologie.uzh.ch; M. Schneeberger, m.schneeberger@psychologie.uzh.ch; L. Eggenberger, lukas.eggenberger@bli.uzh.ch | ¹Clinical Psychology and Psychotherapy, University of Zurich, Binzmühlestrasse 14, 8050 Zurich, Switzerland. ²Clinical Child and Adolescent Psychology and Psychotherapy, Bielefeld University, Bielefeld, Germany. ³Psychology, University of Greifswald, Greifswald, Germany. ⁴Clinical Psychology and Psychotherapy, University of Zurich, Zurich, Switzerland. ⁵Experimental Pharmacopsychology and Psychological Addiction Research, Department of Adult Psychiatry and Psychotherapy, University Hospital of Psychiatry Zurich, University of Zurich, Zurich, Switzerland. ⁶Jacobs Center for Productive Youth Development, University of Zurich, Zurich, Switzerland.



1 Introduction

Plastic surgery and cosmetic surgery are two closely related branches of medical procedures aimed at improving or restoring the appearance or function of the body. Plastic surgery primarily focuses on reconstructing or repairing defects in the body resulting from birth disorders, trauma, burns, or disease. Its goal is to restore normal function and appearance, while cosmetic surgery, on the other hand, is a subset of plastic surgery that specifically deals with enhancing a person's appearance by altering or reshaping the body's features. It is typically performed on patients with no underlying medical issues, and the primary motivation is aesthetic improvement and indeed, most patients are generally satisfied with the outcome of their procedures [1].

Historically, cosmetic surgery has been dominated by women, as beauty and physical appearance have played a significant role in their ability to navigate societal expectations and achieve life goals [2, 3]. About 90% of all cosmetic surgery patients are women and they generally show higher acceptance and greater specific knowledge compared to men [4]. However, recent data from the Associations of American and German Aesthetic Plastic Surgery [5–8] reveals a sharp increase in the number of cosmetic surgeries performed on men. In line with that, men also increasingly use physical appearance modifications such as hair care products and makeup for men [9, 10]. Despite this trend, there remains a dearth of information on the prevalence, acceptance, and motivations behind men's use of cosmetic surgery. In general, individuals undergo cosmetic surgery for various reasons, ranging from aesthetic enhancement and boosting self-confidence to relationship issues [11]. Some may seek to address perceived imperfections, while others may wish to reverse the signs of aging or enhance traditionally gender-specific features. Earlier studies implied different, potentially gender-specific motives, such as men often seeking to emphasize traditionally masculine features, while women focus on meeting societal standards of beauty [12–14].

Especially the influence of societal standards of beauty have become more important for men, as well. For men, traditional masculinity ideologies (TMI) may play a central role. TMI are socially defined sets of standards and norms how men are expected to be or behave [15–17]. Importantly, these aspects include features of ideal men's bodies such as muscular and lean with little body fat [18]. As such, men who aim to uphold TMI, such as power, dominance, status, or playboy, report higher body dissatisfaction [19] and these TMI may drive men to seek cosmetic surgery as a means of conforming to societal expectations and enhancing their perceived attractiveness [17, 20]. By undergoing cosmetic procedures, men may aim to achieve a more youthful, manly, powerful, or successful appearance, which they may perceive as being linked to their overall status and desirability.

Commonly sought-after procedures in men include liposuction, rhinoplasty, male breast reduction (gynecomastia surgery), facelifts, but male-oriented procedures such as hair transplantation or penis enlargements are increasingly performed [5, 6, 8]. Head hair transplantation and penis enlargement are examples of cosmetic procedures that directly relate to TMI of power, dominance, playboy, and success [17, 20]. Hair loss is often associated with aging and a decline in attractiveness, whereas a full head of hair can symbolize youth, vitality, virility and strength [21–23]. Undergoing hair transplantation may thus help men conform to TMI and thereby fulfill societal expectations and enhance their perceived masculinity [20].

Similarly, penis size has long been linked to male sexual prowess, dominance, and masculinity [24]. Penis enlargement procedures may provide men with a sense of increased power, attractiveness, and status, adhering to TMI [17]. Men who undergo these surgeries may believe that these enhancements will positively impact their romantic and sexual relationships, as well as their overall self-esteem and social standing [25, 26].

As men become increasingly aware of the potential benefits of cosmetic surgery, they are investing more in male-tailored procedures. The growth of the male cosmetic surgery market signifies the rising importance of appearance and adherence to TMI in modern society. As a result, men are dedicating more financial resources to enhance and maintain their physical appearance, further fueling the expansion of this industry. The cost of these procedures can vary depending on location, but are in most cases several thousand dollar [7]. The global cosmetic surgery market size is currently valued around \$70 billion, and is projected to reach around \$200 billion by 2030 (Allied Market Research: <https://www.alliedmarketresearch.com/cosmetic-surgery-market-A16492>). The increase in men's cosmetic surgery is therefore already factored in by the current market predictions.

It is crucial to acknowledge that cosmetic surgery is not without risks, and complications can arise from anesthesia, infection, or unsatisfactory results, potentially impacting an individual's overall health [6]. Moreover, it is essential to consider the psychological factors behind the desire for cosmetic procedures. Body Dysmorphic Disorder (BDD), as

defined by the DSM-5, is a mental health condition characterized by a persistent and excessive preoccupation with perceived flaws in appearance, leading to significant distress and impairment in daily functioning [27].

BDD affects approximately 1.9% of the general population, with a similar prevalence in both men and women. The prevalence of BDD is clearly higher in cosmetic surgery settings with 13–20% and, importantly, higher prevalences for men compared to women [28]. There is a fine line between seeking cosmetic surgery for personal enhancement and suffering from BDD. While all individuals may undergo cosmetic procedures to address specific concerns or boost self-esteem, irrespective of BDD status, those with BDD often find that surgery does not alleviate their distress [29], as the surgery does not target their biased perceptual body image [30]. Further symptoms of BDD include excessive grooming, social withdrawal, constant comparison to others, and frequent attempts to change the perceived flaw through various means, including cosmetic surgery [31].

In the present study, we aimed to explore the prevalence of cosmetic surgery in the male population, identify the most common procedures and the satisfaction with the performed procedures, the potential influence of TMI, and the distinction between cosmetic surgery use with and without BDD. By examining these factors, we hope to provide a better understanding of the evolving dynamics of cosmetic surgery and its intersection with gender norms in contemporary society. Our a priori preregistered hypotheses examining the relationship between conformity with TMI (CMNI-30) and cosmetic surgery are presented below. Relationships between the endorsement with TMI (MRNI-SF) and cosmetic surgery (H4-H6) are presented only in the supplementary Material.

- H1: Higher conformity to TMI (CMNI-30) is associated with a higher likelihood of performing cosmetic surgery (all forms).
- H2: Higher conformity to TMI (CMNI-30) is associated with a higher likelihood of performing penis enlargement procedures (enlargement/lengthening/thickening).
- H3: Higher conformity to TMI (CMNI-30) is associated with a higher likelihood of performing head hair transplantation.

2 Methods

2.1 Study design

Data for the present study were obtained through an anonymous online survey investigating the use of cosmetic surgery among men, which was hosted by Unipark (EFS Release 21.2; Tivian XI GmbH; Cologne, Germany, <https://www.unipark.com>). The link to the survey was distributed via social media platforms, the study's website www.andromind.ch, and paid advertising on Facebook. The paid advertisements were age- and geo-restricted for adult men living in German-speaking parts of Europe. In order to take part in the survey, participants needed to provide informed consent, accept a data privacy agreement, and self-report adequate proficiency in the German language. The survey lasted about 30 min and consisted of multiple questionnaires assessing men's experience with plastic surgery, mental and physical health variables, endorsement of and conformity to TMI, as well as sociodemographic information. Recruitment for the present sample started on October 28, 2022, and ended on March 4, 2023. This study was preregistered on OSF [<https://doi.org/https://doi.org/10.17605/OSF.IO/FB6D3>] and was performed in accordance with the open-science guidelines "Guidelines for Transparency and Openness Promotion (TOP) in Journal Policies and Practices [<https://osf.io/ud578>]". The study was approved by the ethical review board of the Ethics Committee of the Philosophical Faculty of the University of Zurich (EK-number: #22.10.15).

2.2 Sample

Out of an initial 6413 individuals who visited the survey's website, 364 continued past the welcoming page and 327 gave informed consent, accepted the privacy agreement, and indicated proficiency in German. Out of these 327 individuals, 247 completed the basic questionnaires relevant for the present study. Five individuals were excluded because they reported their biological sex as female, and one individual was excluded because this person reported being unsure of their gender identity. This resulted in a primary sample of $N = 241$ adult cisgender men. Because some analyses required participants to have filled out additional questionnaires, a secondary, slightly smaller sample consisted of $n = 190$ adult cisgender men. As this study was a voluntary, anonymous online survey, participants could discontinue the survey at

any time. As a result, some participants ($n = 51$) ended the survey before completing the measure for TMI, meaning that no analysis of the relationship between TMI and cosmetic surgery could be carried out for these men.

2.3 Instruments

2.3.1 Sociodemographic information

Participants were asked about their birth-assigned sex, gender identity, age (in years), weight and height, nationality, ethnicity, race, marital status, relationship status, self-identified sexual orientation, highest completed educational attainment, yearly household income (in CHF), and subjective social status (once in relation to their environment and once in relation to their country). Additionally, participants were asked about their general physical health, whether they are psychologically burdened, diagnosed with a psychiatric disorder, using psychotherapy, and whether they are using any form of psychiatric medication. Lastly, participants were also asked questions regarding the self-image of their body to assess whether they potentially fulfill the criteria for BDD according to the DSM-5. The sociodemographic information obtained is described in more detail in the supplementary (Appendices 1, 2, and 3).

2.3.2 Cosmetic surgery

Participants were also asked whether they underwent cosmetic surgery in the past and, if so, how many, and what type (e.g., head-hair transplant, liposuction, etc.). Participants were then asked if they were content with the results of the surgery and if they felt more comfortable, more beautiful, more self-confident, and more manly since the surgery. Additional questions asked about the reasons for undergoing cosmetic surgery (e.g., to remove blemishes, to increase self-esteem, to feel more manly, etc.), how much time has passed since their last surgery, whether they are considering another cosmetic surgery, and whether they feel ashamed of their decision to undergo cosmetic surgery. Lastly, participants were asked how much money they have paid for cosmetic surgeries so far.

2.3.3 Conformity to Masculine Norms Inventory-30

The Conformity to Masculine Norms Inventory-30 (CMNI-30, [32]) consists of 30 items and assesses conformity to TMI on ten dimensions. For each item, participants have to indicate their degree of agreement with a statement about conforming to TMI (e.g., "It bothers me when I have to ask for help") on a six-point Likert scale (0 = *strongly disagree*; 5 = *strongly agree*). For the German-language version used in the present study, internal consistencies between $\omega = 0.63$ and $\omega = 0.94$ have been reported and the use of a total score was supported for heterosexually identified cisgender men [33]. The present study therefore used the total score of the CMNI-30, with higher values indicating stronger conformity to TMI. In the present sample, an internal consistency $\alpha = 0.87$ and $\omega = 0.90$ was found.

2.3.4 Male role norms inventory–short form

The male role norms inventory–short form (MRNI-SF, [34]) consists of 21 items and assesses endorsement of TMI on six dimensions. For each item, participants indicate how strongly they agree with a statement about endorsing TMI (e.g., "When going gets tough, men should get tough"). Answers are given on a seven-point Likert scale (1 = *strongly disagree*; 7 = *strongly agree*). The German-language version used in the present study has been found to possess internal consistencies between $\alpha = 0.73$ and $\alpha = 0.89$ [35]. The present study used a total score of the MNRI-SF, with higher values indicating stronger endorsement of TMI. In the present sample, an internal consistency of $\alpha = 0.93$ and $\omega = 0.95$ was found.

2.4 Statistical analysis

The statistical analysis consisted of three parts, as described below. In a first part, the sample composition was analyzed by calculating summary statistics for all sociodemographic variables, stratified by whether or not men had conducted any type of cosmetic surgery. These groups were compared by using two-samples *t*-tests for continuous and Chi-square tests for categorical variables. In a second part, the subsample of men who underwent cosmetic surgery was further analyzed in relation to the questions pertaining to their experience with cosmetic surgery. However, these analyses were purely descriptive because of the small subsample sizes. In a third part, binomial logistic regression analyses were used

to estimate the association between TMI and the odds of undergoing cosmetic surgery, controlled for the covariates age, education, and income.

For all analyses, an initial α -level of 0.05 was used to test statistical significance, subsequently applying a step-down Holm correction for multiple testing [36]. All analyses were conducted with the statistical software *R* (version 4.2.2; [37]) and the additional packages *psych* ([38]; estimating psychometric properties and implementation of the Holm correction), *rcompanion* ([39]; estimating effect sizes) *car* ([40]; assessment of regression models), and *ggplot2* ([41]; data visualizations).

3 Results

3.1 Sample composition

As shown in Table 1, the sample's mean age was 45.1 years ($SD = 16.7$) and ranged from 18 to 80 years. The majority of men were from Germany and Switzerland, and almost all men were of European race and ethnicity. The majority of men reported to be in an exclusive relationship, identified as heterosexual or gay, and finished a secondary or tertiary education. Additionally, the majority reported a yearly household income over 75,000 CHF and a subjective social status above both the average of their social environment and their country. Regarding physical and mental health, the majority estimated their general health to be good or above, while about one-sixth experienced a psychological burden, and one-tenth each self-reported a psychiatric diagnosis, current psychotherapeutic treatment, and use of psychiatric medication. Lastly, three men (1.2%) were suspected to match the criteria of a BDD-diagnosis according to the DSM-5.

Out of the total 241 men, 47 (19.5%) have undergone cosmetic surgery. Those who underwent cosmetic surgery were on average older, more often married or in a registered partnership, more often gay, and disproportionately often in the highest income category. Notably, group differences regarding sexual orientation and income did not persist when controlling for multiple testing. Nonetheless, because sexual orientation is related to TMI (e.g., non-heterosexual oriented individuals have lower scores on the heterosexual self-presentation dimension and thus overall lower TMI levels) [42], a sensitivity analysis was conducted that additionally controlled for sexual orientation in the analyses (Tables S3–S6).

3.2 Experiences with cosmetic surgery

As presented in Fig. 1, the majority of men who underwent cosmetic surgery did either wrinkle treatment, eyelid correction, or head-hair transplant, followed by liposuction and nose correction. No cosmetic surgeries on glutes, thighs, sixpack, penis lengthening, or penis glans enlargements were reported. The most frequently mentioned reason for a cosmetic surgery was to feel better, followed by wanting to look better, feel more comfortable, remove blemishes, and to be more attractive (Fig. 2). Wanting to satisfy a partner was never mentioned as a reason for cosmetic surgery. Most men's experience after the surgery left them feeling more comfortable, more beautiful, and more self-confident (Fig. 3). Only a minority reported to feel more manly after their surgery, with the majority reporting to feel as manly as before the surgery. Overall, almost all men reported comparable or improved sentiments after their surgery.

As summarized in Table 2, half of the men underwent only one cosmetic surgery, and very few underwent four or more. Similarly, most men reported their last surgery to have been more than two years ago, with only seven men reporting their last surgery as having been more recent than three months ago. Almost all men would consider getting another surgery, and the majority reported positive feedback from their environment regarding the results of their surgery. Most men did not know whether they experienced shame because of their surgery, and few more reported yes (19.1%) compared to no (8.5%). The amount of money spent in CHF for cosmetic surgeries ranged from 500 to 35,000, with a median of 8000 and a mean of 9572 ($SD = 7945$).

3.3 TMI and cosmetic surgery

To test hypothesis 1, stepwise binomial logistic regression models were used to estimate the association between conformity to TMI and the odds of having undergone cosmetic surgery when controlling for the covariates age, education, and income (Table 3). Notably, these analyses were conducted with a smaller sample consisting of only $n = 190$ men (of which $n = 35$ underwent cosmetic surgery). Men who conform more strongly to TMI showed higher odds of having undergone cosmetic surgery. Regarding the effect size, an increase of one standard-deviation in the CMNI-30 (i.e., 7.8

Table 1 Descriptive statistics for the sample

Variable	Total (N=241)	Cosmetic surgery		t / χ^2 (df)	Effect (d / V)	p-value	p (adj.)
		No (n=194)	Yes (n=47)				
Age, mean (SD)	45.1 (16.7)	44.1 (17.4)	49.7 (12.7)	-2.52 (93)	0.34	0.014*	0.041*
BMI, mean (SD)	26.2 (4.3)	26.4 (4.4)	25.6 (3.5)	1.12 (239)	-0.18	0.266	0.266
Nationality, n (%)				0.60 ^{sim}	0.05	0.908	1
Swiss	91 (37.8)	72 (37.1)	19 (40.4)				
German	117 (48.5)	96 (49.5)	21 (44.7)				
Austrian	21 (8.7)	16 (8.2)	5 (10.6)				
Other	12 (5.0)	10 (5.2)	2 (4.3)				
Race, n (%)				0.16 ^{sim}	0.03	1	1
European	233 (96.7)	188 (96.9)	45 (95.7)				
Non-European	8 (3.3)	6 (3.1)	2 (4.3)				
Ethnicity, n (%)				1.75 ^{sim}	0.09	0.353	1
European	234 (97.1)	187 (96.4)	47 (100.0)				
Non-European	7 (2.9)	7 (3.6)	0 (0.0)				
Marital status, n (%)				20.93 ^{sim}	0.29	0.011**	0.015*
Unmarried (single)	74 (30.7)	63 (32.5)	11 (23.4)				
Unmarried (in a relationship)	75 (31.1)	64 (33.0)	11 (23.4)				
Married	66 (27.4)	52 (26.8)	14 (29.8)				
Registered partnership	10 (4.1)	3 (1.5)	7 (14.9)				
Divorced	12 (5.0)	10 (5.2)	2 (4.3)				
Widowed	4 (1.7)	2 (1.0)	2 (4.3)				
Relationship status, n (%)				0.98 ^{sim}	0.06	0.651	1
Yes (exclusive)	151 (62.7)	119 (61.3)	32 (68.1)				
Yes (non-exclusive)	14 (5.8)	11 (5.7)	3 (6.4)				
No	76 (31.5)	64 (33.0)	12 (25.5)				
Sexual orientation, n (%)				14.09 ^{sim}	0.24	0.007**	0.067
Heterosexual	111 (46.1)	98 (50.5)	13 (27.7)				
Gay	92 (38.2)	63 (32.5)	29 (61.7)				
Bisexual	35 (14.5)	30 (15.5)	5 (10.6)				
Asexual	1 (0.4)	1 (0.5)	0 (0.0)				
Other	2 (0.8)	2 (1.0)	0 (0.0)				
Education, n (%)				2.16 ^{sim}	0.09	0.322	1
None completed	0 (0.0)	0 (0.0)	0 (0.0)				
Secondary education	128 (53.1)	104 (53.6)	24 (51.1)				
Tertiary education	98 (40.7)	76 (39.2)	22 (46.8)				
Other	15 (6.2)	14 (7.2)	1 (2.1)				
Yearly income (CHF), n (%)				8.80 (2)	0.19	0.012*	0.098
< 25,000	64 (26.6)	59 (30.4)	5 (10.6)				
25,000–75,000	71 (29.5)	57 (29.4)	14 (29.8)				
> 75,000	106 (44.0)	78 (40.2)	28 (59.6)				
Social status (environment), n (%)				0.28 (1)	0.05	0.597	1
< Average	34 (14.1)	29 (14.9)	5 (10.6)				
> Average	207 (85.9)	165 (85.1)	42 (89.4)				
Social status (country), n (%)				0.12 (1)	0.04	0.726	1
< Average	48 (19.9)	40 (20.6)	8 (17.0)				
> Average	193 (80.1)	154 (79.4)	39 (83.0)				
General health, n (%)				6.12 ^{sim}	0.16	0.054	0.109
< Good	23 (9.5)	21 (10.8)	2 (4.3)				
Good	121 (50.2)	102 (52.6)	19 (40.4)				

Table 1 (continued)

Variable	Total (N=241)	Cosmetic surgery		t / χ^2 (df)	Effect (d / V)	p-value	p (adj.)
		No (n=194)	Yes (n=47)				
> Good	97 (40.2)	71 (36.6)	26 (55.3)				
Mental health, n (%)							
Psychological burden, n (%)	43 (17.8)	37 (19.1)	6 (12.8)	0.64 (1)	0.07	0.423	1
Psychiatric diagnosis, n (%)	28 (11.6)	22 (11.3)	6 (12.8)	0.00 (1)	0.02	0.984	1
Psychotherapy use, n (%)	27 (11.2)	20 (10.3)	7 (14.9)	0.40 (1)	0.06	0.525	1
Psychiatric medication, n (%)	24 (10.0)	21 (10.8)	3 (6.4)	0.83 ^{sim}	0.06	0.421	1
Body dysmorphia, n (%)	3 (1.2)	1 (0.5)	2 (4.3)	4.30 ^{sim}	0.13	0.090	0.452

p-values were adjusted for multiple testing using the Holm-method while bootstrapped 95% confidence intervals (95% CI) are unadjusted SD= standard deviation; n= number of participants; t= t-statistic; χ^2 = Chi-squared-statistic; df= degrees of freedom; d= Cohen's d; V= Cramer's V; 95%-CI= bootstrapped 95% confidence interval for the respective effect; CHF = Swiss Francs

^{sim} = test statistic obtained using Monte-Carlo simulation

*p < 0.05, **p < 0.01

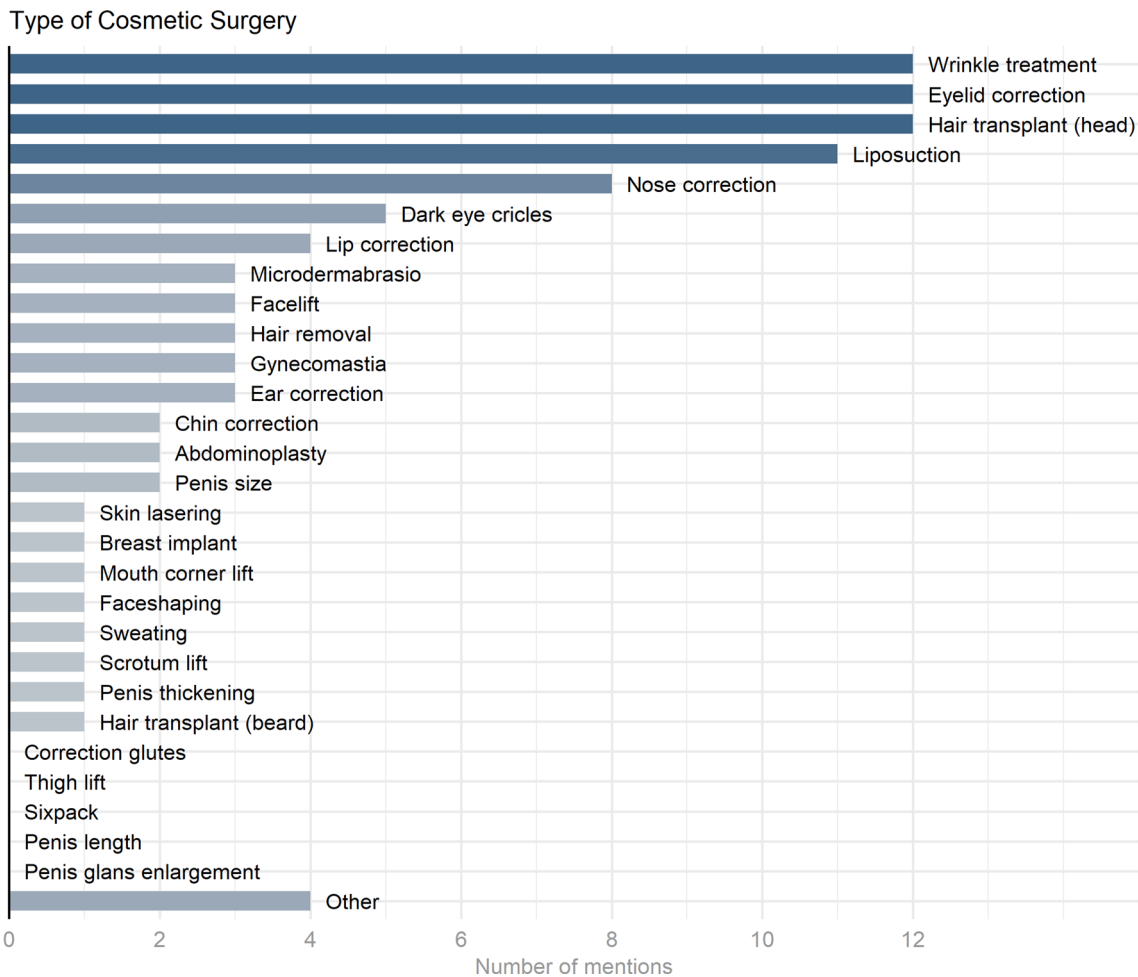


Fig. 1 Frequencies of men's cosmetic surgeries by type

Reason for Cosmetic Surgery

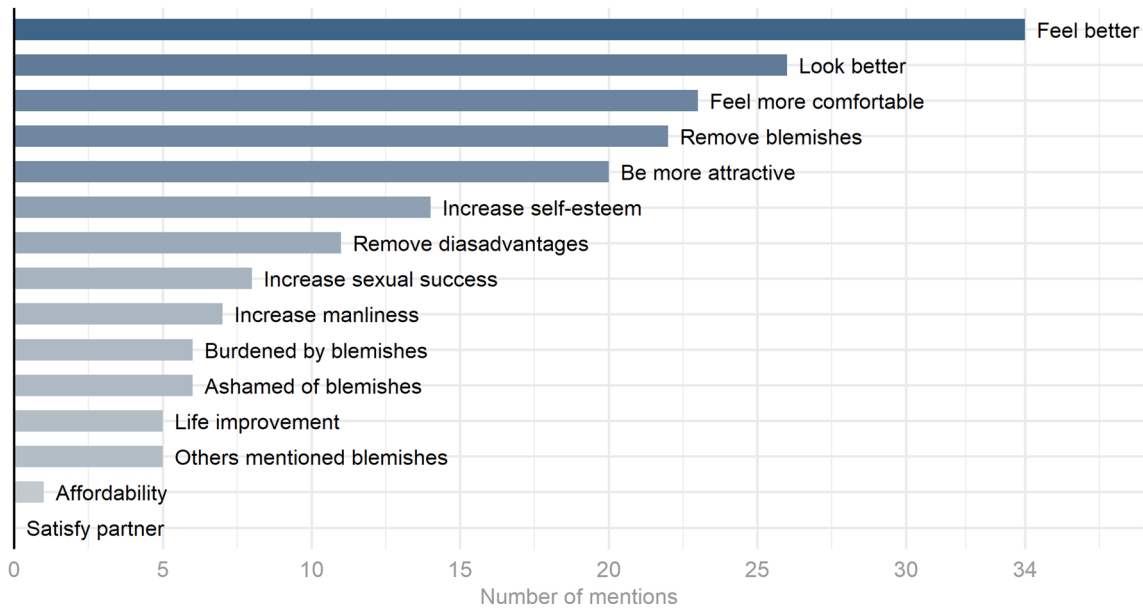


Fig. 2 Frequencies of men's reasons for cosmetic surgery

Fig. 3 Experienced changes after cosmetic surgery

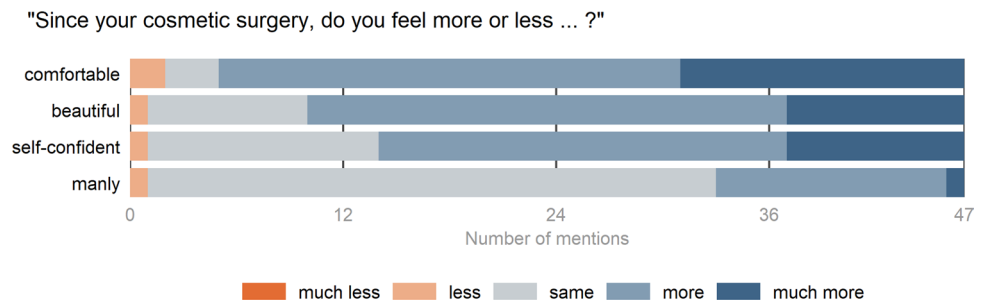


Table 2 Further questions about men's cosmetic surgeries

A) How many cosmetic surgeries have you undergone?	1	2	3	4	> 4	
n (%)	20 (42.5)	13 (27.7)	8 (17.0)	3 (6.3)	3 (6.3)	
B) How recent was your last cosmetic surgery?	< 3 months	< 6 months	< 1 year	< 2 years	< 5 years	> 5 years
n (%)	7 (14.9)	3 (6.4)	6 (12.8)	6 (12.8)	9 (19.1)	16 (34.0)
C) Would you consider getting cosmetic surgery again?	Definitely not	Probably not	Unsure	Probably	Definitely	
n (%)	–	5 (10.6)	2 (4.3)	19 (40.4)	21 (44.7)	
D) What was the reaction of your environment to the results of the cosmetic surgery?	Negative	Mostly negative	Mixed	Mostly positive	Positive	Did not tell
n (%)	–	–	12 (25.5)	8 (17.0)	17 (36.2)	10 (21.3)
E) Was your decision to get cosmetic surgery associated with shame?	No	Don't know	Yes			
n (%)	4 (8.5)	34 (72.3)	9 (19.1)			
F) How much money have you spent on cosmetic surgery so far?	Min	Max	Median	Mean	SD	
CHF	500	35,000	8000	9572.3	7945.5	

n = number of mentions, CHF = Swiss Francs, min = minimum value, max = maximum value, SD = standard deviation

Table 3 Association between conformity to TMI and cosmetic surgery

Predictor	Model 1			Model 2		
	OR	95% CI	<i>p</i> (adj.)	OR	95% CI	<i>p</i> (adj.)
Intercept	0.20	[0.13, 0.29]	< 0.001 ***	0.14	[0.08, 0.25]	< 0.001 ***
CMNI-30 ¹	2.03	[1.39, 2.96]	< 0.001 ***	2.29	[1.51, 3.49]	< 0.001 ***
Covariates						
Age ¹				2.04	[1.28, 3.25]	0.008 **
Tertiary education				1.44	[0.64, 3.23]	0.373
Income ¹ (CHF)				1.47	[1.03, 2.10]	0.066
Fit and performance						
χ^2 (df)	14.59 (1)			14.04 (3)		
ΔR^2 (in %)	12.0 ***			10.7 **		
AIC (BIC)	170.9 (177.4)			162.9 (179.1)		

p-values were adjusted for multiple testing using the Holm-method while 95% Wald confidence intervals (95% CI) are unadjusted. OR=odds ratio; CI=Wald confidence interval; ΔR^2 =difference in Nagelkerke's pseudo- R^2 ; CMNI-30=Conformity to Masculine Norms Inventory—30; CHF = Swiss Francs

¹Variable was z-standardized

p* < 0.05; *p* < 0.01; ****p* < 0.001

points) was found to increase the odds of having undergone cosmetic surgery by a factor of 2.29, conditional on all covariates being at reference level (i.e., men with an average age of 43.8 years, no tertiary education, and an average yearly household income of about 86,900 CHF). Back-transforming this effect yields an increase by a factor of 1.04 in the odds of having undergone cosmetic surgery per one-point increase in the CMNI-30.

It was not possible to test hypothesis 2, since only three men indicated having undergone penis enlargement procedures. Such a small number of men with penis enlargement procedures did not allow for any meaningful statistical analysis regarding the association between penis enlargement procedures and conformity to TMI.

To test hypothesis 3, the same model was estimated as for hypothesis 1 for the odds of having undergone a head-hair transplant surgery (Table 4). Again, men who conform more strongly to TMI had higher odds of having undergone a head-hair transplant surgery. Regarding the effect size, an increase of 7.8 points in the CMNI-30 was found to increase the odds for head-hair transplant by a factor of 3.84, conditional on all covariates being at reference level. Back transformation yielded a multiplicative effect of 1.07 per one-point increase in the CMNI-30 for having undergone head-hair transplant surgery. Comparable results were found for the association between men's endorsement of TMI (MRNI-SF)

Table 4 Association between conformity to TMI and head-hair transplant

Predictor	Model 1			Model 2		
	OR	95% CI	<i>p</i> (adj.)	OR	95% CI	<i>p</i> (adj.)
Intercept	0.03	[0.01, 0.08]	< 0.001 ***	0.01	[0.01, 0.06]	< 0.001 ***
CMNI-30	3.49	[1.91, 6.37]	< 0.001 ***	3.84	[1.96, 7.52]	< 0.001 ***
Covariates						
Age ¹				1.50	[0.68, 3.30]	0.465
Tertiary education				2.85	[0.67, 12.08]	0.465
Income ¹ (CHF)				1.45	[0.79, 2.64]	0.465
Fit and performance						
χ^2 (df)	19.45 (1)			4.27 (3)		
ΔR^2 (in %)	27.2 ***			5.6		
AIC (BIC)	68.6 (75.1)			70.3 (86.6)		

p-values were adjusted for multiple testing using the Holm-method while 95% Wald confidence intervals (95% CI) are unadjusted. OR=odds ratio; CI=Wald confidence interval; ΔR^2 =difference in Nagelkerke's pseudo- R^2 ; CMNI-30=Conformity to Masculine Norms Inventory—30; CHF = Swiss Francs

¹Variable was z-standardized

p* < 0.05; *p* < 0.01; ****p* < 0.001

and cosmetic surgery, which can be found in the supplementary materials (Table S1, Table S2). Finally, our sensitivity analyses showed conformity to and endorsement of TMI remained significant explanatory variables for cosmetic surgery even when accounted for men's sexual orientation (Table S3–S6). Notably, self-reported non-heterosexual orientation was associated with a higher likelihood of cosmetic surgery but not with head hair transplant.

4 Discussion

4.1 Summary of results

The aim of this cross-sectional anonymous online survey was to assess men's use, motives and thoughts regarding cosmetic surgery. Furthermore, this study is the first to examine cosmetic surgery use in men in the context of TMI. The most common types of cosmetic surgeries reported were wrinkle treatment, eyelid correction, and head-hair transplant. Penis enlargement procedures were reported by three (6.4%) of the 47 men that underwent cosmetic surgery procedures. The main reasons for undergoing surgery were to feel better (72.3%) and look better (55.3%), while to increase sexual success (17.0%) and to increase manliness (14.9%) were also reported. Logistic regression models showed that higher conformity to TMI was associated with higher odds of having undergone cosmetic surgery. Specifically, an increase of one standard-deviation in the CMNI-SF increased the odds of having undergone cosmetic surgery by a factor of 2.29, and the odds of having undergone head-hair transplant surgery by a factor of 3.84.

4.2 Integration of findings

A clear association between the use of cosmetic surgery and conformity to TMI was observed. Given the rapidly increasing number of cosmetic surgeries performed on men, it is important to understand their underlying motivations and reasons for seeking cosmetic surgery. In the present study, 19.5% participants reported having undergone cosmetic surgery. In 2021, the Association of German Aesthetic Plastic Surgery recorded a total of 93853 cosmetic surgeries with 13.2% (12389) of all surgeries being performed in men (VDÄPC—Behandlungsstatistik, 2022). Although in Germany the number of performed cosmetic surgeries has increased by approximately 15% compared to the year 2020, it is still a relatively small percentage of the adult male population that uses cosmetic surgery. For Germany—based on the adult male population of around 33 million and the annually performed cosmetic surgeries in men—a lifetime prevalence of cosmetic surgery use of 3–5% can be estimated. It is important to note here, that not all men perform their cosmetic surgeries in Germany and thereby are not recorded by the VDÄPC and that some men perform two or more cosmetic surgeries within one year and thus only approximations of the lifetime cosmetic surgery prevalence can be performed.

Much higher lifetime prevalence rates for men's cosmetic surgery use stem from an Iranian survey suggesting 16.5% of men having ever undergone a cosmetic surgery [43]. However, such high prevalence rates need to be interpreted with caution and might indicate a selection bias for participants with an increased interest for cosmetic surgery. Indeed, this lifetime prevalence of 16.5% would be very similar to our percentage of 19.5% of all men in the study having undergone a cosmetic surgery at least once in their life, although our study explicitly recruited men with an interest in the topic of cosmetic surgery. Therefore, we conclude that the actual prevalence of cosmetic surgery use in men in Germany, Switzerland, and Austria, but also in other industrialized western countries must be much lower and that the estimate of 3–5% based on the annual surgery statistics might be accurate.

The top five procedures in men recorded by the Association of German Aesthetic Plastic Surgery were upper eyelid lift, botulinum treatment, liposuction, hyaluron treatment and tummy tuck. In our study, we found some degree of overlap in that wrinkle treatment, eyelid correction, head-hair transplant, liposuction and nose correction were the five most reported surgeries (Fig. 1). Since both, botulinum and hyaluron treatment are used for wrinkle treatment, it confirms that younger appearance seems to be desirable for many men who opt for cosmetic surgery. Regarding experienced changes after the cosmetic surgery, almost exclusively all men report to feel more or much more comfortable, while also the majority reports to feel more or much more beautiful and also self-confident (Fig. 3). Also, about a third of men report to feel more manly after the cosmetic surgery. Thus, the men in the present study reported to feel better after a performed cosmetic surgery, which is in line with previous research [44].

Regarding hypothesis 1, we were able to show that higher conformity to TMI was associated with a higher likelihood of having performed cosmetic surgery (all forms). This suggests that conformity to TMI such as success, competition, power, dominance, status, or playboy may lead men to undergo cosmetic surgery to meet societal expectations

and increase their perceived attractiveness and fitness [17, 20]. Men seem to want to appear younger, more dynamic, physically strong and more successful through cosmetic surgery. Since only four men in the sample underwent penis enlargement procedures, no sound conclusion can be made regarding the second hypothesis. Whether the hypothesized association between conformity to TMI and cosmetic surgery in the genital area is confirmed needs to be investigated in future studies. Nevertheless, the findings further support hypothesis three stressing that full hair fits the social image of a successful and dominant man or a playboy and therefore men opting for a head hair transplant also often intend to increase their perceived attractiveness and fitness.

The discrepancy between one's own appearance and the societal and internalized ideal image of a man, as well as the stress caused by the perceived discrepancy, could explain why the self-reported main reasons for cosmetic surgery were to feel better ($n = 34$ [72.3%]), to look better ($n = 26$ [55.3%]), and to feel more comfortable ($n = 23$ [48.9%]) (Fig. 2). In total, 7 (14.9%) of the 47 men reported that they opted for cosmetic surgery to feel more masculine. This percentage is rather low compared to other motives, probably because TMI and the ideas of an ideal man attached to it have a rather subliminal influence and men may not be aware of it directly before deciding to undergo cosmetic surgery. This interpretation is supported by the discrepancy of motive versus effect, with an almost doubled percentage of men ($n = 13$; 27.7%) who reported to feel more masculine as a *result* of the surgery.

Importantly, many earlier studies have linked cosmetic surgery to BDD, especially in male cosmetic surgery samples [28]. However, in the present study, only 1.2% met the DSM-5 criteria for BDD reflecting no increased point prevalence in this adult male group as compared to the general population [45], adolescents [46] or female college students [47]. This further underscores the importance of motives related to internal belief systems such as TMI for cosmetic surgery use. Still, a screening for BDD in men seeking cosmetic surgery might be as important as in women, given the higher risk for adverse effects of cosmetic surgery in individuals with BDD [29]. Of further interest is that in the study by Möllmann et al. [46] identified regions of concern for male youth were predominantly related to the breasts/pectorals (20.5%) and having insufficient muscles (17.9%), while in adult males the body parts rated as especially unattractive were head hair (10.3%), nose (5.3%), ears (4.7%), skin (3.7%) and stomach (3.5%) [45]. Corroborating these findings and showing that many men also decide to use cosmetic surgery to correct blemishes, in the present study, head hair ($n = 12$ [4.8%]), wrinkle treatment ($n = 12$ [4.8%]), eyelid correction ($n = 12$ [4.8%]), liposuction ($n = 11$ [4.4%]) and nose correction ($n = 8$ [3.2%]) were the most performed surgeries. Also, men did rarely perform surgeries in the regions with which male youth was primarily preoccupied (gynecomastia: $n = 3$ [1.2%], breast implant: $n = 1$ [0.4%]). On the one hand, interventions related to these regions tend to be more invasive in nature than others. On the other hand, it can be assumed that men have the aspiration to achieve satisfactory musculature through training and effort—in general and in men suffering from BDD of the muscle dysmorphia form. Such an attitude would in turn reflect conformity with TMI dimensions such as success, power, competition, and self-reliance.

However, Drüge et al. [48] report for a male-only sample of Swiss military recruits, which are known to rely more heavily on TMI [49, 50], that the areas of most preoccupation were muscles with 42% and genitals with 33% highlighting the relevance of these areas for TMI and masculinity. The TMI dimensions of strength and power might be reflected by a muscular body, while the TMI dimension of playboy or power over women might be reflected by a large penis. Thus, corroborating and extending the findings by Drüge et al. [48], many men in the present study did perform cosmetic surgeries in areas that are generally associated with TMI dimensions and masculinity in general. In addition to head hair, musculature, and genitals, two men for example also underwent chin correction procedures, which is also associated with dominance and strength, as a broad and pronounced chin is commonly considered masculine and associated with physical strength and assertiveness [51, 52].

In addition, group comparisons between men who have had cosmetic surgery and those who have not showed that men who have had cosmetic surgery are significantly older and are significantly less often single and more often in committed relationships. As possible explanations for these findings, it is conceivable that men who have had cosmetic surgery tend to be older, because they are more likely to have the financial resources and stability required for elective procedures. Furthermore, as these men age, they may feel the pressure to maintain a youthful appearance in order to remain competitive in both personal and professional settings and conform to still upholding TMI of power, success and competitiveness [53–55]. This is also supported by the finding that the most reported cosmetic surgeries may serve as cosmetic rejuvenation procedures such as wrinkle treatment, eyelid correction, and head-hair transplant. Additionally, being in a committed partnership could provide emotional support and encouragement to undergo cosmetic surgery, as partners may discuss and mutually agree upon the decision. Men in committed relationships might thus undergo cosmetic surgery to enhance their self-esteem and maintain their attractiveness within the partnership, which corresponds to the TMI dimension of importance of sex and maintaining sex and vitality [54, 56].

To a lesser extent, so that the significance levels do not survive correction for multiple testing, the analysis revealed that men, who have had cosmetic surgery are more likely to be gay or bisexual than heterosexual and that men who have had cosmetic surgery have significantly higher incomes. As higher incomes enable a more costly lifestyle, men with higher incomes naturally have more resources to perform cosmetic surgeries, what is in line with the argumentation, that older men are also more likely to have more financial resources to perform cosmetic surgery. However, men who identify as gay or bisexual may be more likely to undergo cosmetic surgery due to the heightened emphasis on physical appearance and attractiveness within some LGBTQ+ social circles [57, 58] and higher perceived discrepancy between the actual and ideal body compared to heterosexual men [59]. The desire to fit in and be perceived as attractive within these communities could lead to a higher likelihood of pursuing cosmetic procedures [60] as has previously been shown for gay men [61]. Additionally, LGBTQ+ individuals may face unique pressures to conform to certain beauty standards, which can encourage them to seek surgical enhancements [62]. Furthermore, the LGBTQ+ community has historically been more open to self-expression and body modification [63–66], making cosmetic surgery a more socially accepted choice within these groups. In our sensitivity analysis controlling for sexual orientation, we did indeed find that self-reported non-heterosexual orientation was associated with higher odds of having undergone cosmetic surgery, which is consistent with the aforementioned findings. However, the absence of a significant association between non-heterosexual orientation and head hair transplant is most likely attributable to the small sample size of men having undergone a head hair transplant surgery ($n = 12$), which is also reflected in the large confidence intervals for the estimated effects.

Historically, there has been much investigation of the effects of body satisfaction in female samples, but not as much in male samples. Previous work examining body satisfaction in mixed-sex individuals has found that body satisfaction is more related to appearance for women (particularly heterosexual women), whereas men focus more on body function to determine their levels of body satisfaction [67]. However, the current study calls this finding into question, as it seems that appearance was a major motivating factor for men's engagement in cosmetic surgery. It is interesting that men seem to be motivated to engage in cosmetic surgery in order to a TMI-conform appearance, which implies a certain degree of approval-seeking. However, need for approval or dependency is generally regarded as a component of a traditional feminine ideology [68]. In fact, the need for approval has been linked to disordered eating in both men and women [69], another behavior that focuses on acceptance through appearance, similar to cosmetic surgery. The current study suggests that the need for approval may be less gendered than previously thought and that this approval can be achieved by conforming to TMI with one's own masculine appearance and using cosmetic surgery to achieve this.

The investigation of the connection between traditional femininity and cosmetic surgery is also of interest. Women may have even stronger traditional femininity ideologies surrounding youth and beauty and a strong need for acceptance through appearance [70–73], which may lead disproportionately more women to seek cosmetic surgery than men [4, 8]. Therefore, future research on the connection between traditional ideologies and cosmetic surgery should examine both men and women in parallel shedding light on gender similarities and differences.

4.3 Limitations

When interpreting the results, some limitations must be considered. Most importantly, the cross-sectional nature of the study does not allow for any causal inferences. The men were not surveyed before and after a cosmetic surgery and so we must rely on retrospective assessments. A longitudinal study with time points before and after a cosmetic surgery to measure potential changes in TMI and other variables would be of much interest for the field. Also, most participants were from Germany and Switzerland, and almost all men were of European race and ethnicity. For this reason, the sample is only representative of the general male adult population to a limited extent, despite the large age range (18–80). It needs to be emphasized that the composition of the sample with almost all men self-identifying as European race and ethnicity, might reflect only a specific cultural group of men as there is data from South Korea showing that cosmetic surgery among men is much more prevalent [74]. Ideally, future studies might conduct surveys in different cultural regions across the globe, to better understand cultural differences in men's cosmetic surgery use. Relatedly, around 50% of men self-identified as non-heterosexual, which is comparably higher as in the general male population. Another limitation of the study is that a portion of men ($n = 51$) did not complete the CMNI-30 reducing the sample size from 241 to 190 participants for analysis of the association between TMI and cosmetic surgery. Furthermore, the listed prevalence of cosmetic surgery should be considered in the context of the study. Based on the statistics released by the Association of German Aesthetic Plastic Surgery, it is not realistic that Penis enlargements represent 6.4% of cosmetic surgeries performed on men. It was explicitly stated that the study was about cosmetic surgery, so it is most likely that a selection

bias towards men with an existing interest in the subject of cosmetic surgery participated in the study. Future studies should aim for longitudinal study designs with more diverse samples.

4.4 Conclusion

In cisgender men, undergoing cosmetic surgery is clearly associated with conformity to TMI. Many men strive towards achieving success, establishing dominance, and nurturing competitiveness. This aspiration can foster the belief that projecting an appropriate appearance can enhance these desired achievements. Such an idealized appearance consists of full head hair, a young-looking face without blemishes, prominent facial features, a lean muscular body and a large penis. Cosmetic surgery offers many possibilities to achieve such an appearance. Since women have already been extensively targeted in recent decades through advertising and social expectations, it is now apparent that providers are increasingly trying to recruit men for cosmetic surgeries by framing cosmetic surgery as necessary to obtain the appearance that enables one to be successful, dominant, and competitive. Outreach efforts to make men aware of increased targeting for cosmetic surgery advertising, on the one hand, but also of the link between conformity to TMI and cosmetic surgery use, on the other, would therefore be important. In this way, men are empowered to decide for themselves whether it is their own personal desire to undergo cosmetic surgery or whether it is clever advertising strategies highlighting idealized traditional masculine body images that trigger this feeling in them.

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Data availability Research data supporting the results of this manuscript is publicly available on OSF: <https://osf.io/eqs4t/>.

Declarations

Competing interests The authors declare no competing interests.

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